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Determinants of food insecurity among rural households of South Western Ethiopia

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This study seeks to determine households' determinants of food insecurity among rural households in Woliso district, South Western Ethiopia. The main objective of this study is to identify factors influencing food insecurity in the study area. The study used household-level survey data collected from 122 sample households in Woliso district, and systematic random sampling technique was employed to select the sample households. Calorie acquisition by households was used to categorize the sample households into food secure and food insecure. Accordingly, results of descriptive analysis show that about 25.4 % and 74.6 % of the sample households were found to be food insecure and food secure, respectively. Comparison of percentage of food insecurity was also conducted between two-groups for some discrete variables, and results revealed that food insecurity significantly varies between the two groups. Results of the logit model showed that household's education level, dependency ratio, amount of amount of land and amount of fertilize have significantly influenced the level of food insecurity in the study area. Policy interventions aimed to change food security situation in the study area need to be diversified by focusing on enhancing family planning programs, promoting access to basic education to rural households and efficient functioning of land markets.

Key words: Food insecurity, calorie acquisition, logit model, Woliso district.

INTRODUCTION

Food security is one of the major world agenda in 2018 in several contexts. Worldwide, in 2017 about 124 million people in 51 countries faced food security crisis (FSIN, 2018). According to FSIN (2018), conflict and insecurity are the major drivers of food insecurity in eighteen countries, and the number of food-insecure people across the world has been increasing over time. Likewise, food security situation in Ethiopia deteriorated sharply in 2017. In Ethiopia, the number of food-insecure population was increased from 5.6 million in December 2016 to 8.5 million in August 2017 (ACAPS, 2018). An estimated 3.6 million children and women in Ethiopia were acutely malnourished in 2017 (IFRC, 2018).

The main causes of food insecurity in Ethiopia are prolonged drought, conflict and insecurity, crop disease, etc. According to FAO (2018), in Ethiopia, prolonged drought conditions are severely affecting the livelihoods in most southern and southeastern pastoral and agro-pastoral areas of SNNPR, southern Oromia and southeastern Somali Regions, where cumulative seasonal rainfall was up to 60 percent below average. In these areas, pasture and water availability have declined to

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extremely low levels, severely affecting crop production and livestock conditions, leading to large scale animal deaths. More than one million people are displaced in Ethiopia, most of whom have been displaced by conflict starting in September 2017 and many of whom are displaced along the Oromia-Somali regional border (FEWS, NET and WFP, 2018). In the near-time, this displacement has disrupted households' ability to engage in their typical livelihoods activities, such as seasonal cultivation and raising of livestock, and has resulted in food security crisis in the region where conflict has been reported to be most severe. Another factor driving the food security crisis in Ethiopia is the fall armyworm outbreak, which affects large parts of the country; especially maize-producing parts of SNNPR, Western Oromia, Amhara, Gambela, and Benshangul Gumuz (ACAPS, 2018; FEWS, NET and WFP, 2018). According to ACAPS (2018), food security situation in Ethiopia remain acute in 2018 with the reduced output of 2017 harvests, decreased food access as a result of poor purchasing power, and the exhaustion of coping mechanisms.

The problem of food insecurity greatly varies among households residing in the same country. In Ethiopia, some households frequently face the problem of food insecurity, even in areas where there are no aforementioned drivers of food insecurity. Although a number of efforts have been done to achieve food security at the household level in the rural areas of Ethiopia, it has remained as a challenging goal even today. In Ethiopia, the poor performance of food security at household level is associated with poor institutional forms and dependency on rain-fed agriculture, which is highly vulnerable to drought which leads to loss of rural household's lives and livelihoods in every three years (Abduselam, 2017).

Most of previous studies have focused on wider level. For instance, study conducted by Lemesa et al. (2017) reviewed literature to seek an answer for the question "why does food insecurity persist in Ethiopia?" They found that macro-economic challenges like increasing food prices and unemployment determine the prospect of food security in the country. Therefore, according to them, there is an urgent need to transform access to agricultural technology by farmers and employment opportunity. However, interrelated causes of household food insecurity require an analysis at a household level. Therefore, this study aims to examine determinants of food insecurity among rural households of South Western Ethiopia by taking sample households from Woliso district.

