CAUSES OF HOUSEHOLD FOOD INSECURITY IN KOREDEGAGA PEASANT ASSOCIATION, OROMIYA ZONE, ETHIOPIA

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Abstract

The main objective of the study was to examine the determinants of households' food security using a logistic regression procedure. The model was initially fitted with eleven factors, of which six were found to be significant, and all exhibited the expected signs. These include farmland size, ox ownership, fertilizer application, education level of household heads, household size, and per capita production. The result was analyzed further to compute partial effects and to conduct simulation studies on significant determinant factors. Analysis of partial effects revealed that an introduction to fertilizer use and an improvement in the educational levels of household heads lead to relatively greater probability of food security. On the other hand, simulations were conducted on the basis of the base category of farmers, representing food secure households, revealed that both educational levels of household heads and fertilizer application by farmers have relatively high potential to more than double the number of food secure households in the study area following improvements in these factors.

1. INTRODUCTION

The agricultural sector is the backbone of the Ethiopian economy, making multifaceted contributions to the Ethiopian economy[2]. The performance of agriculture, however, in terms of feeding the country's population, which is growing at about 2.9 per cent per annum, is poor. According to reports, over 50 percent of the Ethiopian population, of whom the majority reside in rural areas, is food insecure in relation to the medically recommended daily intake of 2 100 calories per person per day (FAO, 1998). According to recent estimates about 60 percent of the population live below the poverty line (FAO, 2001).

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[2] *Responsible for about 50% of Gross Domestic Product, and over 90% of foreign exchange earnings, and employing over 85% of the labour force.*

A number of studies made use of various methodologies to identify determinants of food security in different parts of Ethiopia. According to these studies, ownership of livestock, farmland size, family labour, farm implements, employment opportunities, market access, levels of technology application, levels of education, health, weather conditions, crop diseases, rainfall, oxen, and family size are identified as major determinants of food security (Shiferaw *et al*, 2003; Yared *et al*, 1999; Webb *et al*, 1992). No similar studies have been conducted for Korodegaga Peasant Association; therefore, this study takes as its objective the determination of factors influencing food security in the study area. It was anticipated that the results obtained would add to the wealth of information currently available on the determinants of food security in Ethiopia.

The study area (i.e. Korodegaga Peasant Association (PA) is located in Dodota Woreda of the Arssi zone of Oromia region in Ethiopia. Agriculture is the principal activity in the study area, though it takes place at subsistence level. This can be attributed mainly to very low rainfall. The area where the PA is located only receives rain in the months of June, July and August. Consequently, during these months and the next harvest season, few households have enough to eat. Cattle, sheep, and goats are among the principal livestock kept by farmers in the study area (Assefa & Mesfin, 1996).

2. LITERATURE

Food security is defined in different ways by international organizations and researchers. According to Smith *et al* (quoted in Maxwell, 1996), there are close to 200 definitions of food security. Since the World Food Conference of 1974 definitions evolved from viewpoints ranging from emphasis on national food security or an increase in supply to those calling for improved access to food in the 1980s (FAO, 1983). In the 1990s, improved access was redefined by taking into account livelihood and subjective considerations (Maxwell, 1996). Definitions underwent another round of evolution after the 1996 World Food Summit, when the definition was broadly set as achieving food security "at the individual, household, national, regional and global levels when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996). Currently, a synthesis of these definitions, with the main emphasis on availability, access, and utilization, serves as working definition in the projects of international organizations.

Though food security as a problem at the national level was first felt in Ethiopia in the 1960s, it only started influencing policy in the 1980s, when food self-sufficiency became one of the objectives of the Ten-year Perspective Plan (TYPP) in the early 1980s. This took place after the 1983/84 drought and famine, which claimed millions of lives (Alemu *et al*, 2002). While efforts to ensure adequate food supplies at the national level are laudable, these efforts on their own cannot ensure food availability for households and individuals. As Sen (1981) argues, ensuring access to food, not merely increasing food supplies, should be regarded as the major pillar of food security. This assertion is borne out by empirical evidence that suggests that, even in times when countries experience famine, food supplies have been generally available, even in regions where large numbers of people died of starvation. The problem is that those who needed the food do not have the means to acquire it (Sen, 1986).

