CAUSES OF SEASONAL FOOD INSECURITY IN OROMIYA ZONE OF AMHARA REGION: FARMERS' VIEW[1]

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1. Introduction

Ethiopia is currently facing challenging problems, ranging from those induced by environmental crises to those caused by demographic and socio-economic constraints which adversely affect peoples` production system. The country is generally characterized by extreme poverty, continued and high population growth rate, severe environmental degradation and recurrent drought (Getachew 1995; Markos,1997, NOVIB, 1999). Resulting from these, the performance of agriculture, the sector that makes livelihood for 85% of the country's population, has been poor over the last few decades, to the extent that the country could not adequately feed its population from domestic production. This has been manifested in the prevailing chronic and transitory food insecurity which have almost become structural phenomena and the way of life for a significant proportion of the population of the country.

The main indicators for the magnitude of the problem of food insecurity at national level include: i) sharp decline in per capita food available for consumption, in response to the rapid population growth on one hand, and the stagnant or very slow growth in agricultural production, on the other (Getachew, 1995); ii) the considerable increase of the volume of imported food both through purchase and in the form of aid (Tesfaye and Debebe, 1995); iii) the prevalence of energy deficiency among adults; and iv) high rate of children malnutrition as is witnessed by high rates of stunting (64.2%), wasting (8%) and underweight (47.6 %) (CSA, 1992). For at least 50% of farm families, production systems do not satisfy basic needs. Increasing numbers each year become food insecure and most rural households face a hungry season every year. The season of food short supply, in most cases, is just before the harvest when previous year's grain stores are nearly finished and market prices are high. Hence, an identification of the root causes for transitory food insecurity at household level and its in-depth understanding deserve the undertaking of empirical researches at various localities of the country, particularly in areas where food shortage has been pronounced.

2. The Problem and Objective

In Ethiopia, the seriousness of food shortage problem varies from one region to another as well as from one locality to another depending upon the state of the natural resources and the extent of development of these resources. According to various sources, some 42 periods of serious food shortages (including the 1999 and 2000 food shortages) were recorded in Ethiopia (Webb et al, 1992), most of which were concentrated along two

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broad belts, generally described as drought and famine prone areas. One of these is the mixed farming production system area involving the Central and North-eastern highlands of Ethiopia stretching from Northern Shewa through Wello into Tigray. The land resources mainly of soils and vegetation of this part of the country have been highly degraded due to the interaction between various environmental factors (relief and climate) and human factors such as, population pressure and the resultant overcultivation of land, deforestation of vegetation and overgrazing. The second belt is the range-based pastoral economy of lowland Ethiopia ranging from Wello in the north through Hararghe and Bale to Sidamo and Gamo Gofa in the south. Basically, this belt is regarded as resource poor with very limited potential and hence highly vulnerable to drought.

Oromiya Zone makes the transitional zone between those two belts as its territory comprises the escarpments of highlands that rolls into the Rift Valley lowlands. As a result, the environment of the zone exhibits a combination of the underlying constraints characterizing the mixed farming production and the pastoral economy. An assessment of the history of the area as well as frequent visits to this zone have enabled the researcher to recognize that a considerable number of farm households in the zone to be affected by serious seasonal food shortage. The zonal Disaster Prevention and Preparedness Commission (DPPC) office indicated that about one-quarters of the rural population of the zone overcome the food shortage problem by receiving relief food aid. Few farm households that were visited in certain communities of the zone disclosed that although the seriousness varied from one year to another, practically there was no year when they did not face seasonal food shortage. The aim of this investigation was, to explore farmers' view points as to why they face seasonal food shortage to help identify the root causes of transitory food insecurity in the Oromiya Zone of Amhara Region. The outcome of the study would obviously have both basic (academic) and applied (practical) purposes.

3. Literature Review

Much of the Sub-Saharan African population, particularly in rural areas, experiences some degree of hunger over the rainy, or "hungry" season, when food stocks dwindle and roads become muddy and impassable (Bonnard, 1999:3). The study by Fortes (cited in Messer, 1989) among Tallensi reveals grain was short during the planting season and the problem was largely attributed to allocation of resources and poor rationing. In somewhat similar way, Sharman's (1970) observation in Uganda indicates that it is not household supply but the care and skill, with which mothers rationed or distributed food that determined which household's children were seasonally malnourished.

Migration of male labour is also recognized as a cause of seasonal hunger. The study conducted in Lesotho village, found women and children to be suffered from lack of food and poor hygiene, because women were too exhausted to cook and clean at times of peak agricultural work (Huss-Ashmore, 1984). Growing cash crops at the expense of subsistence crops has largely contributed to seasonal food deficit among Gernieri in Gambia (Haswell,1953). He also observed that illness of adults at critical times in the production process adversely affects labour efficiency and productivity, which in turn contributes to seasonal short supply of food. Likewise, a recent study by Ashimgo and

Hella (2000) in Iringa region of Tanzania reveals that the transition to commercial agriculture has had negative influence on food security.

Deterioration in the ecological conditions of production has also been seen as a cause of seasonal hunger in several African nations. Ogbu (1973) noted insufficient farmland, low yields on farms and high storage losses of staples were the principal causes of seasonal food shortage in Nigeria. Nurse's (1975) study finding in central Malawi was contrary to that of study in Lesotho village, because in the former normally men do not work in local subsistence production. The seasonal food shortage here blamed on inadequate storage facilities. Nurse puts the situation ".....wicker granaries allowed a large proportion of the grain to rot during the rainy season and fall prey to rats and mice during dry season".

According to the study of Toulmin (1986), the people of Bambara village of Kala in Mali face seasonal food shortages, which are induced by two principal factors. One of the factors is climatic, specifically lower and highly variable rainfall making the people very vulnerable to crop failure. The second class of risk is demographic in nature consisting of high level of mortality, varying levels of fertility and vulnerability of all producers to sickness and disability (Toulmin, 1986:58).

Land-use competition between pastoralists and farmers has also become the cause for seasonal food shortages in some Sub-Saharan African countries. Regarding this, Longhurst et.al (1986: 68) observe "the pastoralists of central Niger are probably typical of many others in losing land to agriculturists, being increasingly forced to sell off their young cattle and heard cattle owned by non-pastoralists for low wages, and holding herds whose numbers and composition are no longer viable". As a result, they become less and less able to cope with bad years and also more vulnerable to regular stress.