REVIEW OF LITERATURE

Food insecurity is an evolving concept. There are many definitions of food insecurity, which is a clear indication of differing views and approaches to the problem. FAO defined food insecurity as "a *situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life"* (FAO, 2008; Marion, 2011).According to this definition, factors that may lead to a situation of food insecurity include non-availability of food lack of access, improper utilization and instability over a certain time period. In other words, food availability, access, stability and utilization form the four pillars of food security. The four pillars must be fulfilled simultaneously in order to realize food security objectives. Determinants of each pillar are as shown in Figure 1.

Based on duration, food security analysts have identified two types of food insecurity, which are chronic and transitory (FAO, 2008). Chronic food insecurity is long-term or persistent, and occurs when people are unable to meet their minimum food requirements over a sustained period of time. Contrarily, transitory food insecurity is short-term and temporary, and occurs when there is a sudden drop in the ability to produce or access enough food to maintain a good nutritional status. While chronic food insecurity results from extended periods of poverty, lack of assets and inadequate access to productive or financial resources, transitory food insecurity is caused by short-term shocks and fluctuations in food availability and food access, including year-to-year variations in domestic food production, food prices and household incomes. There is also a concept of seasonal food insecurity which falls between chronic and transitory food insecurity (FAO, 2008). It occurs when there is a cyclical pattern of inadequate availability and access to food. This is associated with seasonal fluctuations in the climate, cropping patterns, work opportunities and disease.

Household food insecurity in Ethiopia has been studied by many researchers, who came up with different findings. Endalew et al. (2015) reviewed food security situation in Ethiopia and causes of food insecurity, and found that about 10% of Ethiopia's citizens are chronically food insecure and this figure rises to more than 15% during frequent drought years. According to them, the deteriorating food security situation in Ethiopia is caused by multifactor, which include population pressure, drought, shortage of farmland, lack of oxen, deterioration of food production capacity, outbreak of plant and animal disease, poor soil fertility, frost attack, shortage of cash income, poor farming technologies, weak extension services, high labor wastage, poor social and infrastructure facility and pre-and post-harvest crop loss. To address food security issue in Ethiopia, they suggested that household heads and members of the households should engage in different income generating activities for means of living and coping mechanism. In addition, the government should incorporate different research outputs to design programs that can tack food

