Household Food Insecurity and Coping Strategies: A Perspective from Lasta Wereda, North Wollo Zone of Amhara, Ethiopia

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Abstract

The study aims to assess food insecurity, identify the determinants of food insecurity and analyze the coping strategies of the rural households in *Lasta wereda*, Amhara regional state of Ethiopia. Primary data were collected using questionnaire survey, focus group discussion and key informant interview. Three stage sampling technique was employed to select 299 rural households in the study area. Descriptive statistics such as frequencies mean and standard deviation was used to analyze the data. Econometric analysis of Tobit model was used to identify the determinants of food insecurity, and Foster-Greer-Thorbecke model indices were employed to estimate the incidence, gap and severity of food insecurity. The head count ratio revealed that 51.8 percent of sampled households were found to be food insecure. The gap and severity of food insecurity were estimated to be 14.2 and 6 percent respectively. The results of Tobit regression model showed household size, cultivable land size, livestock ownership, oxen ownership, use of chemical fertilizer and households share of own produced food were found to be significant determinants of food insecurity in the study area. Selling livestock to buy food, reducing the quantity of meals and reducing the frequency of meals were among the common coping strategies adopted at times of decline in food availability. Family planning, off-farm income generating activities, livestock sector productivity and access to chemical fertilizer should be highly strengthened in the study area.

Keywords: Food insecurity, Coping strategy, Determinant, Household.

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INTRODUCTION

Despite the significant advances made to achieve the Millennium Development Goal on eradicating extreme poverty and hunger by half at the end of 2015, the number of hungry people in the world remains unacceptably high and the rate of poverty reduction has been much slower in low-income countries, especially in Sub-Saharan Africa where the absolute number of poor has continued to increase. An estimated 1.2 billion people in developing countries still live in extreme poverty and mainly concentrated in rural areas [1].

Food security is a critical issue of developing countries particularly Sub-Saharan Africa where one third of the population is food insecure and there is an actual increase in the number of hungry people due to rapid population, unreliable rainfall and frequent drought. The global food production projection shows food insecurity will be persistent at global level and the Sub Sahara African countries will be food insecurity hotspots by 2020 [2]. Hence, eradicating poverty continues to be a major challenge and will need to remain a central goal of the post-2015 development agenda.

Ethiopia is a country with a population of more than 96.5 million of which 82% are living in the rural areas predominantly depending on subsistence and rain feed agriculture, food production is highly vulnerable to the influence of adverse weather conditions such as drought and the vast majority of the population is chronically food insecure and vulnerable to natural potential disasters [3].

Ethiopia remains one of the world's most food insecure countries, where approximately one in three people live below the poverty line, although the development efforts of the government and its partners substantially reduces the number of people living in extreme poverty and hunger in the last decades [4]. There were and still are different food aid responses taken to solve the problem of food insecurity through both emergency relief as well as development works. Climate change induced environmental shocks have

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severely eroded Ethiopia rural household livelihoods, leaving households with little capacity to cope. In adequate access to potential resources and viable source of income; and lack of infrastructure and social services exacerbate the vulnerability of the poor, driving thousands of people into chronic food insecurity [5].

The Amhara region is safer from extreme poverty and food insecurity problems. 64 *weredas* out of 166 in the region were characterized as drought prone and chronically food insecure areas and cannot adequately feed its population. These problems are often aggravated by drought, environmental degradation and HIV/ADIS. Recently about 1.4 million people were suffered from food insecurity [6].

The study area, *Lasta,* is one of the droughts prone *wereda* of Amhara region. Farmers in the *wereda* face difficulties in food insecurity even in normal years, and mostly rely on food aid. It has been repeatedly exposed to recurrent drought and famine. The total production is persistently inadequate to cover food requirement of the population [7]. Therefore, Knowledge and understanding of the root causes and constraints of food insecurity and coping strategy are important in the design and implementation of food security-based development programs which can benefit rural societies.

MATERIALS AND METHODS

Data type

Both primary and secondary data were employed in this study towards the achievement of intended objectives. The primary data related to demographic, socioeconomic and other relevant variables were collected at the household level. The necessary secondary data were also obtained from relevant sources in the *wereda,* zonal as well as from regional offices and by reviewing books, journals, research reports and internet web sites.

