



# Households Food Insecurity and Livelihood Strategies in the Central High lands: The Case of Abichu and Gnea Woreda, Oromia National Regional State, Ethiopia

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## Abstract

Food insecurity is widespread in Abichu and Gnea Woreda. Present study has been assessing the status of food insecurity, identifying the major causes of food insecurity and the local livelihood strategies employed by sample households to cope with food insecurity. In order to achieve the objectives of the study the investigator used descriptive survey research design. The total number of sample households selected for this research is 188. This sample size was drawn by using a multi-stage sampling procedure from 3 purposively selected sample Kebeles through primary and secondary sources. The collected data were analyzed by using descriptive and inferential statistical techniques. Household Food Balance Model was used to reach at reliable results. The survey result revealed that 61.7 percent of sample households were food insecure and 38.3 percent food secure. The causes of household food insecurity are related to demographic, biophysical, economic, institutional and socio-cultural factors. Further analysis showed that sale animals, eating less preferred foods, reducing number and size of meals; receiving food aid, borrowing cash or food were the frequently practiced livelihood strategies by sample households in the study area. The results suggest the need to improve agricultural technologies, promoting non/off-farm activities household food. Moreover, both short term and long-term actions from government bodies, donors and households themselves to ensure household food security have been recommended.

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## Introduction

Globally there is continuing a fight against hunger in different parts of the world specially in the third world. However, an unacceptably large number of people still lack

the food they need for an active and healthy life. The latest available literature indicated that about 795 million people in the world were undernourished in 2014-16 and the vast majority of the people exposed to hunger were living in developing regions where an estimated 780 million people undernourished in 2014-16 (FAO, 2015). The FAO most recent estimate shows that about 805 million people in the world do not have enough food to lead an active and healthy life. The significant proportions of this hungry people are in developing countries (FAO, 2014). In Africa, specifically in Sub-Saharan region, the number of people do not have enough food to lead an active and healthy life is more pronounced, where more than one in four people remain undernourished (FAO, 2014). As understood from FAO annual reports (2014), though world hunger has generally showed significant improvements, sub Saharan Africa has still remained with sizable food gap. As Degefa (2005) explanations, the reasons why sub-Saharan Africa has failed to feed its population have mostly associated with both natural and man-made factors such as climate shocks, recurrent drought and prevalence of epidemic diseases, resource degradation, conflict, bad governance, inefficient policies, deep-rooted poverty and poor access to modern agricultural technologies (Degefa 2005).

Ethiopia is the second most populous country in Africa with an estimated population of 94.3 million people in 2013 (CSA, 2013), and one of the fastest-growing economies in the world (USAID, 2014) in general, the presence of poverty, and particular food insecurity, due to underdeveloped production technologies, transport and communications networks. According to USAID (2015), approximately 44 percent of the children less than 5 years of age in Ethiopia are severely chronically malnourished, or stunted, and nearly 28 percent are under weight. Roughly, 32 percent of the country's population is undernourished, indicating food insecurity as interminable problem in the country (FAO, 2014). This is more severe in the rural part of the country, which consists of around 83 percent of the total population (Tassew, 2014). Ethiopia's economy has grown by 11 percent annually for the last five years, and Poverty declined from 38 percent in 2004-05 to 29 percent in 2009-10. But, it remains a least-developed, low-income, food-deficit country, one of the poorest in Africa: gross domestic product of US\$472 per capita is much lower than the sub-Saharan African average of US\$1,077. Despite reduction in the food poverty index, the scale of food insecurity and malnutrition remains serious: 23 million people have insufficient income to meet their food needs (WFP, 2011). These famine and food crises areas have been geographically concentrated into two broad zones in the country. The first belt consists of the mixed farming production system areas of the central and Northern-Eastern highlands, stretching from Northern Shewa through wollo into Tigray (Degefa 2002).

The land resources, mainly the soils and vegetation of this part of the country have been highly degraded because of the interplay between various environmental and human factors such as relief, climate, population pressure and over-cultivation of the land, deforestation of vegetation and overgrazing. The second belt is made-up of the low-lying agro- pastoral lands ranging from wollo in the North, through Hararghe and Bale to

Sidama and Gamo Gofa in the South. Apparently, this belt is considered as resource poor with limited potential and hence highly vulnerable to drought (Degafa, 2002). The concept of food security can be seen in terms of four major components, as outlined by the world food program (WFP) like food availability, food access, food utilization and food vulnerability (WFP, 2002).