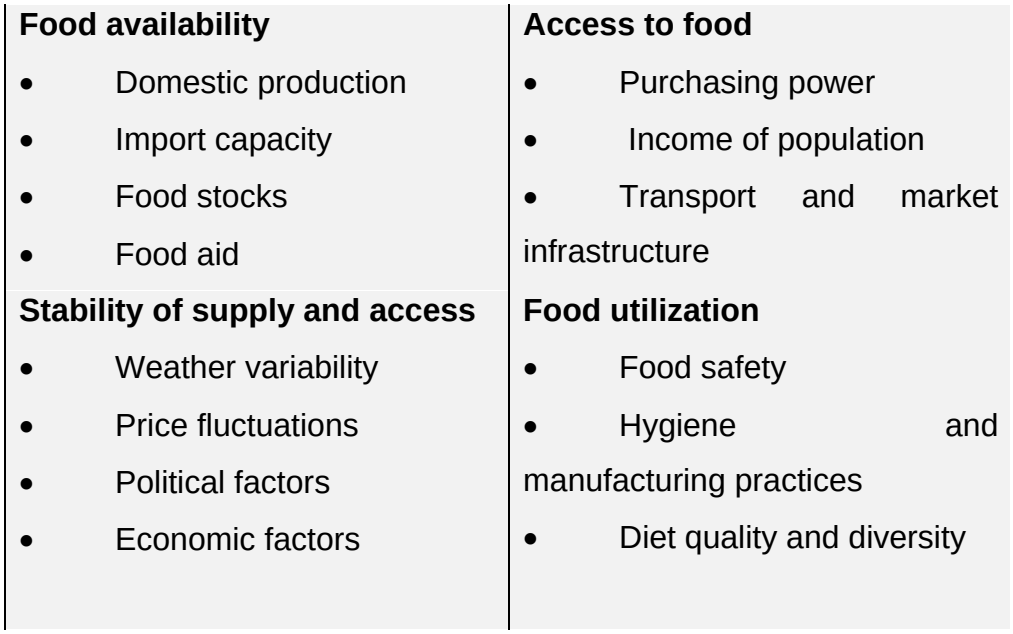

Figure 1. Determinants of each pillar.
Source: FAO (2008) and Marion (2011).

insecurity. Using empirical analysis, Beyene and Muche (2010) examined determinants of household food security among rural households in the Ada Berga district in Central Ethiopia. Household calorie acquisition was analyzed to measure the status of household food security. They estimated the logit model to identify variables which can significantly influence household food security in the study area. Accordingly, they found that variables like experience in farming activities, off-farm and non-farm incomes, land and livestock holdings, as well as soil and water conservation practices significantly influence household food security. Besides, difference in fertilizer use has a positive impact on food security, in which food security was improved as the intensity of fertilizer use increases. Result of the study further indicated that development interventions aiming at income diversification, improved fertilizer supply; increasing land and livestock productivity will enormously contribute to the attainment of food security in the study area. The study conducted on food insecurity in rural areas of Eastern Ethiopia also indicated that socio-economic factors can influence food insecurity (Bogale and Shimelis, 2009). According to Bogale and Shimelis (2009), socio-economic variables like family size, annual income, amount of credit received, access to irrigation, age of household head, farm size, and livestock owned have significant influence on food insecurity in rural areas of Dire Dawa, Eastern Ethiopia. Their findings implied that improvement in food security situation in the study area requires building household assets, improving the functioning of rural financial markets and promoting family planning.

In general, the reviews of empirical studies of household food security/insecurity in Ethiopia show the existence of difference in findings, which are associated with difference in study areas. Therefore, their findings may not apply in different contexts. Moreover, most of previous empirical studies done on the problem were stick to similar methods. This study is an attempt to fill the aforementioned gaps using different methods, focusing on determinants of food insecurity among rural households of Woliso district, South Western Ethiopia.

MATERIALS AND METHODS

Data collection

This study depended mainly on primary data, which was collected from sample farm households using questionnaire. The questionnaire was administered to heads of farm households through interviews by trained enumerators. In the absence of the head of the household, other members of the household such as grown up child who can provide the required information was interviewed. For the interview, trained enumerators were deployed, and continuous supervision was made by the researcher to correct possible errors in the interview. The primary data needed for the study mainly focused on households' demographic and socio-economic characteristics, their food consumption and expenditure, asset ownership and crop production, technology adoption and access to different services, and households' perception toward food insecurity. It is known that households do not keep records of data on different aspects. So, the household survey entirely depended on recall method.

The target population of this study is farm households living in Woliso district, South Western Ethiopia. There are 22, 888 farm households in Woliso district (SWSZANRO, 2018). The study used a simplified formula provided by Yamane (1967) to determine the

sample size at 95% confidence level and 5% degree of variability (Israel, 2002). In addition, 5% level of precision is used in order to get the sample size which represents a true population. According to Hussey and Hussey (1997), no survey can ever be believed to be free from error or provide 100% surety and error limits of less than 10% and confidence levels of higher than 90% can be regarded as acceptable. The sample size determination formula provided by Yamane (1967) is as follows (Israel, 2002).

$$n = \frac{N}{1 + N(e)^2}$$

where n is the sample size, N is the total number of farm households in Woliso district, which is 22,888. e is the level of precision or sampling error, which assumed to be 9% for this study.

$$n = \frac{22{,}888}{1 + 22{,}888(0.09)^2} \cong 122$$

Therefore, this study randomly selected 122 farm households from the target population, and systematic random sampling based on a given interval between houses was employed during household selection.