Regarding seasonal food insecurity among poor farmers in Asia, Hartman and Boyce (1983) mention that hunger occurs principally before the major rice harvests, when food supplies of land poor households are exhausted, wage labour is scarce, and food prices peak. In Mexico, peasants complained about *Sepi-hambre* (hunger September) the lean month when the maize from previous harvest was exhausted, and the new maize not yet harvested. People sought to minimize suffering with seasonal crafts and other occupational diversification (Warman, 1980).

Basically, literature regarding Ethiopian catastrophic famines such as the 1973 and 1984/85 seems to be voluminous. Nevertheless, proper "transitory food insecurity" had received little attention, despite its prevalence even in what we call 'normal years' as well as in the so called " high potential**"** and "surplus areas**"**.

Although investigations concerning households' transitory food shortage have been limited, the situation in Ethiopia does not deviate much from condition in other developing regions. Mesfin's (1991) investigation in North-central Ethiopia indicated that most farmers cannot produce enough to meet the annual requirements, both from the farmers' annual requirement perceptions and the ENI estimates. My own

empirical research (1996) in Arssi, a zone considered to be a surplus producer at aggregate level, examines seasonal food shortage among farm households and assesses variations between households practising double cropping (during *meher* and *belg* seasons) and those who rely upon single harvest (*meher*). The study found 40% of households (out of 220 sampled households) face seasonal food shortage. Farmers practicing double cropping reported to face seasonal food deficit was 29%, while the proportion among single harvesters was 52%. An assessment of the causes of transitory food insecurity identified various physical and socio-economic constraints to subsistence production. These were insufficient farmlands for 99% households, lack of cash income to purchase farm inputs for 79% households, poor quality of their farmland for 67% households, reliance on single harvest for 55% households, and shortage of draught power for 33.7% households (Degefa, 1996).

Another research finding by Merkos (1997) shows that "household's average cereal production during normal harvest years is persistently lower than annual food requirements and hence many households feed themselves from their farm outputs only for less than three-fourth of the year." Martha's (2000) recent study in Meket, Habru and Gubalafto *weredas* of North Wello Zone found out 30%, 21% and 40% of the sample households respectively are unable to satisfy the food demand of their family for more than five months. Based on empirical observation in Northern Shewa, Yared (1999) argues that the seasonality of agriculture introduces fluctuations in the income, expenditure and nutritional patterns of peasant households. He further says "the coincidence of diminishing grain supplies and increasing grain prices is a liability for the economic status and food security of households" (Yared, 1999: 123). Research findings from the community assessment at 21 *Kebeles* of South Wello and Oromiya Zones of Amhara Region in 1999 has come out with several factors resulting in severe food shortages and household food insecurity including drought, crop pests, frost, rust, hailstorms, untimely or excessive rainfall, land shortages and degradation, lack of oxen, population growth and diseases (Yared et al, 2000).

4. Conceptual and Theoretical Framework

4.1. Concepts

Food security is conventionally defined as "access by all people at all times to enough food for an active and healthy life" (World Bank, 1986:1). It is generally accepted as entailing not only food availability (adequate supply of food) but also food access through home production, purchase in the market or food transfer. Recent definitions of the concept of food security introduce the third dimension, that is**,** utilization which refers to the appropriate biophysical conditions (good health) required to adequately utilize food to meet specific dietary needs.

Food insecurity is a situation in which the individuals of the society have neither the physical nor the economic access to the nourishment they need (Reutlinger, 1987). A household is said to be food insecure when its consumption falls to less than 80% of the Minimum Recommended daily Allowance (MRA) of caloric intake for an individual person to be active and healthy. On the basis of temporal dimension, two types of household food insecurity can be distinguished: chronic and transitory food insecurity.

Chronic (permanent) food insecurity refers to a continuously inadequate diet resulting from the lack of resources to produce or acquire food (Reutlinger,1987). It is argued that chronic food insecurity at household level is mainly the problem of poor households in most part of the world. Transitory food insecurity refers to a temporary decline in households' access to enough food. It results from instability in food prices, production or incomes. The worst form of transitory food insecurity is famine. Hence, transitory food insecurity faced by farm households should be understood in this study as a seasonal food shortage of any magnitude ranging from mild to severe. It should also noted here the concepts of transitory food insecurity and seasonal food shortage are synonymous and will be used interchangeably.

Another important concept that should be defined here is seasonality. Thomas and Leatherman (1990) define it as "a fluctuating phenomenon which entails significant alterations in the biotic potential of the landscape with in the annual cycle". Seasonality exerts a strong organizing influence on the actions of agricultural producers, especially those dependent on the local environment to provide food and other basic needs. Rainfed agriculture that dominates in Ethiopian farming system would rightly demonstrate how seasonality adversely affects the food security situation of the country.

4.2. Theoretical Orientation

There exist two broad approaches to the analysis of famine. The first approach is the 'Political Economy' or 'general explanation'. In this regard, a number of environmental and socio-economic attributes that are assumed to explain famine have been pin pointed. The principal ones include: war and civil strife, ecological degradation, government mismanagement, unequal access to resources and unequal exchange, and socio-economic and political dislocation (Da Corta, 1985, Deveroux,1993). The argument here is that one or a combination of these can disrupt food production. However, production failure may or may not result in famine. Due to this fact the attributes (factors) are not the precise explanations of the causation of the process of famine. It is partly in response to this major weakness that the specific models of famine have emerged out.

The second approach to analysis of famine has been through models of famine: Food Availability Decline (FAD) model and Food Entitlement Decline (FED) model. Alamgir (1980) defines FAD as availability decline per capita of food for the consuming unit. The central argument of this model is that "anything which disrupts food production such as drought or flood and population pressure can cause famine, the logic being that a drought or flood causes crop failure and cattle death, reducing the availability of food in the affected region, and that such a food availability decline for an extended period by definition constitutes a famine" (Devereux, 1988:270). Rapid population growth also results in the declining per capita food available. The model basically demonstrates a situation of subsistence farmers, like farmers under investigation, and reveals how a failure of production during one growing season would end up with food shortage. Nevertheless, the model is criticized for it overemphasizes food supply and undermines the demand for available food.