### **Measurements of food insecurity**

Measuring households 'food security/ insecurity is necessary at the outset of any development projects as it helps to identify the food insecure group/ area, to assess the severity of their food shortfall, and to characterize the nature of their insecurity. Von Braun *et al.* (1992) described the measurement of food insecurity at country level, household level and individual level. Food security at the country level can be monitored in terms of demand and supply indicators; that is, the quantity of available food versus needs and net imports needed versus import capacity. Food security at household level is measured by direct surveys of dietary intake in comparison with appropriate adequacy norm. However, it measures existing situation and not the down side risks that may occur. Food security at individual level is anthropometric information measurements at the individual. The anthropometric measure refers to nutritional status at individual level. Thus, individual food security implies an intake of food and food absorption of nutrients sufficient to meet an individual's needs for activity, health, growth and development. The individual's age, gender, body size, health status and level of physical activity determine the level of need.

Hoddinot (2002), clearly point out the four outcome measures of household food security as follows. These are individual intakes, household caloric acquisition, dietary diversity and indices of household coping strategies. Individual food intake is a measure of the amount of calories or nutrients consumed by individual in a given time period usually 24 hours. Household caloric acquisition is the number of calories, or nutrients, available for consumption by household members over a defined period of time. Dietary diversity is the sum of the number of different foods consumed by an individual over a specified time period. Indices of coping strategy are household coping strategies is an index based on how households adapt to the presence or threat of food shortages. Since food security is influenced by different interrelated socio economic, physical, institutional and political factors, it requires understanding of multidimensional contexts of the target area. Hence, combining both qualitative and quantitative household data sources in studying of food security activities allows knowing holistic nature of the study area comprehensively as argued by Degefa (2006). Some indicators only appropriate for assessing the process while others monitoring of the outcomes of certain project goals. It is up to the researcher to select a combination of indicators that suit the objectives of the investigation.

Ethiopian agriculture is dependent mainly on traditional farming and rainfed methods with a limited use of improved technologies. Over the past many years, the pattern, amount and distribution of rainfall have been deteriorating with several bad years in terms of food production in (1985 and 1994) during drought years, which indicated that the production trend is very much correlated with the rainfall trend (Kifle and Yoseph, 1999). As a result of this and other factors, Ethiopia has been suffering from both chronic and transitory food shortages. Three major famines have occurred in the country during the last successive decades (1974, 1984-85, and 1994) claiming the lives of many Ethiopians (Kifle and Yoseph, 1999). Abichu and Gnea, is one of the Woreda of Oromia Regional National State is found in the North Shewa Zone is the food insecurity area which is taken by the government as a pilot woreda for the implementation of productive safety Net program (PSNP). In the woreda, the problem of food insecurity related to natural and human factors (WAO, 2016).

The main objective of this study was to assess the status and causes of food insecurity and livelihood strategies adopted by rural households in Abichu and Gnea Woreda, Oromia Regional National State, Ethiopia.

### Materials and Methods

Abichu and Gnea is one Woreda (Woreda: District) of North Shewa Zone of Oromia National Regional state, Ethiopia. The geographical location of the study area is 9°28'00"N - 9°48'00"N latitude and 39°05'00"E - 39°23'00"E longitude (Figure 1).