Much of the literature on food security focuses on developing and testing determinants of food insecurity at the household level (Maxwell, 1996). In line with the literature this study also investigates factors determining food security. These determinants of food security are categorized into three groups within the framework of the general definition of food security mentioned above, that is, food availability, food access, and utilization. For example, food availability may be constrained by inappropriate agricultural knowledge, technology, policies, inadequate agricultural inputs, family size, etc. On the other hand, access to food and its utilization could be constrained by economic growth, lack of job opportunities, lack of credit, inadequate training, inadequate knowledge, etc. (Hoddinott, 1995). Accordingly, this study investigates the general effects of eleven factors, which fall in any of the three categories discussed above, on the food security status of households. A review of the literature relating to the way these variables affect the food security status of households, and the methodology used to measure these variables are discussed in the paragraphs that follow.

Food security, a dependent variable in this study, was measured in four steps. Firstly, food supply at household level was determined by compiling a Food Balance Sheet for each sampled household. The following variables entered the Balance Sheet as additions to or subtractions from own production of grain at household level: grain purchases (+), grain received as gifts/remittances (+), grain borrowed (+), grain received as payment for use of oxen (+), and grain received from hiring out of labour (+), post harvest grain losses (-), cereals used for seed (-), cereals given out for hiring in labour (-), cereals given out for sharing in oxen (-), and repayment of crop borrowings (-), and grain marketed

(-)[3]. Different conversion factors were used to convert the available grain to total calories available for each household. Secondly, the food supply at household level calculated in step one was used to calculate calories available per kilogram per person per day for each household. Thirdly, following FDRE (1996), 2,100 kilo calories per person per day was used as a measure of calories required (i.e. demand) to enable an adult to live a healthy and moderately active life. Fourthly, the difference between calories available and calories demanded by a household was used to determine the food security status of a household. Households whose available per capita calories were found to be greater than their demand were regarded as food secure and were assigned a code of 1, while households experiencing a calorie deficit were regarded as food insecure and they were assigned a code of 0.

Per capita aggregate production, a factor affecting food security status of households, is expected to influence the food security status of households through the price effect. The fall in food prices in local markets following an increase in per capital aggregate production is expected to influence the incomes of households whose income is dependent on the sale of food crops. The effect of this on the food security status of households is dependent on the price elasticity of demand (Foster, 1992). If price is inelastic, lower price translates into lower farm incomes, which adversely affect the food security status of households. Per capital aggregate production was computed by converting the output of different cereals in to their respective wheat equivalent units.

Household size is another factor expected to have influence on food security status of households. The majority of farm households in Ethiopia are small–scale semi-subsistence producers with limited participation in non-agricultural activities. Because land and finance to purchase agricultural inputs are very limited, increasing family size, according to the literature, tends to exert more pressure on consumption than the labour it contributes to production. Thus a negative correlation between household size and food security is expected (Paddy, 2003) as food requirements increase in relation to the number of persons in a household. Household size is a continuous variable. It is measured in this study by the number of adult equivalent units in a household.

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[3] *All the data needed to calculate calories available at household level, with the exception of post-harvest losses, are available from the household survey produced by CSAE. Post-harvest crop losses (including storage loss) and part of the crop used as seed for the next planting season, were estimated at 10% and 6% respectively following Ramakrishna and Demeke (2002).*

Oxen ownership, a continuous variable, is another determinant of the food security status of households. Oxen serve as a source of traction in many developing countries, thereby significantly affecting households' crop production. Animal traction power enables households to cultivate greater areas of land and to execute agricultural operations timely (Govereh & Jayne, 1999). Therefore, a positive relationship between ox ownership and food security is expected in this study.

Fertilizer use is used by most studies as a proxy for technology. According to the literature, subsistence farming, by its nature, is production for direct consumption. Any farm input that augments agricultural productivity is expected to boost the overall production. This contributes towards attaining household food security (Brown, 2004). Studies by Rutsch (2003) and Smith and Huang (2000) on "Role of fertilizer in agricultural productivity" found that fertilization of farmland can boost agricultural production and influence the food security status of a household. Fertilizer use was measured on the basis of whether or not a household uses fertilizer i.e. a dummy variable was used. A household that does not apply fertilizer took a value zero and a household that applies fertilizer took a value of one.

Education is an additional factor which is thought to influence the food security status of households. Educational attainment by the household head could lead to awareness of the possible advantages of modernizing agriculture by means of technological inputs, enable them to read instructions on fertilizer packs and diversification of household incomes which, in turn, would enhance households' food supply (Najafi, 2003). Educational attainment of a household head is considered by this study to be a qualitative variable. Households led by educated heads take a value of 1 while those who are led by uneducated heads take a value of 0.