The FED model is pioneered by Amartya Sen (1981) as an alternative method for the analysis of famine. The model suggests that food availability in the economy or in the market does not entitle a person to consume it, and famine can occur without aggregate availability decline. This means access to food plays a crucial role in securing command over food which is, in turn, determined by production, exchange or transfer.

Food security at household level signifies the complementarity of the political economy explanation and the two models, due to the fact that there must be favourable and stable political situation, enough food must be available, and households must have the capacity to acquire it. Thus the framework of this study mixes the premises of the 'general explanations to famine' and the two famine models. It consists of five major variables adversely affecting farmers food production, which in turn determines the situation of households' food security. These are environmental crises, population pressure, poor asset base, social (cultural) issues, and ineffective policies and poor rural infrastructure.

5. Methodology

The data for the study were generated from primary sources under two phases of field work. Initial field observation was made in the zone and unstructured interviews were held with community administrators, with Development Agents and a few farm households in December 1999. Discussions were also held with the three *wereda* officials and *wereda* agriculture officers. These preliminary assessments have considerably contributed to the designing of the instruments (questioner) for the main survey, especially for the inquiry on why farm households are unable to produce or acquire adequate food. Myself and trained field assistants carried out face-to-face interview of 60 sample households at three selected sites and the total of 180 households, in March 2000. The sites are Shakilla in Dawa Chaffa *wereda*, Charitti Debaso (Charitti hereafter) in Artuma Jille *wereda* and Kamme in Batti *wereda*. Households were randomly selected from PA tax registration books. About 2.7% of the samples were female-headed.

Information generated through key informants interview and focus group discussions were qualitatively analyzed. The household survey data were processed and analyzed by Statistical Package for Social Scientists (SPSS). Household Food Balance Model is utilized to quantify the per capita food availability at a household level. Point Score Analysis was an approach employed to statistically measure farmers' perceptions for identifying the most important causes of transitory food insecurity.

6. Setting Of Oromiya Zone

6.1. Physical Environment

Oromiya Zone is one of the eleven administrative zones in Amhara Region. Astronomically, the zone lies between 10^0 5' and 11^0 26' north latitudes, and between 39^0 48' and 40^0 25' east longitudes. It is the smallest of all zones (excluding Bahir Dar

Zone) in Amhara Region, having an area of 4434[2] km^2 which makes up about 2.8% of the area of the Region. It is divided into three administrative *weredas* namely Dawa Chafa, Artuma Jille and Batti[3] .

The altitude of the zone ranges between about 3000 masl and less than 600 masl. Thus it comprises three agroclimatic zones: *dega*, *weyna dega* and *kolla* which account for about 2.6 %, 26.2 % and 71.2 % of the area of the zone respectively. The zone's surface configuration is somehow diversified and consists of all types of landforms namely deep valleys, plains, plateaus and mountains. Due to the inclination of the slope eastwards all streams that rise in the zone as well as those rise from the neighbouring highlands west of the zone form the tributaries of the Awash River. The major river valleys according to their arrangement from the northern part of the zone in Batti through southern margin of Artuma *wereda* include Cheleka, Borkena, Jerra, Alela and Nejeso.

Most part of the Oromiya Zone falls in the lee-ward escarpments for the moisture bearing Equatorial Westerlies blowing to the North-western Highlands of Ethiopia during summer season. This position coupled with relatively low altitude play a significant role in determining the duration and amount of rainfall received by the zone. Rainfall data at meteorological stations of Batti (1660 masl), Kammise (1450 masl) and Artuma (1920 masl) depict that the zone receives big rains in summer preceded by small rainfall peak in spring or by a prolonged period of moderate rainfall. The long-term (20 years for Batti and 15 years for both Kammise and Artuma) mean annual rainfalls were 851 mm, 1035 mm and 1425 mm (National Meteorological Service Agency, 2000). This means despite its higher altitude Batti receives lower amount of rainfall than Kammise which is partly explained by the positional differences in relation to the moisture bearing winds. Temperature in Oromiya Zone sharply decreases from the top of the escarpment in the west to the floor of the Rift Valley in the east. About seven thermal belts exist in the zone and the mean temperature during growing seasons ranges between 10^0c and 27.5^0c.

Originally the landmass of the zone was covered by four climax vegetation[4] namely: Podocarpus forest, Juniperous Woodland, Acacia Woodland, and Hyparrhenia Rufa Grasslands. Nonetheless, like other parts of Ethiopia the zone has undergone extensive deforestation. According to the MoA/FAO (1984) six major soil associations cover the landscape of the Oromiya Zone. These are Lithosols, Eutric Cambisols (Lithic), Eutric Cambisols (stoney), Eutric Regosols (Lithic), Chromic Vertisols and Orthic Solonchaks[5]. The zone's location in relation to the northeastern escarpments made it

[2]The area of the zone and the boundaries I adapt here are not official ones because the delination along with other zones and regions has not yet finalized.

[3] The *weredas* are divided into rural Peasant Adminstrations (PAs)and Urben Kebeles (UKs). Accordingly, Dawa has 26 PAs and 4 UKs, Batti is divided into 22 PAs and 3 UKs, and Artuma consists of 33 PAs and 2 UKs.

[4] The climax vegetation refers to the natural vegetation that would grow in the absence of human influence, which reflects the optimal vegetation of an area, as determined by environmental conditions.

[5] This account does not include the minor soil associations which occassionally exist along with the the major ones (see MoA/FAO Geomorphology and Soil Map, 1983).

disadvantageous and fragile with respect to its soil resources in particular, and its environment in general.

6.2 . Demographic Characteristics

The 1994 Population Census result put the population size of the Oromiya Zone at 462, 951, which made up about 3.3 % of the population of Amhara Region. The male and female population were 232,461 and 230,490 respectively, giving a sex ratio of 101 males to 100 females (CSA, 1998). According to the CSA Projection its population has reached 530, 258, by July 1999 (CSA, 1999). Over nine-tenth of the zone's population are the inhabitants of rural areas.