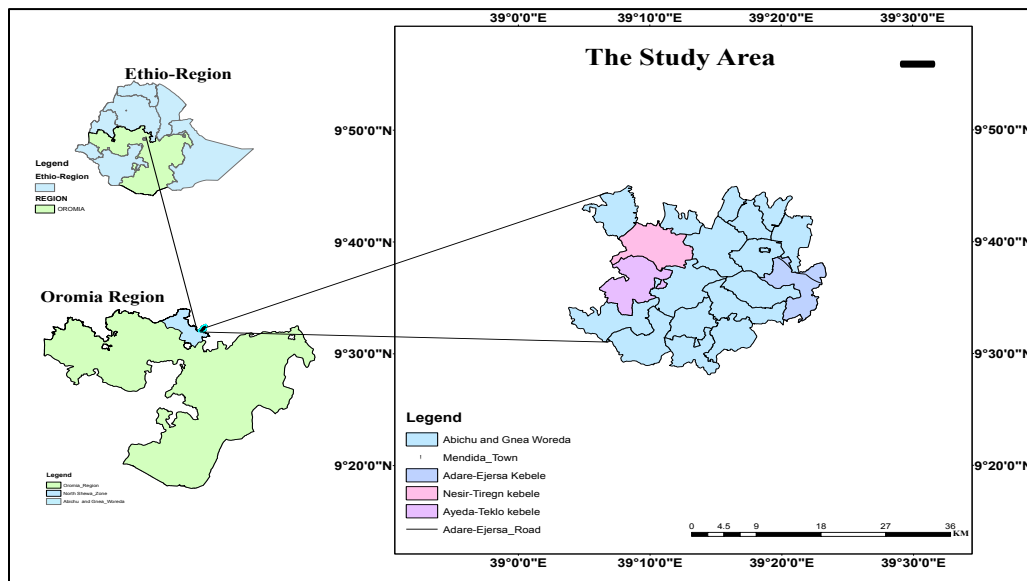


Figure 1. Map of the study area

The descriptive survey research design was used for this study. The researcher purposively selected three kebeles (Kebele: Lowest administrative division) from total twenty kebeles of Abichu and Gnea woreda, namely Ayeda-Taklo, Adare-Ejersa and Nesir-Tiregn. The researcher selected 188 household heads as respondents for research from the total 2,359 household heads. Primary data were collected from households and individuals in selected areas through survey questionnaire, interviews and focus group discussion. Secondary source of information was reviewed to supplement the primary sources of information. Descriptive statistics and inferential statistics were used to analyze the data. The overall adequacy of food supply in the study area was analyzed by using household food balance model (HFBM).

**Food Insecurity Status of the Sample Households:** The per capita kilocalorie available for the household per adult equivalent per day (per capita kilocalorie) compared to the minimum recommended allowance (2100 kilocalories). Households whose per capita kilocalorie is less than 2100 classified as food insecure and those households whose per capita kilocalorie is greater than 2100 kilocalories classified as food secure. As a result, from all respondent households 116(61.7 percent) households were found to be food insecure and 72(38.3 percent) of them food secure.

**Measuring food insecurity of respondents:** HFBM utilized in measuring food insecurity status of sample households. The model originally adapted by Degefa (1996) from FAO Regional Food Balance Model and then used by different researchers (Mesay, 2010; Meskerem, 2011). The data used for the computation are generated through field survey except for the estimates given for the total seed reserve and post-harvest loss due to poor storage facilities. Mesay (2001) and Degefa (2002) revealed that, farmers reserve five percent of their total food produced for seed while post harvest loss are estimated as ten percent of the total yield of a household produced. These estimates are used to quantify the total grain used for seed and the amount of grain lost due to poor storage and other problem by the household. The Household Food Balance assessment covers a period of January 2016 to January 2017.

The model is given by the following mathematical expression.

$$NGA = (GP + GB + FA + GG) - (HL + GU + GS +GV);$$

Where,

NGA: Net grain available/year/household

GP: Total grain produced/year/household

GB: Total grain bought/year/household

FA: Quantity of food aid obtained/year/household

GG: Total grain obtained through gift/year/household

HL: Post harvest losses/year

GU: Quantity of grain reserved for seed/year/household

GS: Amount of grain sold/year/household

GV: Grain given to others within a year

In order to convert grains available in Kg into equivalent Kcal, first computing the balance between foods grains gained and lost using the above model. Then, the net quantity available of each crop type is converted in to kilocalories using Ethiopian Health and Nutrition Research Institute (EHNRI)'s food composition table based on the amount of kilocalories available from 100 gram of grain of each crop (conversion factors). The resulting value shows the amount of total food energy available for the household during the reference period (January 2016 to January 2017). Then, the value divided by the number of adult equivalents for each household and the number of days of a year that gives the per capita kilocalorie available for the household per adult equivalent per day.

## Results and Discussion

**Household Food Balance Model (HFBM) balance sheet result:** The balance sheet of HFBM (Table 1) reveals that the mean per capita kcal available to the sample households is found to be 2165kcal with standard deviation of 603. The mean per capita kilocalorie available is above the minimum daily requirement set by the national standard of 2100 kcal. These conditions create groups of some household that one could achieve in fulfilling the minimum energy requirement in their household became (food secure). While the second groups whose do not fulfilling termed as (food insecure).

Table 1: Household food balance sheet result in Kcal

No	Item for HFBM	Mean		All sample				t-test
		Food secure	Food insecure	Min	Mean	Max	SD	
1	Food grain produced	3405	1673	588	2239	8956	110	8.6
2	Food grain bought	278	164	24	251	1288	259	3.4
3	Quantity food aid	214	312	0	103	616	23	2.4
4	Food obtained as a gift	12	0	0	7	360	69	2.7
	Subtotal 1(1+2+3+4)	3539	2149	612	2600	11220	461	12.3
5	Post harvest losses	16	1	28	15	412	760	2.7
6	Reserved for seeding	267	104	36	156	406	16	2.8
7	Amount grain sold	623	145	0	245	4215	12	4.5
8	Grain given to other	34	2	0	19	387	380	6.3
	Subtotal 2(5+6+7+8)	940	252	64	435	5420	142	7.6
	Net grain available (1-2)	2599	1897	548	2165	5800	603	12.8