Data analysis

The data analysis was started with the conversion of monthly, weekly and daily consumption data into kilocalorie (kcal) in order to realize objective of the study. The converted data was further changed into household adult equivalent (AE). Following this, the amount of energy in kcal for sampled households was recorded. Next, kcal of each sample household was compared with the minimum subsistence requirement per AE per day. The government of Ethiopia has set the minimum subsistence food requirement per AE per day at 2200 kcal (MoFED, 2010/2011). Households which consume below this minimum requirement were grouped as food insecure whereas those which consume above the threshold were grouped as food secure. Thus, the response variable (food insecurity status) is a dichotomous, which takes a value of y = 0 if a household is food secure and the value y = 1 if the household is food insecure. Here, we are interested in estimating the probability that a household is food insecure, given the explanatory variables. This probability can be expressed by logistic distribution function as (Gujarati, 2004):

$$P(y_i = 1|X_i) = \Lambda(\beta_0 + \beta X_i) = \frac{e^{(\beta_0 + \beta X_i)}}{1 + e^{(\beta_0 + \beta X_i)}}$$

where $P(y_i = 1|X_i)$ is the probability that household i is food insecure, given the explanatory variables, Λ is the logistic cumulative distribution function, X_i is the column vector of explanatory variables and β is the row vector of slope of coefficients to be estimated.

If $z_i = \beta_0 + \beta X_i$, the aforementioned function can be re-expressed as:

$$P(y_i = 1|X_i) = \Lambda(z_i) = \frac{e^{z_i}}{1 + e^{z_i}}$$

As z_i ranges from $-\infty$ to $+\infty$, $P(y_i = 1|X_i)$ ranges between 0 and 1.

If $P(y_i = 1|X_i)$ is the probability that household i is food insecure, then the probability that the household is food secure, $1 - P(y_i = 1|X_i)$, can be expressed as:

$$1 - \mathrm{P}(\mathrm{y_i} = 1|\mathrm{X_i}) = \frac{1}{1 + \mathrm{e}^{\mathrm{z_i}}}$$

Thus, $\frac{P(y_i=1|X_i)}{1-P(y_i=1|X_i)} = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i}$

The expression $\frac{P(y_i=1|X_i)}{1-P(y_i=1|X_i)}$ represents the odds ratios in favor of food insecurity. It means the ratio of the probability that a household will be food insecure to the probability that he/she will be food secure.

By taking the natural log of odds ratio, we obtain the following result known as logit model:

$$L_i = \ln\left(\frac{P(y_i = 1|X_i)}{1 - P(y_i = 1|X_i)}\right) = Z_i = \beta_0 + \beta X_i$$

L_i, the log of the odds ratio, is called logit.

Based on empirical literatures reviewed, six explanatory variables were identified, and the final logit model was specified as follows:

$$Z_i = \beta_0 + \beta_1 HHSex + \beta_2 HHE_i + \beta_3 DR_i + \beta_4 Mkt_i + \beta_5 Pest_i + \beta_6 Fert_i + \beta_7 Land_i + \beta_8 Livestock_i + U_i$$

where $HHSex$ represents sex of household head, HHE is education level of household head, DR is dependency ratio, Mkt is access to market, $Pest$ is pesticide use, $Fert$ is amount of fertilizer, $Land$ is amount of land and $Livestock$ represents livestock ownership.

After specification of the logit model, diagnostic tests were conducted to detect the problem of hetroscedasticity and multicollinearity. Moreover, to assist the regression analysis, two-group percentage of food insecurity-comparison test was done for discrete variables with two categories, such as sex, land owning, fertilizer usage, improved seed usage, pesticide usage, herbicide usage, road access, market access, credit access and ceremonial practice.

RESULTS AND DISCUSSION

Descriptive analysis

For examining the food security status of sample households, calorie acquisition by households is taken as an indicator. The amount of energy attained by a household is compared with the minimum subsistence requirement per AE per day (that is, 2200 kcal). Accordingly, the result shows that 25.4% (31) and 74.6%

Table 1. Food security status and calorie intake of sampled household.