The overall population crude density for Oromiya Zone was estimated at 120 persons per square kilometre of the land. Of course, there exists a considerable disparity among the three *weredas* of the zone, which ranged between 94 in Artuma and 155 in Dawa. The figure of the agricultural density for the Oromiya Zone, 11.8 persons per hectare of cultivated land, is found to be the highest of all zones in Amhara Region. Another indicator for high population concentration would be the average family size with which the zone is again recorded the highest, 4.8 persons per household. Given the low carrying capacity of the zone because of the overwhelmingly lowland nature of the landmass coupled with extensive degradation of land resources, the Oromiya Zone can be regarded as one of the overpopulated area of the country.

In terms of Crude Birth Rate (31 per1000) and the average number of children a women may produce at the end of reproductive period (TFR - 5) the zone appeared the least of all zones in Amhara Region, including the Bahir Dar Special Zone. The death of children under year one per 1000 live births (IMR) and the death of children between year one and five (CMR) of 132 and 73, respectively were found out the second highest among the zones in Amhara region, following the figures for East Gojjam (IMR - 142 and CMR - 73). The relatively low life expectancy at birth in the zone would be another indicator for high overall mortality rate. Part of explanation for generally high death rate in the zone may be the prevalence of lowland diseases, particularly malaria and yellow-fever, which were identified to be the serious health threats almost for the entire parts of the zone. Besides, the problem of malnutrition in causing infant and child mortality should not be undermined. About 13.7% of the inhabitants of Oromiya Zone reported to be the immigrants from other areas.

With regard to ethnic composition, Oromiya zone is one of the three special zones[6] in Amhara Region. The overwhelming majority (about 65%) of the people in the zone belong to Oromo ethnic group followed by Amhara. The zone comprises the negligible numbers of Argoba, Affar, Weyito, Tigraway and other ethnic groups. Oromiffa and Amharic are the mother-tongue for 65% and 34% of the people in the zone, according to the 1994 census response. The literacy rate of the Oromiya zone was 10%, which appeared the lowest of all zones in Amhara Region, except Wag Hemera with the literacy rate of only 57%.

[6] The other two special zones in Amhara Region are Wag Hemra and Agew Awi which are dominated by the ethnic groups of Agew/Kamyr and Agew/Awingi respectively.

6. 3. Access To Production Resources And Farming System

6.3.1 Access To Land

By the time of our survey, 95.6% of sample households had land to be utilized for agricultural purposes, and only 4.4% reported to be landless. The land holder farmers have got access to land through three major ways: inheritance from parents (42.2%), land reallocations (40.5%) and sharing from relatives (13.9%). A few farmers also got land through transactions such as illegal land purchase, cash rental and share cropping. On average, holding size per household was found to be 0.93 ha which is very small even when compared with the figures for the national average (0.95 ha) and for Amhara Region (0.97 ha) (CSA, 1998). The holding size varied from 0.015 ha to 2.75 ha. In the face of deteriorating and exhausted land conditions as well as backward agricultural practices and the resultant poor yields, the average holding is generally smaller than the economic level to adequately feed farm households in the zone under consideration.

We made an assessment of changes occurred to the farmers' land holdings. About 16.7%, 29.4% and 53.9% farmers have reported the increase, decrease and no changes, respectively, in their land holdings during the last ten years. This means no change happened to the land of the great majority of the households under investigation. Part of explanation for this can be the already small size of holding below the optimum size. The reported reasons for the holding size decline, according to order of importance, included the loss of land to others by redistribution, give up land from cultivation in response to depletion in soil nutrients, rent out of land to someone else, and share of land to family members. On the other hand, those who got additional land were mainly benefited from recent land reallocation, and a few households by purchasing land as well as renting in land through share cropping arrangements.

The survey data reveals a substantial variation with respect to number of plots belonging to the studied farmers. The number of plot ranged between 1 and 5. Despite of this wide gap, the overall average (1.2 plots) would suggest somehow low degree of land fragmentation in the zone. In the face of rugged topography of the escarpment covering the landmass of the study zone, one would expect fragmentation much higher than the present finding.

6.3.2. Farming System

Oromiya Zone is characterized by subsistence mixed farming system. The great majority of the zone's population get their livelihoods by cultivating a variety of crops and rearing livestock simultaneously. The importance of crop cultivation, however, decreases with the drop of altitude as the people in the extreme lowlands largely depend on pastoralism. A few number of farmers in highland parts of Dawa and Artuma practice double cropping during *meher* and *belg* growing season.

Our sample farmers at three sites were found to be the growers of eight field crops. These according to the order of the number of growers are sorghum (by 140 cases), maize (by 53 cases), teff (by 53 cases) barley (by 8 cases), wheat (by 6 cases), millet (by 4 cases), linseed (by 1 case) and horse bean (by 1 case). The distribution would

rightly demonstrate the typical *weyna dega* cropping pattern situation. A few households also grow perennial cash crops such as sugar-cane, mango, coffee, papaya, chat and banana. Besides, vegetables like potato, garlic and onion are grown in rare cases.

Animal husbandry forms the other important source of livelihood for the studied farmers. We found a total of 449 heads which is equivalent to 356 Tropical livestock Unit (TLU), giving an average of 2.49 heads (1.98 TLU) per farm household. For the mixed farming areas like Oromiya Zone, the figure appears very small and the farmers can generally be regarded as extremely poor in terms of livestock resources. As a result, the farmers have limited capacity to cope with the problem of crop failure. The food insecurity problems experienced in the study communities would be a clear manifestation of this dare condition.

For the farmers like in Oromiya Zone, who almost entirely rely on traditional plough, farm oxen possession would be a critical production factor. The data on farm oxen ownership shows that about 37% of the households were without farm oxen. Surprisingly, another 40% of the farmers have reported to own one ox. This means over three-quarters of the studied farmers have faced severe problems of traction power. From the findings it is not difficult to deduce that crop cultivation in the zone is partly constrained by the lack of farm oxen. Comparison of farmers in three sites with regards to farm oxen possession reveals a substantial variation. Shortage of draft power becomes the worst in Artuma as more than six farmers out of ten are oxless.