Moreover, HFBM balance result shows that household's food calorie availability was found within the range of minimum of 548 to the maximum of 5800Kcal. This also implies that there is large gap in energy availability among the sample households in the study area. The result of the food balance sheet of HFBM also illustrate that important variations have been observed between the food secure and food insecure households in per capita kilocalorie availability that food secure households has average per capita kilocalorie of 2418.8, which is higher than the minimum recommended allowance. In contrast, the mean per capita kilocalorie available in food insecure households is 1978.53,

which is much lower than the minimum recommended allowance. The mean net availability of crops for food secure households is by far greater than food insecure. This difference in per capita kilocalorie has been found to be statistically significant ( $P < 0.05$ ). This clearly indicates that there is deficiency in food energy to considerable proportion of the population in the area.

**Food grain source of the respondents**

Figure 2 shows the major food grain sources in terms of energy amount for sample households of calorie per capita was obtained from own production, domestic purchase, food aid and remittance that an average of 77 percent, 10 percent, 17 percent and 1 percent respectively. According to the survey results large proportion of food grain of households were obtained from their own production as compared to other means of food acquisition. Hence, any factor that disrupts agricultural production has adverse impact on household food availability and dietary energy of households. As presented in figure 2, food grain sources for food secure and food insecure sample households the share from own production was high for food secure households than food insecure households by 82 percent and 72 percent respectively. Regarding, the food grain available obtained from local purchase and food aid for the food secure households were 12 percent and 5 percent constitutes the lowest amount compared with food insecure households were 10 percent and 17 percent respectively. This shows that food secure households directly cover most of their food consumption needs from own production than other means of food source.

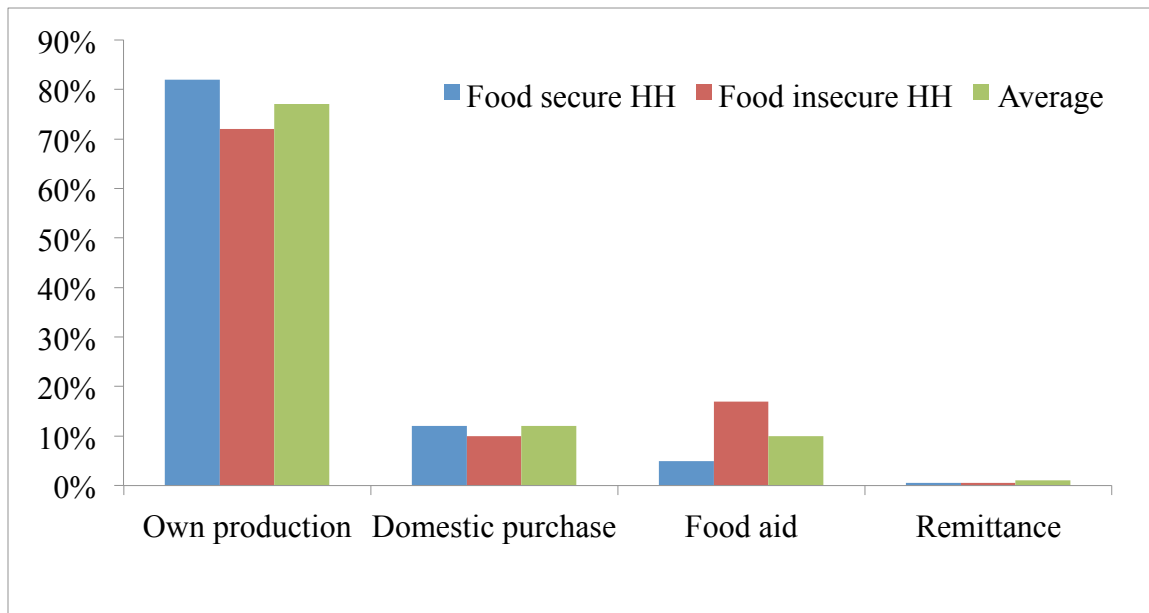


Figure 2: Food grain sources distribution of study area

Finally, the share from food aid and purchase is high for food insecure households than for food secure households. This implies that food insecure households were more dependent on purchasing of food commodities to meet the minimum household food consumption requirements than food secure ones. Moreover, food aid was received by food insecure households at large proportion that reflects food aid program is important source for food insecure households, who are vulnerable section of the community in the study area.