Farmland size is a continuous variable. This study expected farmland size to affect food security status of households positively. According to Najafi (2003), food production can be increased extensively through expansion of areas under cultivation. Therefore, under subsistence agriculture, holding size is expected to play a significant role in influencing farm households' food security. The sample households plough fragmented plots with different sizes and fertility levels. Plot sizes are available in local units of measurement. The size of farmland owned by a household was determined by summing the fragmented plots, and converting it to hectares using a conversion factor.

Land quality measures farmers' perception of the fertility of their farmland. Households were asked to indicate whether they consider their land as very fertile, medium fertile, and not fertile, on average. Under optimal management, better land quality boosts crop production (Sah, 2002). Stephen (2000) found that a decline in soil fertility negatively affects food security. It is expected that this study will find that land quality affects food security status of households positively.

Hofferth (2003), in his study, argues that the higher the age of the household head, the more stable the economy of the farm household, because older people have also relatively richer experiences of the social and physical environments as well as greater experience of farming activities. Moreover, older household heads are expected to have better access to land than younger heads, because younger men either have to wait for a land distribution, or have to share land with their families. A similar study by Obamiro *et al* (2003) arrived at a similar conclusion regarding the relationship between age of a household head and household food security. Age of household head was measured in years. Hofferth (2003) further states that subsistence farming is generally characterized by greater reliance on labour than commercial agriculture. In subsistence farming, households with larger labour supplies are better positioned to increase the productivity of their land. Availability of a relatively larger labour force, regardless of farm size, can be an advantage to those households who strive to achieve food security, provided that the excess labour force is engaged in other income generating activities. Similar study by Jiggins (1986), Thomas and Leatherman (1990), and Chen (1991) report that labour availability is an important determinant of household productivity and food security, especially in subsistence-oriented households given the necessary landholding and rainfall. It is thus expected by this study that labour availability will affect food security positively. A conversion factor was used to measure labour availability in terms of man equivalent units.

A household's wealth status forms the other important source of livelihood for farming households. Livestock contribute to households' economy in different ways, e.g. as a source of pulling power, source of cash income, source of supplementary food, and means of transport. Besides, livestock are considered a means of security and means of coping during crop failure and other calamities (Kang'ara *et al* 2001). Livestock provides not only food for the producers, but also a range of other products which could be sold or consumed by the livestock owner to provide nutrition, income, traction and fuel. The major products of livestock include draught power, meat, milk, eggs, manure which is used as fertilizer or fuel, feathers, fibre, hides, and horns. In addition to these products livestock serve as an asset and may provide a reserve that can be converted to cash in times of need. A study by Kassa *et al* (2002) found that households who own livestock have good food security status as well as sustainable farming. Particularly in Ethiopia, where crop failure is frequent due to poor rainfall, the level of a household's resources a critical factor in combating such disasters. In view of this, an inventory of livestock for the sample households was conducted. Households' livestock ownership was measured by the number of tropical livestock unit (TLU) owned. Conversion factors were used in order to change each livestock of a household to its equivalent tropical livestock unit.

FAO (1999) reports that employment in off-farm and non-farm activities is essential for diversification of the sources of farm households' livelihoods; it enables households to modernize their production by giving them an opportunity to apply the necessary inputs, and reduces the risk of food shortage during periods of unexpected crop failures through food purchases. Especially in Africa, diversification of sources of income has long been a survival strategy which allows household heads to reduce the risk of starvation for themselves and their families during periods of chronic or transitory food insecurity (Devereux 1993; Maxwell & Frankenburger, 1992). In this study, households diversify their incomes by selling firewood, working on farms as daily labourers, and selling crafts. In this study participation in off-farm and non-farm activities was measured by whether or not a household was engaged in those activities i.e. a dummy variable was used. A household who engaged in off-farm and non-farm activities took a value of one and households who did not engage in those activities took a value of zero.

3. METHODOLOGY

3.1 Data sources and measurement of variables

The primary data used in this study were adapted from a survey carried out by Centre for Studies of African Economies (CSAE, 2003) in collaboration with Addis Ababa University. The survey gathered qualitative and quantitative data pertaining to social, demographic and economic aspects of households. The present analysis is based on data from a sample of 108 households randomly selected from 304 households residing in the study area.

The dependent variable, that is food security, was measured as follows. Firstly, cereal availability from own production and net transactions was calculated and used to determine calorie availability for each household[4].