Data collection

Primary data used in the study were collected through household survey, key informant interview and focus group discussion. A structured questionnaire was prepared and pre-tested before administering and then after administered to the randomly selected household heads by a team of enumerator recruited and trained for this purpose with close supervision by the researcher. Focus group discussions and key informant interviews were facilitated by the researcher. A total of three focus group discussions, one focus group discussion per *kebele* were held in each the selected *kebeles* and the group was composed of youngsters, women, village leaders and socially respected individuals who are known to have better knowledge on the present and past social and economic status of the area to validate and strengthen the data collected using questionnaire. Moreover, five key informant interviews were held with respective *wereda* experts who have good knowledge and experience on the subject of study. Secondary data were obtained from relevant sources in the *wereda,* zonal as well as from regional offices by reviewing documents.

Sampling techniques and sample size

In this study, a three-stage sampling technique was employed to select 299 rural households in the study area. *Lasta wereda* were selected using purposive sampling techniques. Three *Kebele* administration areas were selected from three agricultural zones, highland, Midland and Low land of the *wereda* using the clustered random sampling technique. Finally, from the three *Kebele* administrations, 299 households were selected using random sampling on the basis of the *Kebele's* population size. The number of sample households was determined based on the [8] formula. This required estimation of tolerable error margin as 0.05 allowing 95 percent confidence level. Hence, the formula is stated below.

$$n = \frac{z2pqN}{e2(N-1) + z2pq}$$

Where,

n= the minimum number of sample size within the range of acceptable error margin.

N= the total number of households in the three selected *kebeles* (4276 Households)

z= confidence level (95 percent) and which is 1.96

e= acceptable error margin (0.05)

p= proportion of sampled population (0.3)

q= estimate of the proportion of population to be sampled (0.7)

Method of data analysis

The data from sample household responses were coded and entered into the statistical package, SPSS version 20 and STATA version 12. The data was analyzed using descriptive statistics such as frequencies, mean and standard deviation. In this study, poverty line direct calorie intake method i.e. the recommended minimum food intake of 2100 kilo calorie per adult equivalent per day which was assumed to be the minimum energy requirement enabling an adult to lead a healthy and moderately active life in Ethiopia (FDRE, 2002) were used to measure food insecurity status of sample households, and the dietary diversity score also used as an indicator of food insecurity status. Moreover, the three Foster-Greer-Thor beck (FGT) indices i.e. head count ratio, food insecurity gap and squared food insecurity gap or severity of food insecurity was calculated for the analyses of the incidence, depth and severity of food insecurity in the study samples respectively. The determinants of food insecurity were analyzed using Tobit model. The qualitative information from the key informant interview and focus group discussion was analyzed contextually to validate the statistical results from the household questionnaire. The magnitude of coping strategy was measured using the frequencies of the strategy by ascribing weights, never, rarely, often and always as 0, 1, 2 and 3 respectively and the weights were multiplied by percentage of their frequencies and then were summed up to get scores of every coping strategy.

RESULTS AND DISCUSSIONS

Food insecurity status of households in the study area

Based on the minimum recommended daily food intake of 2,100 kilo calorie, 51.8 percent of sampled households were found to be food insecure. This indicated that large proportion of households were unable to meet the stipulated minimum level of calorie intake i.e. 2100 Kcal per adult equivalence per day. The gap and severity of food insecurity were estimated to be 14.2 and 6 percent respectively (Table 1). On average the food insecure households could get only 85.8% of the minimum recommended daily per capita food energy necessary for survival. This implied 14.2 percent of caloric needed of every food insecure households was required to bring up to the recommended daily caloric requirement level. The HDDS Within 24 hours recall (Table 2) showed 73.8% of the total sampled households had consumed low dietary diversity (one to three food groups), 26.2% of them had consumed medium dietary diversity (4 and 5 food groups) and none of them had consumed high dietary diversity (6 and above food groups). In general, dietary diversity was poor with overall mean of 3.