**Food grain types in the study area:** The main crops produced in the study area are barely, wheat, teff, beans, pea, lentil, oats and linseed (Table 2)

**Causes of Households Food Insecurity:** The causes of Ethiopian food insecurity are multifaceted and complex in their nature. As noted in FDRE (2002), for instance, adverse climate changes combined with high population pressure, environmental degradation, technological and institutional factors have led to a decline in the size of per capita landholding causing a severe food insecurity problem in the country. Furthermore, Degefa (2002) and Hussein (2006) have also indicated that the causes of household food insecurity vary from household to household, and the major causes of food insecurity in Ethiopia are closely related to environmental, demographic, economic, social, infrastructural and political factors.

Table 2: Major traditional food types and food grains available in the study area

No	Food item	Local name	Form of food stuff	Food Energy (Kcal/100Grams)	Total dietary energy supply
1	Barley	<i>Gerbu</i>	<i>qinche, qollo, Injera</i>	372.30	32.6
2	Wheat	<i>Qamadi</i>	<i>nefro, qollo, injera</i>	362.30	27.2
3	Teff	<i>Xaffii</i>	<i>Injera, dabo, qixa</i>	358.90	22.7
4	Pulses	<i>Dheedhii</i>	<i>Nifro, qollo, kik, ashug,</i>	355.30	17.5
Total					100

**Source:** Computed based on EHNRI's food composition table and Field survey, 2017

There were many natural and human factors are challenging farming households not to produce enough food for their families. Various techniques were used in order to identify the major perceived causes of food shortage of the community in the area. Surveys was conducted to estimate the net available food grain and per capita dietary energy in calories for consumption in the households. Respondents replied that diverse factors can either causes or aggravate food insecurity at household level. For instance, demographic, economic, biophysical, institutional and socio-cultural related constraints were mentioned as the main causes of food insecurity. Though the causes are diversified, interrelated and believed as the root causes for another problem. They have also different magnitudes and the level of influence on household food insecurity.

**Biophysical related causes:** Frost problem, inadequate and erratic rainfall distribution, pest and weeds, poor soil fertility, drought, water logging and soil erosion were identified



as the major biophysical related problems of food insecurity identified by households are. Households responded on the degree of influences of these problems on household food production. The major biophysical factors for the declining trend of crop production are shown in Table 3. Among this, frost problem, inadequate and erratic rainfall distribution, pest and weeds, poor soil fertility, and are the most dominant bio-physical factors making the rank from one to four respectively in constraining food production in general and household food insecurity particular.

Table 3: Biophysical related causes

Biophysical related causes	Food secure N=(72)		Food insecure N=(116)		Total (N=188)	
	Number	Percent	Number	Percent	Number	Percent
Frost problem	24	33.3	81	69.9	105	55.5
Inadequate and erratic rainfall	17	23.6	80	68.9	97	52.0
Pests and weeds	14	19.4	78	67.2	92	49.1
Soil infertility problem	12	16.6	56	48.3	68	36.2
Drought	11	15.2	54	46.6	65	34.2
Water Logging	8	11.1	23	19.2	31	16.3
Soil erosion	8	11.1	17	14.6	25	13.1

Accordingly, the primary and significant farming problem in the study area which 60.7 percent of samples agreed on it was frost problem. During the Interview time (woreda expert) explained that *“Mostly barley and wheat crops that are mostly grown and cover large share of crop production in the area highly affected by frost problem”*. In addition, Focus Group Discussion participate from Ayeda-Teklo Kebele indicate that, *“We did all things to improve our crop production including use of agricultural input, and crops growing in good way at beginning. However, due to frost problem all our crops production failed”*.

Fifty two percent of sample respondents described as inadequate and erratic rainfall are the main constraints to agricultural production and directly affects household food security by influencing food availability. In connection to this, Focus Group Discussion participants described that, *“Before twenty years, we produce crop twice a year, which is belg(spring season) and meher(summer season) crop production. But, currently, we cannot produce even meher crop properly due to erratic rainfall distribution”*.

Pest and weeds were considered as a major cause of household food insecurity because they reduced the productive potential of domestic production. 49.1 percent of the total sample respondents explained that pest and weeds infestation as more severely problem for their crop production. According to the participants of FGD, *“insect pest and weed infestation occur due to climate change particularly late rainfall and temperature increase, become cause for pest and weed infestation which leads to degradation of*

*productivity*". The pest called "*makas*" in Afan oromo language more prominent in the study area as mentioned by the FGD.

The other cause of household food insecurity was soil infertility problem which stated by 36.2 percent of respondents. Interview results also described that, "poor soil fertility and deforestation were among the major casuses for food insecurity.