6.4. Household Food Availability

The results of household food balance analysis reveals that the great majority of the farmers at the study sites were facing severe seasonal food shortage during the year under investigation. This is demonstrated by the overall mean daily per capita food available of 1415 Calories(Cal) accounted for only 67% of the Minimum Recommended Allowance (MRA - 2100 Cal). The range for per capita food available was extremely wide falling between 35Cal and 7680Cal. Out of the total sample, only 18% of households could attain the MRA. Households with per capita calorie of less than 50% of the MRA constituted 44% and about 70% of the sample had under 80% of the MRA. These figures are good indicators for the magnitude of the prevailing transitory food shortage facing farm households in the Oromiya Zone. Basically, it should be noted that the year (1999) for which we measured food availability is one of the worst with respect to household food short supply.

Households were asked to quantify the amount of food crops (cereals, pulses and oilseeds) that could satisfy their families' food requirements. The amount offered in quintal/kilogram by each household was converted into equivalent food calories. The overall mean is estimated at 2780 Cal, making up 137% of the MRA, and only 7% of the households could meet the amount they felt to be sufficient. The mean food made available for our sample households constituted less than half of what is regarded adequate by the farmers. The figures for the amount identified by the household should be understood and interpreted with due precaution since the farmers

exaggerated their demand deliberately, by relating the inquiry with the assessment for relief food distribution.

The disparity among the farmers at three sites seems quite significant in terms of food available for consumption. Households at Shakilla (Dawa *wereda)* were relatively better than those at other two sites. The average per capita food available at this site was 75% of the MRA and 53% of what the farmers claimed to be adequate. About 19% of the households at Shakilla site have attained the MRA.

Table 1: Percentage Distribution of Households with Per Capita Food Available of above MRA, Over 80% of MRA, and Over 50% of the MRA by Site.

Site	**No. HH**	**Households with per capita calorie of**							
		< 50% MRA		**50-80% of MRA**		**81% - 2100**		**Over MRA (2100)**	
		No.	%	No.	%	No.	%	No.	%
Shakilla	58	21	36.2	20	34.5	6	10.3	11	19.0
Kamme	58	31	53.4	10	17.2	7	12.1	10	17.2
Charitti	55	23	41.8	15	27.3	7	12.7	10	18.2
Total	171	75	43.9	45	26.3	20	11.7	31	18.1

Source: Field Survey

Charitti held the second rank having a mean daily per capita calorie of 1416 (67% 0f the MRA). Some 18% of the farm households have access to food greater than the MRA. Apparently, farmers at this community have highly inflated their consumption demand, as a result of which the amount of food available made up only 47% of the stated demand. Farmers at Kamme (Batti wereda) were seriously stricken by food insecurity in 1999. For over half of the sample the calorie intake was found to be less than 50% of the MRA.

Table 2: Per Capita Calorie Requirement as Reported by the Household and Availability by Site

Site	Per capita Calorie[a] Requirement	Per Capita calorie[b] available	Difference (a - b)	b as % of a	A as % of MRA
Shakilla	2976.3	1572.2	1404.1	52.8	141.7
Kamme	2614.4	1255.3	1359.1	48.0	124.5
Cheritti	3020.2	1416.3	1603.9	53.1	143.8
Total	2870.3	1414.6	1455.7	49.3	136.7

Source: Field Survey

7. Perceived Causes Of Seasonal Food Shortage

In order to assess farmers' perception and identify the causes of transitory food shortage, the study was at the outset based on two basic assumptions. First, subsistence farmers face seasonal food shortages due to their inability to produce adequate food at home which can be attributed to a multiple of factors. Second, a household can face transitory food shortage because of poor management of harvests and their stocks. It

was possible to compile some 35 variables that were assumed to directly and/or indirectly induce seasonal food shortage among farmers in Oromyia Zone during pilot study. These factors were roughly grouped into five categories: environmental problems, demographic factors, economic constraints, infrastructural constraints and social factors. Nevertheless, the fact that all factors can not have equal magnitude of influence upon every farm household nor applicable all study sites, the household survey instrument was designed in such a way that our sample farmers responded to each variable by rating either as *nil* for not applicable, as *moderate constraint (problem)* or as *severe constraint (problem)* for their home food supply. *Point Score Analysis* was then employed to analyse the data and in identifying the main perceived causes of seasonal food shortage.

The households were asked if own production can meet their households annual food requirements. Of 180 households, only five (three at Shakilla and two at Charitti) have reported to regularly produce sufficient food to cover all year round demand from their own crop production and animal husbandry.

7.1. Environmental Problems

Farmers deal with living things: plants and animals whose inherent biological characteristics determine their productivity, and they only function efficiently in environments in which they are adapted (Grigg, 1984). Hence, any deviation of environmental element from the normal pattern could adversely affect farmers' production and livelihoods. Basically, the magnitude of the environmental influence varies according to the development level, and subsistence farmers in developing regions are generally regarded as much more susceptible to environmental shocks.

Regardless of the differences in perceived magnitude of their influence, it is possible to group the environmental factors presented in table 3 into climatic, relief, edaphic and biological. Among climatic factors, the farmers rated drought and erratic rainfall patterns as the top rankings of all environmental factors and all other variables under consideration. The farmers have had several experiences of crop failure and resultant severe seasonal food shortages. The informants at three study sites recall the disastrous droughts and famines of the years 1973, 1984/85, 1994 and 1999. It should, however, be underlined that drought has not been the continuous phenomena in Oromiya Zone although its cumulative effect on the subsistence farmers can have long lasting impacts. A single year drought erodes farmers' asset ownership and make them more vulnerable to various risks. Farmers' complaints of the dependency on single harvests, that is, *meher* season is also an issue largely explained by temporal rainfall distribution patterns. Under rainfed situation, most parts of the zone have only one growing season. Some 70% of our sample have also reported crop failures due to other climatic factors, specifically hail storms and frosts.