Table 1: FGT measure of food insecurity

Measures of Food insecurity	Value
Head count ratio	0.518 (51.8%)
Average Food insecurity gap	0.142 (14.2%)
Squared Food insecurity gap	0.060 (6%)

Table 2: Household dietary diversity score (HDDS)

Explanatory variable	Coefficient	Robust SE	Marginal effects	t-value
HHAGE	-0.0003658	0.0008212	-0.0012744	-0.45
HHSEX	0.0529635	0.0365863	0.1778297	1.45
EDU	-0.0051337	0.0163774	-0.0178535	-0.31
HHSIZE	0.031538	0.0091179	0.1098874	3.46***
CULTLSIZ	-0.1501939	0.0557971	-0.5233191	-2.69***
TLU	-0.0320006	0.018511	-0.1114992	-1.73 *
OXENOWN	-0.1100804	0.0408755	-0.383552	-2.69***
CREDIT	0.0069493	0.0164273	0.0242024	0.42
FRTLZR	-0.0440656	0.0260491	-0.1511216	-1.69*
DR	0.019197	0.0318674	0.066888	0.60
TRANSINC	-0.0000325	0.0000269	-0.0001133	-1.21
SHAREOPF	-0.0143674	0.0033442	-0.0500603	-4.30***
SHAREFE	0.0000131	0.0004068	0.0000457	0.03
_cons	1.050303	0.2511678		4.18***
/sigma	0.1116541	0.0213812		

Number of observations	299
F (13)	150.43
Prob > F	0.0000
Pseudo R^2	1.6930
Log pseudo likelihood	106.18735
Left censored observations at ratio <=0	144
Uncensored observations	155
Right censored observations	0

Note: *** significant at 1% level; * significant at 10% level.

Table 3: Tobit regression result

Coping strategy	Relative Frequency %				Total weighed score
	Never	Rarely	Often	Always	
Selling livestock to buy food	22.6	10.7	62	4.7	148.8
Seasonal migrating to search job	62	16.6	21.4	0	59.4
Selling charcoal and faire wood	91.7	7.1	1.2	0	9.5
reducing the quantity of meals	17.8	75	7.2	0	89.4
Consuming wild foods	97.6	2.4	0	0	2.4
Reducing the frequency of meals	15.5	79.8	4.7	0	89.2
selling farm implements	98.8	1.2	0	0	1.2
Consuming seed reserves,	51	49	0	0	49
Going without food throughout the day	42.9	57.1	0	0	57.1
Permanent migration	100	0	0	0	0

Econometric result

Determinants of food insecurity

The Tobit model indicated that out of thirteen explanatory variables which were hypothesized to affect food insecurity, six variables namely household size, cultivable land size, livestock ownership, oxen ownership, use of chemical fertilizer and household share of own-produced food found to be significant in influencing household food insecurity (Table 3).

Household size (HHSIZE): Household size had positive marginal effect. This implied higher the household size, the more likely household to be food insecure. This might be due to large family size exerts more pressure on food consumption than it contributes to production. Marginal effect of the variable signified a unit increase in the household size lead to 0.10 increases in the level of food insecurity. The result was consistent with the findings of [9, 10, 11]. This result disagrees with [12, 13] where household size had higher negative effect on food insecurity.

Cultivable land ownership (CULTLSIZ): As expected, cultivable land ownership showed negative effect on household food insecurity. The marginal effect of the variable was -0.52 which showed a unit increase in

cultivable land decrease the level of food insecurity by 0.52. This might be due to household can either cultivate the land to obtain more production or may rent it to people in short of cultivable land so as to generate more income to the household. This result was in agreement with [10, 14, 15].

Livestock ownership (TLU): In agreement with a priori assumptions, livestock ownership had negative influence on household food insecurity. The marginal effect of the variable indicated a unit increase in livestock ownership decrease the level of food insecurity by 0.11. This might be due to households with large number of livestock had better chance to earn more income from livestock production. This result was in line with [9] in North Wollo and [15] in Tigray.

Oxen ownership (OXENOWN): The marginal effect of oxen ownership had negative sign. This implied larger ox ownership of the household, the more likely household to be food secured. This might be due to households with a greater number of oxen were able to rent land in addition to their own and thus produce more crops than those with lesser or no oxen. Marginal effect of the variable indicated a unit increase in oxen holding decrease the level of food insecure by 0.38.

Use of chemical fertilizer (FRTLZR): Use of chemical fertilizer had a negative relationship with food insecurity. The marginal effect of the variable indicated using fertilizer decreased the level of the household's

food insecure by 0.15. This implied chemical fertilizer boosts agricultural production and ensure household food security [10]. The result was consistent with the finding [9, 11].