**Demographic related causes:** One of our country's development challenges now is the rapid population increase rate that exceeds the economic growth (Hussein, 2006). Land fragmentation, rapid population growth, shortage of farmland, high age dependency and poor fallowing practice were the main identified demographic related causes for food insecurity in the area. Because it causes to increase the rate of soil erosion and depletion of soil fertility that directly reduces agricultural production and productivity and results household food Insecurity

According to responses of sample respondents on major demographic causes for the declining trend of crop production were shown in Table 4. For example, land fragmentation was among the other main constraint to improve agricultural production. Thus, 58.4 percent of households put land fragmentation size as the primary demographic related for household food insecurity. On the other hand, 53.3percent farmers reported high population pressure as a second cause of household food insecurity. In addition, high age dependency and poor fallowing practice were replied by 20.7 and 18.7 percent sample households respectively as other demographic related causes of household food insecurity in the study area.

Table 4: Demographic related causes

Demographic related causes	Food secure N=(72)		Food insecure N=(116)		Total (N=188)	
	Number	Percent	Number	Percent	Number	Percent
Land fragmentation	24	33.3	85	72.4	109	58.4
Rapid population growth	19	26.3	83	83.6	102	53.3
High age dependency	11	1.5	28	24.1	39	20.7
Poor fallowing practice	8	1.1	26	22.4	36	18.7

**Economic cause:** A household's status of economic /resource ownership/ had a significant role in enabling households to access food either through production or buy from market. Hence, the responses of sample farmers on major economic causes for the declining trend of crop production are shown in Table 5. 53.2 percent of households in the study area was lack of cash income. Income mainly improving agricultural activities and improves food production. Hence, cash income of the households was determined by productivity of agricultural production. In the study area, the limited cash incomes obtained from off/non farm income activities from casual labor wage are limited to

satisfy the cash demand of household. Limited livestock number owned and traditional farm implements were other economic cause for food insecurity as replied by 37.4 and 23.0 percent respondents respectively.

Table 5: Economic causes

Economic causes	Food secure N=(72)		Food insecure N=(116)		Total (N=188)	
	Number	Percent	Number	Percent	Number	Percent
Low cash income	24	33.3	77	66.3	101	53.2
Limited livestock owned	11	15.2	59	50.8	70	37.4
Traditional farm implements	10	13.8	36	31.0	46	23.0

**Source:** Field Survey, 2017

**Institutional and socio-cultural related causes:** As indicated in Table 6, the main institutional and socio-cultural related causes for food insecurity in the study area that identified by the households were inadequate extension services, absence of credit service, low use of agricultural input, cultural and religious ceremonies and poor educational attainment. Households are more likely to intensify agricultural livelihood activities and increase their production if extension workers support farmers regularly (Yishak et al. 2014). Access to extension services for crop and livestock production is inadequate for the household in the study area. According to sample respondents of food secure and insecure, about 30.3 and 78.9 percent respectively had stated that inadequate extension services as the cause of their food insecurity. As responses by FGD support given to livestock production through provision of improved livestock breed and lack of adequate veterinary services is almost poor in the communities understudy.

Table 6: Institutional and socio-cultural related causes

Institutional and socio-cultural related causes	Food secure N=(72)		Food insecure N=(116)		Total (N=188)	
	Number	Percent	Number	Percent	Number	Percent
Inadequate extension services	39	54.1	75	64.6	114	60.8
Low access to credit service	37	51.3	65	5.9	102	54.0
low use of agricultural input	28	38.8	17	14.6	65	34.2
Social and religious ceremonies	25	34.7	41	35.3	46	24.2
Low level of education	22	3.5	12	1.0	34	17.8

**Source:** Field Survey, 2017

Income generating activities included rural credit serves. Households with cash deficiency forecasted to compensate by making them accessible to credit provisions. But, most samples raised lack of credit service as the main problem to enhance agricultural production and productivity of subsistence farmers in the study area.

Agricultural input such as chemical fertilizers, manure, improved seeds, herbicides and insecticides are important for highly degraded land. However, poor input

utilization contributed a great share to low agricultural productivity that causes to low crop production in the area. As a result, it leads to low food production and erodes the capability of households to feed their family from own production.

According to survey result social and religious ceremonies and poor educational attainment were the main socio-cultural factors that cause effect on household food production and food insecurity status. They influence the food utilization of the households and way of saving and directly or indirectly affect the food access of the given community. Participants of Focus Group Discussion described that at different communities, various social ceremonies and celebrations taking place in the immediate post-harvest months use up sizeable proportions of annual farm households' incomes. Expenditure on the weddings of their children and ceremonies related to the death of relatives and family members were mentioned as social practices taking up much investment.