The direct impact of relief on agricultural production as well as its influence through various features of soil are also the well recognized causes of seasonal food short supply. The entire landmass of the Oromyia Zone constitutes the rugged escarpment of the central highlands that rolls into the main Ethiopian Rift Valley. Its impact on land utilization for agricultural purposes would be quite obvious. Expansion of cultivation

into marginal and sloppy areas has facilitated soil erosion and the depletion of basic soil nutrients. The proportion of farmers that have complained about the poor harvests of their crops due to soil erosion, poor soil fertility and stoniness of their farmlands were 80%, 79% and 77% respectively. On the other hand, level terrain in the valleys of the major rivers such as Borkena and Jera constrain farmers crop production through a water logging effect.

The farmers felt that some biological factors such as diseases, pests and weeds have been negatively affecting their agricultural production. The former two were particularly rated highly and follow drought and erratic rain in terms of rank order. Emphasizing the influence of those factors on food production an informant at Kamme site, in Batti *wereda* stated "Our environment is very favourable for the thriving of various macro and micro organisms that have in fact threaten the health of our family members as well as our crops and livestock".

What seems very important regarding the environmental constraints as cause of households' food insecurity is the awareness of the risks of agricultural problems brought about by all of the factors by more than half of the respondents. The percent of applicability of the factors ranges between 57.7% for rugged topography and 98.3% for both drought and rainfall unreliability.

Table 3: Results of Point Score Analysis for Perceived Environmental Problems.

Problem	**Shakilla**		**Kamme**		**Charitti**		**Total**		**Percent of. Applicability**
	Score	Rank	Score	Rank	Score	Rank	Score[1]	Rank	
Drought	111	1	120	1	112	1	343	1	98.3
Erratic rain	111	1	119	2	108	2	338	2	98.3
Soil erosion	76	7	96	5	66	6	238	6	80.0
Water logging	80	6	72	9	53	11	205	9	70.3
Diseases	97	5	113	3	90	4	300	3	96.6
Pests	99	4	96	5	80	5	275	5	93.7
Hail storms	64	10	54	13	62	7	180	10	70.9
Frosts	52	12	61	11	55	10	168	12	70.9
Rugged topography	50	13	66	10	26	12	142	13	57.7
Weeds	57	11	59	12	58	9	174	11	69.1
Poor soil fertility	71	8	93	8	62	7	226	7	78.9
Stoniness of farmland	67	9	96	5	58	9	221	8	76.6
Dependency on single harvest	102	3	99	4	94	3	295	4	96.6

Note: 1. The scores given to the responses were: 2 for severe problem (constraint); 1 for moderate problem (constraint); and 0 for nil (not applicable). Response values were then multiplied by the number of respondents and summed up to get total scores.

2. Percent of Applicability refers to the sum of the percentage of farmers that reported the factor to be severe and moderate.

Source: Field Survey

7.2. Demographic Factors

One of our country's development challenges at the present time is the rapid population increase rate that by far exceeds the pace of economic growth. The other constraints under consideration here appear to be the direct outcome of the population expansion. The farmers perceive that overpopulation has caused diminishing holding size for individual farmers, which partly constrained them to produce sufficient food grains. Under such circumstances, they have very limited scope to give up land under fallow. Farmers do normally keep large numbers of livestock on a small grazing area when own holding sizes shrink which in turn results in considerable overgrazing. Official periodic redistribution and reallocations of land to entertain new land claimants as well as land transfer through inheritance to children have induced fragmentation of farmlands. The effect of periodic land reallocations on farmers' tenure security is another issue that has to be underlined here in view of agricultural productivity. An assessment of farmers perception toward those factors has come out with interesting results given in table 4 .

The demographic factors reported to cause seasonal food deficits according to the rank order of scores for the farmers' response at aggregate level are rapid population growth, diminishing land holding, absence of fallow, farm fragmentation and overgrazing. The respective factors are reported to moderately or severely influence the agricultural production of 98%, 96%, 85% and 83% of the study households .

Table 4: Results of Point Score Analysis of Perceived Demographic Factors for Seasonal Food Shortage

Problem	**Shakilla**		**Kamme**		**Charitti**		**Total**		**Percent Of App.**
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
Rapid Population Growth	107	1	102	1	105	1	314	1	97.7
Diminishing of land holding	103	2	99	2	98	2	300	2	96.0
Farm Fragmentation	82	4	62	5	91	3	235	4	82.9
Absence of Fallow	89	3	80	3	72	5	241	3	85.1
Overgrazing	79	5	79	4	73	4	231	5	85.1

Source: Field Survey

7.3. Economic Constraints

Among economic variables presented to the farmers, lack of cash income has been identified as the main bottleneck for promoting agricultural development, according to the responses of 98% of the study farmers in three *weredas*. They are purely subsistence cultivators, with no surplus production at all. The scope to diversify their cash income through employment in off-farm or non-farm activities appears very limited, since 83% of the farmers mentioned the absence of such kinds of opportunities in their areas.

The poverty factor because of lack of cash manifests itself not only in the livelihoods of the farmers but also directly reflected in the lack of capacity to modernize their agriculture. Lack of investable cash among farmers means inability to purchase modern farm inputs as well as limited scope to innovate towards improving the archaic farm implements that had been under use for decades. In response to this, both labour and land productivities have been extremely low. Some 95% and 88% of households have attributed seasonal food shortages facing them to the inability to purchase and properly apply modern farm inputs, and to backward farm implements and practices, respectively.

Shortage of farm oxen is the other economic constraint that adversely affected the cultivation of crop among the farmers in Oromiya zone. Lack of farm oxen greatly affects farmers' livelihoods. Because an ox-less or a farmer with one ox can not properly and timely prepare his farmlands for planting. He has to either rent out his land to other farmers with adequate draft power or he has to rent in oxen. Under both circumstances a farmer has to loss some of his produce through shares which would be directly reflected in his households' food supply.

Table 5: Results of Point Score Analysis for Perceived Economic Constraints.

Constraints	**Shakilla**		**Kamme**		**Charitti**		**Total**		**Percent of App.**
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
Lack of cash	98	1	97	1	95	1	290	1	97.7
Absence of off-farm incomes	79	4	81	4	63	5	223	5	83.4
Shortage of Farm oxen	85	2	95	2	81	2	261	2	89.7
Low modern farm inputs	81	3	95	2	81	2	257	3	95.4
Traditional farming implements and practices	75	5	70	5	79	4	224	4	88.0

Source: Field Survey

7.4. Infrastructural Constraints

Infrastructural predicaments are related to the absence or inadequacy in certain physical structures and economic services that are expected to facilitate the processes of production and distribution of agricultural commodities. In view of this, farmers' perception regarding the impact of the status of seven infrastructures was assessed.