Variable	Total (N=122)			Food insecure (N_1=31)			Food secure (N2=91)			Mean difference	t-value
	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean		
Calorie intake	14,785	1,500	3,160	1,500	2,199	2,027	14,785	2,250	3,541	1,514	2.999***

*P<0.1, **P<0.05, ***P<0.01.
Source: Sample Household Survey (2018).

(91) of the sampled households were found to be food insecure and food secure, respectively.

Table 1 shows that the mean energy intake of food insecure households is 2,027, whereas that of food secure household is 3,541. The mean comparison test (t=2.9992***) confirms that there is significant difference between food insecure and food secure households with respect to calorie intake. Socio-economic characteristics of farm households are important determinants of their food security or insecurity status (Babatunde et al., 2007).

Table 2 compares the percentage of food insecure households between two categories of discrete variable under consideration. This comparative analysis helps us to identify which category is more vulnerable to food insecurity in the study area. Table 2 shows that of female headed households 57% are food insecure, whereas only 18% are food insecure for male headed households and the difference (39%) is significant at 1% level of significance. This implies female headed households are more vulnerable to food insecurity as compared male headed households. This difference is associated with customary rules and practices that often have restrictive effects for women through limiting their access to resources and their roles in food production, preparation, processing, distribution, and marketing activities, which generally affects women's food security and nutrition. Zakari et al. (2014) also found that male-headed households are more food secure compared to female headed households, which is consistent with result shown in Table 2.

Food insecurity and educational deprivation are highly correlated, and they create vicious circle in rural community of many developing countries (DFID, 2005). In the same way, from Table 2, we understand that illiterate households are more food insecure than literate households, revealing that education contributes to food security especially through influencing productivity. This finding is consistent with the result of study conducted by Mutisya et al. (2016). Using longitudinal data analysis, Mutisya et al. (2016) found that the probability of being food insecure decreased by 0.019 for a unit increase in the average years of schooling for a given household. In addition, Mutisya et al. (2016) explained that investment in education of households, in the long-run, contributes to reduction in the prevalence of food security.

Livestock ownership plays a key role in contributing to food security through enabling direct access to livestock products, providing cash income from sale of livestock and livestock products for purchasing food, and contributing to increased crop yields as result of improved productivity from the use of manure and traction. The result of the present study shows this fact; livestock ownership patterns play significant role in determining household food security. Table 2 shows that households without livestock are more food insecure than those with livestock. This result is consistent with the result of study done by Ali and Khan (2013). Ali and Khan (2013) found that livestock ownership has a positive impact on rural household food security in Pakistan.

Modern agricultural technologies, such as fertilizer, improved seed, pesticide and herbicide, as shown in Table 2, result in difference in food security between those who use them and who do not use them. Households who use each of these farming inputs is more food secure than those who do not use them. According to Popp et al. (2013) and Kughur (2012), the use of pesticide and herbicide provides economic benefits to the farmers through protection of crop quality and yield; especially it can prevent large crop losses, thus increasing agricultural output and farm income.

Similarly, previous empirical studies have indicated that the use of fertilizer has significant effect in achieving of food security. For instance, Stewart and Roberts (2012) have evaluated long-term studies, and the result shows that the average percent of yield attributable to fertilizer inputs ranges from 40 to 60% in temperature climates. Specially, yield attributable to fertilizer tends to be much higher in the tropics, which ensures food security in the areas considered by the studies.

Improved seed is also a key input for improving agricultural productivity; thus enhancing household food availability and increasing household income. Table 2 confirms that improved seed very is important in attaining food security in the study area. Rural households that use improved seed are food secure, whereas 81% rural households who do not use improved seed are food insecure, and the difference between the users and non-users of improved seed is significant. This result is consistent with a study by Bekele (2017), finding that improved seed beneficiaries earn 41.8% higher income than non-beneficiaries. In addition, he suggested that sustainable access to improved seeds by food insecure households can ensure them to improve their food

Table 2. Comparison of food insecurity by different socio-economic variables.