Furthermore, educational level, the educated farmers felt that their low level of education has adversely affected their production activities which clearly shown in their poor agricultural performance.

**Livelihoods Strategies to Households Food Insecurity:** This section presented investigation of livelihoods strategies conducted by households at the time of inadequate availability and accessibility of food. Different scholars in different contexts define livelihoods strategies. Sewnet (2015) stated that livelihoods strategies as a mechanism by which household or community members used to meet their relief and recovery needs and adjust to future disaster related risks and shocks by themselves without depending on any external support. Food insecure households in the study area develop their own mechanism of livelihood strategies to during food shortage. The respondents experienced in the past during food insecurity in order to cope up from food problems. As per the collected data responses from the respondents through questionnaire, interview and focus group discussion, respondents were mentioned and identified different livelihood strategies. Meskerem (2011) forwarded that livelihoods strategies used by rural households categorized in to three sub-themes namely increasing food supplies by income generating ventures, reducing household food consumption and reducing number of their family. The rural dwellers of Ethiopian used different coping strategies so as to cope up with the existing food insecurity including reduction in number and quantity of meals per day, diversification of livelihood incomes and migration. In addition to the coping mechanisms used by rural households, the government of Ethiopia used different strategies to mitigate food insecurity including food aid and implementation of PSNP (Sewnet, 2015).

As depicted in the Table 7, the most commonly practiced livelihoods strategies at household level that are sequentially used during the severe food crisis time according to the responses of the farmers in the study area are discussed as follows:

Table 7: Major livelihoods strategies to food insecurity by sample respondents

Households livelihoods strategies	Food Secure (N=72)		Food Insecure (N=116)		Total (N=188)	
	Number	Percent	Number	Percent	Number	Percent
<b>Increasing food supplies /Income generating<sup>t</sup></b>						
Selling livestock	39	54.1	93	80.1	132	70.7
Borrowing	32	44.4	72	62.0	104	55.2
Receive food aid	27	37.5	60	51.7	87	46.4
Engaging in petty trade	26	36.1	34	29.3	60	32.1
Sale fire wood and charcoal	25	34.7	28	24.3	53	28.9
Employing as a daily labor	22	30.5	30	25.8	52	27.6
Participating in PSNP	20	27.7	30	25.8	50	26.5
Leasing out land	6	8.3	38	32.7	42	22.2
Selling local drink and food	6	8.3	32	27.5	38	20.1
<b>Reducing household food consumption</b>						
Eating less preferred food	18	25.0	87	76.9	105	55.5
Reducing size & number of meals	17	23.6	86	74.1	103	54.6
<b>Reducing number of people in the household</b>						
Migrating to other areas	8	11.3	47	41.5	55	29.2
Send children to eat from other	5	6.8	45	39.8	48	25.4

Source: Field Survey, 2017

**Selling livestock:** Besides their complimentary relationship with crop production, livestock provide large proportion against risk of food insecurity. Therefore, when food produced consumed and no cash reserve available to purchase food grain, household sale their animals and can buy food grain for their home consumption. Accordingly, among the sample households, 29.7 percent of food secure and 70.7percent of food insecure households were involved in the sales of animals to acquire food whenever there is a shortfall in food supply. This mechanism was ranked as the first important coping practices.

**Eating foods that are less preferred:** The method by which households were used less preferred or cheapest foods. According to respondents report, during shortage of food availability and inadequate access, households purchase from the market less preferred and cheapest foods like low quality wheat, barley, millet, maize and *shalo*, which consist less nutritional value. This method sometimes may leads to cause malnutrition and other health problem. This mechanism was ranked as the second important coping practice. The proportion of food secure and food insecure households who practiced eating less preferred foods during food supply shortage was 13.7 and 55.5percent respectively.

**Borrowing:** Borrowing either food or money was one of the strategies that the households used in the study area. Households found in one Kebeles borrow from friends

or relatives in the other Kebeles, within Kebeles or even from friends or relatives found in other woredas with the understanding that the loan will be paid back when the borrower will get harvest or money. However, borrowing money for food sometimes can lead to permanent indebtedness and is an example of how a short-term coping strategy can put a household in a more vulnerable position with regard to longer-term livelihood options. This mechanism is ranked as the third important coping practice. The proportion of food secure and food insecure households who practiced borrowing cash and /or food during food supply shortage were 20.6 percent and 55.2 percent, respectively

**Reducing number and size of meals:** lower-income groups change their consumption behavior in times of food crisis. Change takes place in frequency and amount of food consumed depending on the degree of the severity of the problem. The respondents of the study area respond to food crisis and shortage, by skipping the regular frequency of meals and quantity of food they take. Households usually decide to go hungry for days and skip meals voluntarily and the family usually gives more priority for children than adults. This mechanism is ranked as the fourth important coping practices. The proportion of food secure and food insecure households who practiced skipping meals during food supply shortage were 12.6 and 79.6 percent, respectively.