[4] *Using conversion factors from IFPRI, quantities of each cereal were converted into available energy equivalents.*

Secondly, the medically recommended levels of calories per adult equivalent were used to determine calorie demand for each household[5]. Thirdly, the difference between calorie availability and calorie demand for households was used to determine a household's food security status. Households whose per capita available calories were found to be greater than their per capita calorie demand were regarded as food secure and were assigned a value of 1, while households experiencing a calorie deficit were regarded as food insecure and the were a assigned a value of 0[6].

Eleven explanatory variables, six measured as continuous variables and four as discrete variables were identified to be major determinants of food security in this study. These include per capita aggregate production[7], off-farm work, technology adoption[8], land quality, land size, household size, age of household head, household labour availability, ox ownership, wealth and education level of household head. Except for household size, the remaining 10 factors were *a priori* expected to have a positive impact on food security.

3.2 The model

Following the modelling of production and consumption behaviours of rural households by Strauss (1983), Barnum and Squire (1979) and Yotopoulos (1983) (cited in Shiferaw *et al*, 2003), the extent of household food security found in this study is modelled within the framework of consumer demand and production theories.

Households derive utility from the consumption of foods through the satisfaction found in a set of taste characteristics as well as the health effects of the nutrients consumed. The model used by this study to determine factors affecting seasonal food insecurity is given below.

$$\phi_i = E(y_i = 1 / X_i) = \frac{1}{1 + e^{-(\beta_1 + \sum_i^k \beta_i x_i)}} \tag{1}$$

[5] *Following the general practice in the literature, 2,100 kcal per day was assumed to be the minimum energy demand enabling an adult to lead a healthy and moderately active life.*
[6] *Of the different nutrients derived from the consumption of foods, only calories are considered in this study.*
[7] *Per capita aggregate production consists of cereal output of the household only.*
[8] *Measured as a dummy variable reflecting whether or not the households applied fertilizer.*

Where: ϕ_i stands for the probability of household ***i*** being food secure, y_i is the observed food security status of household ***i***, x_{ij} are factors determining the food security status for household ***i***, and β_j stands for parameters to be estimated.

Denoting $\beta + \sum_{j=1}^{k=n} \beta ij$ as Z, equation 1 can be written to give the probability of food security of household ***i*** as:

$$\phi_i = E(y_i = 1 / X_i) = \frac{1}{1+e^{-Z_i}} \tag{2}$$

From equation 2, the probability of a household being food insecure is given by (1-ϕ_i) which gives equation 3, which can be written as

$$(1-\phi_i) = \frac{1}{1+e^{z_i}} \tag{3}$$

Therefore the odds ratio, i.e., $\phi_i / (1\text{-}\phi_i)$ is given by equation 4 as

$$\left(\frac{\phi_i}{1-\phi_i}\right) = \frac{1+e^{z_i}}{1+e^{-z_i}} = e^{z_i} \tag{4}$$

The natural logarithm of equation 4 gives rise to equation 5

$$Ln\left(\frac{\phi_i}{1-\phi_i}\right) = \beta + \sum_{j=1}^{k=n} \beta ij + \varepsilon_i \tag{5}$$

Rearranging equation 5, with the dependent variable (food security) in log odds, the logistic regression can be manipulated to calculate conditional probabilities as

$$\phi_i = \frac{e^{\left(\overline{\beta_o} + \sum_{i=1}^{k=n} \overline{\beta_j} x_{ij}\right)}}{1+e^{\left(\overline{\beta_o} + \overline{\sum_{j=1}^{k=n} \beta_j xij}\right)}} \tag{6}$$

Once the conditional probabilities have been calculated for each sample household, the "partial" effects of the continuous individual variables on household food security can be calculated by the expression

$$\frac{\partial \phi_i}{\partial x_{ij}} = \phi_i (1 - \phi_i) \beta_j \tag{7}$$

The" partial" effects of the discrete variables are calculated by taking the difference of the probabilities estimated when value of the variable is set to 1 and 0 ($x_i = 0, x_i = 1$), respectively.

4. RESULTS AND DISCUSSION

4.1 Descriptive results[9]

This section reports the descriptive results of the relationship between food security and determinants of food security. Out of the 108 observed households in the sample, 29 are food secure (26.9 %) and 79 (73.1 %) are food insecure.

Table 1: Household Food Security Rates for significant variables

Variables	Food insecure	Food secure
Average farm land size (ha)	3.34	4.85
Average per capita production (kg)	74.32	160.85
Non fertilizer users (%)	43.04	13.79
Fertilizer users (%)	56.96	86.21
Average ox ownership	0.87	1.24
Average household size	7.5	6.7
Illiterate (%)	87.5	12.5
Primary (%)	58.33	41.67
Secondary	47.62	52.38

Source: Authors' computation based on survey data.