Variable	Categories	Food insecure (%)	Percentage difference	t-value
Sex of household head	Female	57	39	14.982***
	Male	18		
Education	Illiterate[1]	86	81	3.939***
	Literate	5		
Land ownership	No	80	57	2.968***
	Yes	23		
Livestock ownership	No	90	71	5.513***
	Yes	19		
Fertilizer usage	Non-users	95	84	10.785***
	Users	11		
Improved seed usage	Non-users	81	81	17.933***
	Users	0		
Pesticide usage	Non-users	69	66	11.224***
	Users	3		
Herbicide usage	Non-users	85	85	21.486***
	Users	0		
Market access	No	78	73	12.296***
	Yes	5		
Credit access	No	71	68	11.747***
	Yes	3		
Road access	No	81	77	14.232***
	Yes	4		

*P<0.1, **P<0.05, ***P<0.01.
Source: Sample Household Survey (2018).

security status.

Access to market and road play a crucial role in achieving global food security by increasing access to food. More importantly, farmers can boost agricultural output productivity and availability through getting access to agricultural input markets, such as improved seed and fertilizer. Besides, farmers can increase production if they have access to feasible market for their agricultural outputs. In Woliso district, as can be seen from Table 2, households that do not have access to market are more food insecure than those who have access to it. In studying the correlation between market access and level of food security in Nepal, Shively and Thapa (2017) have found that each one-hour reduction in travel time required to reach a market center is associated with a 0.2% increase in the non-staple food expenditure share, which is an indicator of food security. Table 2 also reveals that households that have access to road are more food secure than those that have limited access to road. Shively and Thapa (2017) have confirmed this finding, in which they found that food insecurity prevalence falls by 0.5% for each one-hour reduction in travel time to a well-paved road.

Access to credit is also an important instrument for household in purchasing modern agricultural technologies when the household faces budget deficit. It also normalizes consumption at the hard time. The result in Table 2 shows that households that have access to credit are more food secure than those having limited access to it.

Table 3. The Logit model regression result for determinants of food insecurity (Y=1).

Food insecurity	Coefficient	Robust standard error	Z-value	P>|z|	Odds ratio	95% confidence interval of odds ratio
HHSex (cat.)	-0.611	1.376	-0.44	0.657	0.543	[0.036, 8.048]
HHE (cat.)	-5.782	2.712	-2.13	0.033**	0.003	[0.000, 0.626]
DR^2 (cont.)	3.472	2.079	1.67	0.095*	32.188	[0.547, 1892.495]
Mkt (cat.)	-1.657	1.047	-1.58	0.114	0.191	[0.024, 1.484]
Pest (cat.)	0.135	1.120	0.12	0.904	1.145	[0.127, 10.288]
Fert (cont.)	1.283	0.619	2.07	0.038**	3.608	[1.071, 12.145]
Land (cont.)	-3.211	1.502	-2.14	0.033**	0.040	[0.002, 0.765]
Livestock (cat.)	-0.083	1.924	-0.04	0.965	0.920	[0.021, 39.948]
Constant	2.781	1.425	1.95	0.051	16.127	[0.987, 263.496]
Number of observation						122
Wald chi^2 (8)						26.85***
Prob > chi^2						0.0008
Pseudo R^2						0.8715
Log likelihood						-8.129

[1]Illiterate means those that cannot read and write. [2]Dependency ratio is the proportion of the number of household members whose age are less than 15 years and greater than 65 years to the number of household members whose age are in between 15 and 65 years.
(cat.) and (cont.) represent categorical variable and continuous variable, respectively. *P<0.1, **P<0.05, ***P<0.01.

Pseudo $R^2 = 1 - \frac{\mathcal{L}_{ur}}{\mathcal{L}_o} = 1 - \frac{(-8.129)}{(-63.268)} = 1 - 0.1285 = 0.8175$, where $\mathcal{L}_{ur}$ is the log-likelihood function for the estimated model and $\mathcal{L}_o$ is the log-likelihood function with only intercept. The odds ratio is computed from the logistic regression using STATA software.