**Food Aid:** According to the information obtained from disaster prevention and preparedness desk of the Woreda, the food aid requested and delivered in the woreda and the number of population needing food assistance are mismatched. Most of the respondents explained that it doesn't cover the food requirement of the family and also not given on regular basis.

**Engaging in petty trade:** Both men and women are actively involved in petty trading. Such trading items were fruits, root crops, large and small animals. These items were bought from smallholder farmers, and either by animals or by human labour transported to the market centers. However, lack of capital, and little of profit were the main problem of this method due to sometimes consumed for home those who engage in this activity.

**Sale fire wood and charcoal:** Charcoal burning and fuel wood selling subsidize farming households in the study area at varying degrees. The respondents indicated that these strategies are sources of daily income especially during bad times.

**Migration:** Most migration takes place from rural villages to urban areas. Though migration takes place under normal conditions in the study area in search of better life, it is also a response for food shortages and used as a survival strategy.

**Employing as a daily labor:** Wage labour is other means of generating income during times of poverty and food shortage. For some young and working age people who are landless and land short, non-agricultural and agricultural wage labor is an important source of income. Children usually work both for themselves and for their parents.

Survey result shows that, among the livelihood strategies participating in PSNP, send children to eat from other, leasing out land and selling local drink and food are practiced by some proportion of households in the study area.

### Binary Logistic Regression Model

The logistic regression model takes a dummy variable as the dependent variable. The logistic regression applies maximum likelihood estimation after transforming the dependent into a legit variable (the natural log of the odds of the dependent occurring or not). In this way Logistic regression calculates changes in the log odds of the dependent not changes in the dependent itself.

Here, household food insecurity status is the dependent variable where a value of zero is given for food insecure households and a value of one is given for food secure households. A household is said to be food insecure if the total kilocalorie available to the household divided by the family size of the household and the number of days in a year less than 2100 cal per person per day.

Among the threaten factors included in the model four factors are found to have more significant impact in determining the state of food insecurity. These are land size, livestock holding, oxen holding, and off/non farm income (Table 8)

Table 8: Factors determining the state of food insecurity among sample respondents

Variables	Responses	B	S.E.	Wald	df	Sig.	OR	95% C.I. for EXP(B)	
								Lower	Upper
Land size	≤ 1.5 ha	1.057	.466	5.143	1	.023	2.877	1.154	7.173
	>1.5 ha								
TLU	≤5	-.821	.470	3.050	1	.021	.440	.075	1.106
	>5								
Ox/Oxen	≤2	-2.596	.473	30.083	1	.000	.075	.029	.189
	>2								
Off/non farm income	≤5000 birr	-3.375	.430	61.686	1	.000	.034	.015	.079
	>5000 birr								
	Constant	3.098	.371	69.586	1	.000	22.163		

Source: Field Survey, 2017

The respondents who had less than or equal to 1.5 hectares were 2.8 times more likely food insecure as compared to respondents who had more than 1.5 hectares (OR=2.877, 95 CI (1.154-7.173)). The respondents who had less than or equal to 5 TLU were 56 percent less likely food insecure as compared to respondents who had more than 5 TLU (OR=0.075, 95 CI (0.29-.189)).

The respondents who had less than or equal to 5 livestock units of ox were 93% less likely food insecure as compared to respondents who had more than 5 livestock units of ox (OR=0.075, 95 CI (0.029-0.189)). The respondents who receive less than or equal to 5000 birr per year were 97% less likely food insecure as compared to respondents who receive more than 5000 birr (OR=0.034 95 CI (0.015-0.079)).

## Conclusions

The study revealed that, the family sizes of food insecure households were greater than food secure households. Moreover, majority of the households were lower in holding of cultivated land, ownership of livestock and lower in generating off/non-farm income. Biophysical related problems such as frost problem, soil infertility problem, inadequate and erratic rainfall, water logging, soil erosion, pests and diseases are the main constraints to crop production. The major livelihood strategies of the households practiced in the study area, according to their rank, were selling livestock, eating foods that are less preferred, borrowing grains or cash, reduce number of meal, reduce size of meal, engaging in petty trade and sale fire wood and charcoal. As the study result indicated, the food insecurity status of Abichu and Gnea is widespread. Therefore, strong effort needed to reduce the study area food insecurity status. It is necessary to make food accessible, either in the form of means to produce or of purchasing power to buy it.

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