According to Table 1, average farm land size, average per capita production, average ox ownership and fertilizer application of food secure households are higher than by food insecure households. On the other hand, household size and the percentage of households with illiterate heads are higher among food insecure households than among food secure households. Therefore, the results confirm the findings of the literature regarding the relationship between food security and the major determinants of food security.

[9] *Only descriptive statistics of significant determinants are reported in this section. Results of non-significant determinants can be provided upon request.*

4.2 Empirical results (model characteristics)

In this section, results of the test for significance of the determinants of food security and of the predictive efficiency of the model are discussed[10]. The former was conducted using the likelihood ratio chi-square statistic[11] while the Pesaran-Timmermann test statistic was used to test for the latter. According to results shown in Table 2, the log likelihood value of 40, with $p<0.001$ indicate that at least one of the parameters of the determinants of food security shown in equation 1 is significant.

Table 2: Parameter estimates of the logistic regression

Variable	Coefficient	Std Error	z-Statistic	Probabilities
Constant	-3.0588	1.0420	-2.9354	0.004
Fertilizer application (FAPP)	1.7765	0.81325	2.1844	0.031
Farm land size (LANSIZE)	0.45849	0.18624	2.4618	0.016
Household size (HHSIZE)	-0.39548	0.15301	-2.5847	0.011
Ox ownership (OXOWN)	0.33826	0.22153	1.5269	0.130
Education (EDU)	1.3040	0.58993	2.2104	0.029
Per capita production (PCAPRO)	0.0058236	0.0033776	1.7242	0.088
Percentage of correct prediction	0.852			
The Pesaran-Timmermann test statistic	6.4229			<0.001
Log likelihood value	40			<0.001

Source: Authors' computation based on survey data.

With regard to the predictive efficacy of the model, Table 2 shows that, of the 108 sample households included in the model, 92 (85.02%) are correctly predicted. According to the Pesaran-Timmermann test statistic, a significant association exists between the observed and the model's prediction of a household's food security status.

4.3 Parameter estimates of determinants of food security

First, all 11 factors were considered for the model. Then a step by step process of deletion of insignificant variables reduced the number of significant

[10] *Before a logit model was fitted i.e. to check for the determinants of household food security a correlation matrix was computed all explanatory variables included. According to the results found no severe multicollinearity problem could be detected. Results are available upon request.*
[11] *Calculated on the basis of the formula LR=2(ULLF-RLLF) where ULLF and RLLF are, respectively, unrestricted log-likelihood function and restricted log-likelihood function. It is chi-square distributed with 6 degrees of freedom.*

variables to six. The six factors that were retained were farmland size, per capita aggregate production, fertilizer application, household size, ox ownership and educational level of farm household heads (Table 2).

The marginal effects of a unit change in the continuous variables, computed at sample means, on the probability of food security were estimated. Tables 3 and 4 give results on the partial effects of continuous and discrete variables respectively (see equation 7 for explanation of how the partial effects were computed).

Table 3: Partial effects for continuous determinants

Determinants	"Partial Effects"
Farmland size (ha)	0.062
Per capita aggregate Production (kg)	0.001
Household size (#)	-0.0542
Ox ownership (#)	0.046

Source: Authors' calculations.

4.3.1 Farm land size

According to results reported in Tables 2 and 3, and keeping the other variables in the model constant, land size is positively and significantly related to the probability of a household being food secure (Table 2). According to Table 3, the marginal effect of a unit change in farm size, computed at sample mean of holding size, on the probability of food security is 0.062. This means that the probability of food security increases by 0.062 (about 6%) for a one hectare increase in farm size.

4.3.2 Fertilizer application

Use of fertilizer is another factor which was found to have a significant impact on household food security. A positive and significant relationship was found between fertilizer usage and the probability of a household being food secure (Table 2). This means that the likelihood of food security increases with farmers' use of fertilizer. In other words, fertilizer users are more likely to be food secure than non-users. According to Table 4, a unit increase in fertilizer use defined by the shift from non fertilizer user (X_i=0) to fertilizer user (X_i=1) increases the probability of food security from 0.338 to 0.443 i.e. by 11%.