Share of own-produced food in the total quantity consumed (SHAREOPF): This variable had negative relationship with food insecurity. This showed the higher the share of own produced food, the lower the food insecurity. Marginal effect of the variable indicated unit increase in household share of owns produced food in the total quantity consumed decreased the level of food insecurity by 0.05. This result was in line with [16] and [14] where lower share of own produced food of the household increases food insecurity status of rural households.

Coping Strategy

Based on the score of weighted sum of the frequency of occurrences, the most widely used coping strategies by the households in the study area in order of importance were selling livestock to buy food, reducing the quantity of meals and reducing the frequency of meals, seasonal migrating to search job and going without food throughout the day .This showed the immediate strategy adopted by households when faced with food shortage were sell livestock to buy food. The coping strategies such as reducing the quantity of meals, reducing the number of meals and going without food throughout the day indicated households in the study area were more vulnerable to the food insecurity (Table 4).

Table 4: Coping strategies adopted by households

Coping strategy	Relative Frequency %				Total weighed score
	Never	Rarely	Often	Always	
Selling livestock to buy food	22.6	10.7	62	4.7	148.8
Seasonal migrating to search job	62	16.6	21.4	0	59.4
Selling charcoal and faire wood	91.7	7.1	1.2	0	9.5
reducing the quantity of meals	17.8	75	7.2	0	89.4
Consuming wild foods	97.6	2.4	0	0	2.4
Reducing the frequency of meals	15.5	79.8	4.7	0	89.2
selling farm implements	98.8	1.2	0	0	1.2
Consuming seed reserves,	51	49	0	0	49
Going without food throughout the day	42.9	57.1	0	0	57.1
Permanent migration	100	0	0	0	0

CONCLUSION AND RECOMMENDATIONS

Households in the study area were potentially food insecure (51.8%). Based on the econometric model result, household size, cultivable land size, livestock ownership, oxen ownership, use of chemical fertilizer and household share of own-produced food were the major determinants (factors) that affect the rural household's food insecurity. The coping strategy of households in the study area were temporal and might not systematically link to the ever-increasing climate change and other related hazards. This indicated households in the study area were more vulnerable to the food insecurity.

Household size was positively related to the food insecurity. The ever-shrinking productive resources in the study area coupled with increasing population would hamper any development intervention from achieving its objectives. So, policy measures directed towards the provision of better family planning to reduce household size should be given adequate attention and priority by the federal and regional governments. Awareness creation on the impacts of population growth at the household and community level should be strongly advocated that lead to reduction in fertility and lengthen birth spacing resulted in smaller household size.

Cultivable land holding with increase in population size of the study area is becoming very limited. It is therefore important that the national as well

as regional government should promotes agricultural intensification through improving the quality of the land (improving soil and nutrient management), increase access to irrigation and agricultural inputs which enables households to increase their crop productivity. Appropriate policy and strategy that resettle volunteer households in short of cultivable land to other parts of the region where better land resources available, should be designed and implemented. Moreover, there is a need to look forward to reduce the increasing labour force in agriculture through designing polices that promote the establishment and operation of off-farm income generation opportunities.

Livestock was found as a very important asset in assuring food security in the study area. Hence, the government and other stakeholders need to work towards enabling poor households to access credit and extension service on time. Doing this could increase livestock holding of poor households. Moreover, the livestock sector has to be enhanced through improving the production and productivity of the livestock. Such an improvement can be brought about by supporting the existing intensive livestock production system through launching sustainable and effective forage and fodder crops development program, improved water supply points, strengthen the livestock health delivery system, improve both the breed and livestock management system based on the local needs and priorities. From all livestock resources oxen are strategic asset especially for farming households; since they serve as a source of traction in the

rural households. Therefore, concerned bodies should support the poor households by providing access to appropriate credit to have draught power.

Application of chemical fertilizer increases the productivity of crops and there by improve food security status of households in the study area. Hence, *kebele* development agents and other stakeholders need to see how they can help farming households can raise their crop productivity. This could be done through training and demonstration at the farmers training center and experience sharing visits. Moreover, there is a need to increase chemical fertilizer users among the poor households through the timely provision of credit service.

Households in the study area were exercising varied local coping strategies to cope up the vulnerability to food insecurity. However, the strategies have been temporal and might not systematically link to the ever-increasing climate change and other related hazards. It needs policy makers and rural development practitioners to aware of the linkage of the increasing net impact of vulnerability due to change in climate and intentionally design strategies to reasonably respond and hence integrated with long term adaptive strategies.

Acknowledgement

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