Most parts of the Oromiya Zone are characterized by lowland and semi-arid climate. Thus irrigation becomes a vital input for promoting crop production sub-sector. Irrigation would minimise the risk of crop failures due to drought and rainfall variability. Furthermore, irrigation makes possible an intensification of agriculture and

more than one harvest per year from the same plot. This means it may relieve the problem of land scarcity, to a certain extent. The farmers felt that their dependency on rainfed agriculture and the failure to utilize irrigation have considerably affected the size of crop harvests and household food supply. That is why they rated it to be the most important infrastructural constraint directly reflected in household food insecurity.

The second important infrastructural predicament about which some 83% of the farmers have complained is the lack of veterinary services for livestock. The study by Mesfin (1991) in Northcentral Ethiopia, where the current study zone is partly situated, identifies some 125 diseases of cattle, sheep and goat. This would clearly show the existence of much demand for veterinary services. Let us see what our informant at Cheritti site, Artuma stated "Government efforts toward promoting agriculture has been highly biased against livestock sub-sector and the extension package focuses on crops, which even according to my view has shown little success in our community". Some 57% of the farmers were in favour of this comment, as they complained about the inadequate extension services offered by the MoA. We observed one or two Development Agents stationed at each PA. The main problem in relation to the DA, however, seems the lack of professional competence to render the expected services. DAs had limited training of not more than ten months, in most cases. On top of this, the incentives they earn for staying in rural areas, where social and economic services are non-existent, discourage them highly from offering genuine and efficient services.

The other infrastructural constraint that is perceived to be one of the causes for agricultural underdevelopment is related to marketing. Despite the fact that most are subsistence, over 70% of them have felt the significantly wide gap that exists between the prices for agricultural produce and the manufactured consumer goods and farm inputs. The farmers stressed that they can not afford most of the inputs for modernizing their agriculture under these circumstances. Small farmers' cash deficiency is expected to be compensated by making them accessible to farm credit provisions. However, according to over half of the studied households no such supportive and crucial inputs are provided.

Table 6: Results of Point Score Analysis for the Perceived Infrastructural Constraints

Constraints	Shakilla		Kamme		Charitti		Total		Percent of App.
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
Inaccessibility to roads	24	7	67	4	15	7	106	7	45.1
Absence of irrigation	92	1	97	1	77	1	266	1	93.1
Absence of rural credit	43	4	63	6	43	3	149	4	58.9
Inadequate extension services	43	4	64	5	34	5	141	5	57.1
Poor storage facilities	41	6	62	7	25	6	128	6	52.6
Low prices of agricultural output	56	3	85	3	43	3	184	3	70.9
Lack of veterinary service	67	2	88	2	64	2	219	2	82.9

Source: Field Survey

Over half of the farmers admitted the serious problem facing them through post-harvest crop losses due to poor and traditional storage. Given the small number of chemical users and high temperature in the area, the proportion of crop losses is expected to be higher than the estimated national average. The farmers have also complained regarding inaccessibility to motorable roads. In this regard, significant variation is observed among the farmers at three study sites. Farmers at Shakilla and Cheritti are almost along the main highway. Thus, only one-third and less than one-quarter of households at respective sites reported the problem they face in terms of transportation services. In case of Batti, Kamme is situated off the highway and thus 80% of the respondents have complained of this infrastructure.

7.5. Social Factors

Five variables related to the peoples' social characteristics were considered under this investigation. The previous study by Mesfin (1991) has identified a diversity of diseases that threaten the health of people, the principal of which include eye illness, disability, deaf, skin diseases, chest and others. The current observation, however, slightly deviates from those mentioned diseases. Because the people at three study sites directly pointed to malaria and yellow fever. These are said to be the main killers of the people at the present times. It is due to this that about 88% of the households appreciated health problems as the main social factor affecting food security. Malaria's direct effect on households food security would be through inefficient use of labour in farm operation. The outbreak of the epidemic during critical agricultural operations such as cultivation, weeding and harvesting adversely affects agricultural productivity. Otherwise, given the rapid population growth and land scarcity problems, labour supply can not be a very important constraint to production in the areas under study.

With regard to labour supply and efficiency for production the researcher would like to record two crucial observations. First, food shortage and malnutrition facing household during land preparation, crop planting and weeding have significant influence on productivity. Second, unlike the Oromo farmers in other areas of the country, the people

in the zone under study were found to be, in most cases, not hard-working nor innovative enough in their agricultural undertakings.

The studied farmers are aware that their poor food rationing system (second ranking) as well as low saving habits (third ranking) have contributed to the seasonal food shortages that they face almost every year. Focus group discussion at different communities indicated that various social ceremonies and celebrations taking place in the immediate post-harvest months use up sizeable proportions of annual farm households' incomes. Expenses on the weddings of their children and ceremonies related to the death of relatives and family members were identified as social practices taking up much investment. The researcher had a chance to observe few of these ceremonies during the household survey for the study.

The studied farmers felt that their low level in education has adversely affected their production activities, which is clearly manifested in their poor agricultural performance. Literacy rates in Oromiya zone is at the bottom of the ranks for all zones in Amhara Region. The comparison of the perception of the farmers at community level regarding education shows interesting results. Farmers' response point score at Shakilla rank low education as the most important, while it held third and fourth place respectively at Kamme and Charitti. The reason for the disparity might be the frequent visits of the former farmers to the nearby town, Kamisse which gave them more chances to perceive the living condition gap that exists between rural people and the relatively more educated urbanites.