Table 4: Change in probabilities between X_i =0 & X_i =1 for the significant discrete determinants

Determinants	Probabilities	Change in probabilities
Education attainment		
Illiterate	0.143	0.182
Literate	0.325	
Fertilizer Use		
Non users	0.338	
Users	0.443	0.105

Note: The change in probabilities of household food security due to the change in the significant discrete explanatory variables can be calculated by taking the difference of the mean probabilities estimated for the respective discrete variables $X_i = 0$ and $X_i = 1$.

Source: Authors' calculation based on survey data.

4.3.3 Ox ownership

Ox ownership was found to have a significant and positive relationship with household food security (Table 2). According to Table 3, a unit increase in ox ownership, computed at average ox owned by sampled households, increases the probability of food security by 5%.

4.3.4 Education

Education was found to have a significant and positive relationship with household food security (Table 2). This indicates that households with relatively better educated household heads are more likely to be food secure than those headed by uneducated household heads. According to results reported in Table 4, an improvement in education level defined by the shift in educational level from illiterate (X_i=0) to literate (X_i=1) results in increase in probability of a household being food secure from 0.14 to 0.325 i.e. by 18%.

4.3.5 Household size

According to Table 2, household size has a negative and significant relationship with the probability of food security. Table 3 shows that the probability of being food secure, calculated at average family size of sampled households, decreases with an increase in family size. Each additional member of the household decreases the probability of food security by 5%.

4.3.6 Per capita production

Per capita aggregate production has a significant and positive influence on food security (Table 2). As shown by Table 3, a unit change in per capita aggregate production, calculated at sample means, results in a 0.1% increase in the probability of food security.

4.4 Impact on food security of major determinants of food security

This section reports simulation results for the levels of change in the conditional probability of being food secure following improvement in any of the significant factors. Simulations were conducted with reference to a base group of households representing food insecure households. The results are reported in Table 5. The base group represents food insecure households with an average farm land size of 3.34 ha, aggregate per capita production of 74.32 kg, average household size of 7.5 members, and average ox ownership of 0.87 units. In addition, the dummy variables for educational attainment and fertilizer application were set to zero.

Table 5: Simulated impact of determinants on the probability of household food security

Variables	Predicted probabilities
Base	0.02
Farm size increased by one hectare	0.04
Increase in per capita production by 70 kg	0.05
If the households adopt fertilizer	0.12
Increase of ox ownership to two	0.03
If the household size is reduced by 1	0.07
If education level of household head improves	0.08

Source: Authors' computation.

According to Table 5, the conditional probability of food security for the base group of households is 0.02. This means that, of 100 farm households, two are food-secure. If a group of households with characteristics similar to that of the base group of farmers apply fertilizer, the number of food secure farmers will increase to 12. Improvement in the educational level of household heads of the base group of farmers will increase the number of food secure households to 8. Furthermore, Table 5 shows that an increase in the average farmland size of the base group of farmers by one hectare results in an increase in the number of food secure households from two to four. It is also shown in Table 5 that ownership of an additional ox by each household will increase the number of food secure households from two to three. A decrease in the average family size of farmers from 6.7 to 5.7 will lead to an increase in the probability of food security from 0.02 to 0.07. A 70 kg increase in aggregate per capita production (in wheat equivalent) for the base group of farmers will increase the number of food secure households from two to five.

5. CONCLUSION

The objective of this study was to determine the causes of seasonal food insecurity among members of the Koredegaga Peasant Association in the Eastern Oromia region of Ethiopia. According to descriptive statistics of the sample households, *a priori* expectations about the relationships between indices of food security and factors influencing it are satisfied for majority of the cases considered. This was further supported by a binary logistic regression model applied to randomly selected primary data of 108 sample farm households. Factors identified as having a significant influence on food security by the logistic regression model include farmland size, per capita aggregate production, fertilizer application, household size, ox ownership, and educational attainment level of farm household heads.

Partial effects, computed at sample means using results from the logistic regression model, indicate that a unit change in farmers' access to fertilizer or educational level of household heads or farmers' access to land or farmers' access to family planning improve the probability of food security in the study area.

Simulations were conducted with reference to a base group of food insecure households. Results showed that an increase in land holding size, increase in ox ownership, decrease in family size, increase in per capita production, increase in fertilizer use, and an increase in education level of food insecure households have the potential to increase the number of food secure households in the study area. For example, increase in the availability of fertilizer to food insecure households will increase the probability of food security by 10%. Similarly, improvements in the education level of food insecure household heads and reduction of family size of food insecure households will increase the probability of food security by 5% and 6% respectively. It is therefore recommended that introducing institutions which foster agricultural research and extension, family planning, efficient use of land use, and schools, should receive priority attention in policy making.

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