Source: Sample Household Survey (2018)

Econometric analysis

The Logit model having eight explanatory variables was estimated, and the result of the regression is shown in Table 3. The explanatory variables are identified based on the previous empirical literatures. Some important variables that may affect household's food security status, such as access to road, credit, herbicide and improved seed were omitted from the model because of the problem of multi-collineratity.

From Table 3, we see that out of eight explanatory variables included in the model, four of them were found to be significant. These are household's education level, dependency ratio, amount of amount of land and amount of fertilizer. While the first three explanatory variables have the expected sign, the last one come up with unexpected sign.

The regression result reveals that education level of household head has negative and significant effect on household food insecurity. The odds ratio in favor of food insecurity of illiterate households is 0.3% much higher than that of literate households, indicating that illiterate households are more food insecure than literate households. This reflects improvement in human capital contributes to food security significantly, which is consistent with our descriptive analysis. The possible explanation of this result is that literate households have more chance to apply their knowledge towards the achievement of food security as compared to illiterate households. Similarly, Okyere et al. (2013) found negative and significant association between education level of household head and food insecurity. In their study, they showed that the odds of household heads having primary education are about 2.2 times more likely to be food secure than those with no formal education.

The maximum likelihood estimate shows that dependency ratio significantly influences food insecurity, and there is positive association between them. As it is observed from Table 3, the odds ratio in favor food insecurity will increase by a factor of 32.188 as the dependency ratio increases by one unit. In other words, the probability that a household becomes food insecure will increase as the number of dependent members of the household increases. This finding is obvious because the dependents contribute less labor and income to the family, which reduces the amount of food available to each of the family member. This reiterates the findings of others in which a household with large size, composed of mainly non-productive members is more likely to be food insecure due to high burden levied on active labor (Beyene and Muche, 2010). Moreover, the positive relation between dependency ratio and food insecurity implies that family planning policies, which have an impact in reducing dependent household size, will increase the probability of a household to be food secure.

In contrast to the result shown in the descriptive

analysis, amount of fertilizer is negatively correlated with food security. This finding contradicts previous findings, who stating that there is a positive association between the amount of fertilizer applied in farming and achievement of food security (Beyene and Muche, 2010; Stewart and Roberts, 2012).

Majority of people in developing countries depend on agriculture as their subsistence of life. Therefore, access to land for rural people is essential for food security and economic development in developing countries. The logit model regression result points out that size of farm land holding is found to have a negative and significant impact on food insecurity. That is, the odds ratio in favor food insecurity will decrease by a factor of 0.04 as size of farm land increases by one hectare. Households with large farm land produce more for household consumption and for sale; thus have higher chance to be food secure than those having relatively small size of farm land. This finding supports result shown by Table 2, and is consistent with studies done by Beyene and Muche (2010), Muraoka et al. (2014), indicating a negative association between farm land size and food insecurity.

CONCLUSION AND POLICY IMPLICATIONS

This study has examined determinants of food security among rural households in Woliso district, South Western Ethiopia. Even though the descriptive result supports the importance of chemical fertilizer in enhancing food security, the econometric result invalidates the positive association between fertilizer use and improvement in food security. This indicates policies and strategies working on the use of chemical fertilizer should focus on long-run effect of chemical fertilizer on food security. On the other hand, the result supports the worth of human capital development in improving food security in the study area. Therefore, rural development policies should encourage access to basic education to improve the food security situation by revealing the strong association between education and food security. Moreover, the study found positive relation between dependency ratio and food insecurity, implying family planning policies should be enhanced in order to reduce food insecurity. Finally, like many empirical studies, this study also found out that there is significant relationship between size of farm land and achievement of improved food security. This implies that land markets should work efficiently to make land-constrained rural households to access additional land for cultivation. Generally, the results of this study suggest that attaining food security in the study area requires adoption of mixed policies and strategies, which can influence significant variables. Future research works should pay attention to the present empirical evidences in the study area, to investigate issues which have not been addressed by this research. Moreover, it will better if the future research works examine the problem using panel data analysis.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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