Table 7: Results of Point Score Analysis for Perceived Social Factors

Problem	**Shakilla**		**Kamme**		**Charitti**		**Total**		**Percent of App.**
	Score	Rank	Score	Rank	Score	Rank	Score	Rank	
Shortage of human labour	55	5	70	5	33	5	158	5	57.1
Health problem	85	1	103	2	73	1	261	1	88.0
Low level of Education	82	2	102	3	60	4	244	3	82.3
Poor food rationing	81	3	106	1	73	1	260	2	78.3
Absence of saving tradition	70	4	91	4	69	3	230	3	72.0

Source: Field Survey

7.6. Seasons of Food Shortage

Seasonal food shortages facing subsistence farmers are partly explained by seasonality of the agricultural operation *per se*. Under normal circumstances, harvest and immediately post-harvest periods are generally the times when food supply are adequate. November, December and January are reported to be the months when 69%, 79% and 73% of the respondent households do not face any kind of food shortage. On the other hand, planting and pre-harvest times are seasons of food shortage. More than 85% of the households encounter severe food shortage during the months of July, August and September. July is found out to be the worst month since almost all households face severe food shortage. The farmers' reliance on single harvest of *meher* season per year at study sites has contributed much to the relatively longer duration

of food short supply at household level. Although our year of study (1999) coincided with the worst seasonal food insecurity (famine) in the area under investigation, we should note that the finding here indicates the general pattern for even the so-called 'normal years'

We assessed the number of meals per day for each sample household. The reported number of meal under normal situation ranged between one and four. About 3.9%, 7.9%, 86.5% and 1.7% of households consume once, twice, three times, four times respectively. Nevertheless, the group discussions at study sites indicated that the number of meals per day are considerably reduced as well as the type of food stuffs for consumption are changed during the months of food short supply.

7.7. Households' Mechanisms of Copping With Food Shortage

Farm households respond to the problems of seasonal food insecurity in different ways. Various coping mechanisms that were identified by different authors (Messer,1989; Moris, 1989, Degnew, 1994) can be put under three broad categories. These are production based responses (expansion of production and improving productivity); market based responses (food grain purchase through sale of assets mainly livestock); and non-market responses (including institutional and societal income transfer systems (gift, relief food distribution, etc.). Farm households' coping mechanisms in Oromiya Zone were consistent with those strategies. Over three-quarters (79.7%) of the food insecure households overcame the problem through purchasing of grains. When asked about the sources of cash income to buy grains, the farmers pointed out a multiple of possible ways, the principal of which include employment in occasional labour (77%), selling of their livestock (70%) and petty trading (18%). Also mentioned were working as a daily labourers in their own areas and by migrating to other regions. The major destinations of the migrants from Oromiya zone, according to the informants, include Wellega and Hararghe with in the country and Djibouti in certain cases. Sales of livestock to purchase grain during food supply shortages has a considerable effect on farmers' economy mainly because of the sharp decline in livestock prices.

Table 8: Households Coping Mechanisms for the Seasonal food Shortage (multiple response is possible)

Mechanism	Respondent by *wereda*			
	Shakilla	**Kamme**	**Charitti**	Total
Purchasing grains	54 (93.1)	58 (96.7)	29 (49.2)	141 (79.7)
Borrowing grains from other farmers	11 (18.6)	5 (8.3)	19 (31.7)	35 (19.6)
Borrowing grain from 'Kire'	2 (3.4)	1 (1.7)	5 (8.6)	8 (4.5)
Reducing consumption	38 (64.4)	25 (41.7)	49 (83.1)	112 (62.7)
Changing dietary habits	30 (50.8)	30 (50.0)	39 (66.1)	99 (55.6)
Receiving relief aid freely	28 (47.5)	37 (61.7)	50 (84.7)	115 (64.6)
Obtaining food through Food For Work	19 (32.2)	38 (63.3)	35 (59.3)	92 (51.7)
Migrating to other areas and work as labourer	32 (55.2)	39 (65)	34 (57.6)	105 (59.3)

Source: Field Survey

Reduction of consumption in terms both the number of meals per day and amount of food in single meal was identified to be the coping means for the largest proportion (63%) of households. Households also change the type of food stuffs during short supply. This means passing food shortage under serious malnutrition is a common phenomenon in the area. About 65% of the food insecure households reported to overcome food short supply problems by receiving relief food freely from government and non-government organizations, and over half of the respondents used to obtain food through working in various food-for-work development schemes. The two approaches have been widely practiced in the zone under study for several decades. Nonetheless, they could not bring about long lasting solutions for the problems which seem to increase from time to time.

8. Concuding Remarks

The study findings revealed that the overwhelming majority of farm households do regularly face seasonal food shortage. In fact, household vulnerability varies with certain demographic and socioeconomic factors. For instance, households headed by the women, the young and the illiterates and those with large family size were found out to be more vulnerable to seasonal hunger. By contrast, farmers with fertile farmlands, those who own relatively large number of livestock, those who got farm credit and those who utilized irrigation for crop cultivation were identified to be less affected by seasonal food shortage.

The farmers perceived that a multitude of environmental, demographic, economic, infrastructural and social factors have been contributing to the seasonal food insecurity facing them. They have identified drought, erratic rainfall patterns, livestock and crop diseases, dependency on single (*meher)* harvest per year, and pests, according to order of importance, as the principal environmental problems hindering them to be self-sufficient in food production. Among demographic variables, rapid population growth and the resultant diminishing land holdings were felt to be the most important causes of food insecurity. The current mean land holding size is found out to be considerably below economic level. The farmers also perceived the poverty factors specifically, lack of investable surplus cash and shortage of draft power as their main bottlenecks to expand agricultural production. The zone under consideration exhibits one of the poorest with respect to the development of rural infrastructure. The absence of irrigation and the consequent dependency on rain for crop cultivation, and the lack of sufficient veterinary services were among the infrastructural predicaments about which the overwhelming majority of the farmers, individually and in group, have complained. Health problem and poor saving traditions were conceived to be the most important social factors adversely affecting households' food security.

The fact that an interaction of a multitude of factors are involved in causing seasonal food insecurity in the Oromiya Zone calls for integrated approach of dealing with the predicaments of rural development. In order to improve farm households food security, the following may be the major immediate areas of intervention: rehabilitating

degraded land resources; implementing sound and effective population policy; taking possible measures that can relax the problem of land scarcity; providing rural credit and enhancing off-farm employment opportunities; promoting livestock and crop sub-sectors according to the potential of the zone; and giving priority to the development of small-scale irrigation. Policies towards enhancing households' food security should rely upon the local people knowledge and needs.

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