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Determinants of Food Security in Farm Household in Drought Prone Area of Oromia Region: In Case of Dodota District

Girum Dagne
Bule Hora University, Bule Hora, P.O.Box-144, Ethiopia

Abstract
This study analyzed the determinants of major determinants of food security in farm household in drought prone area of Oromia Region taking evidence from rural kebele of Doddota wereda. In order to achieve these objectives demographic and socio-economic data were collected from 200 randomly selected households in Dodota District of Arsi Zone Oromia Regional State. The sample households were classified into food secure and food insecure groups based on estimated food expenditure value of meeting Recommended Daily Allowance (RDA) of 2200 kcal.The summary was made using STATA 11 software. The data collected were analyzed using descriptive statistics and binary logistic regression model. The descriptive analysis of the study revealed that only 23% of the sample households were food secured and about 77% are food insecure. Binary logistic regression model has been employed to identify the major determinants of Food security.Therefore, policy needs to focus on supporting households in delivering services in the area of the determinants of household food security in the study area. Specially, focus should be given to the significant variables which determinate the food security in farm households of the study area.
Keywords: Determinants of food security, binary logit. Oromia, Doddota.

1. INTRODUCTION

According to World Bank Report 2008, about 850 million people in the world were food insecure. The majority of these live in the developing regions. Especially the number was high in Sub-Saharan Africa (SSA) and it was the only region where the food insecure population has an upward spiral (between 1970s and 1990s), as well as a region with the highest incidence of food insecurity (Yonatan, 2009).

Ethiopia is a land of extremes; as one of the largest countries in Africa it covers an area of approximately 1.1 million km^2 with an estimated population of 80 million (WHO, 2008), ranking the second largest populas country next to Nigeria. The country is also one of the poorest nations in the world and every year an average of five million Ethiopians is in need of food assistance (WHO, 2005, FAO, 2010, USAID, 2010).

Many Ethiopian live in condition of chronic hunger with both a low average daily energy intake (FDRE, 2002; Tassew, 2008). In the ranking of countries on the prevalence of food energy deficiency, from highest to lowest; Ethiopia is categorized under the leading food insecurity with estimated 29% of population is under food poverty (IFPRI, 2011).

A significant number of Ethiopians were also chronically food insecure. They were usually unable to access enough food for an active, healthy life - even in the absence of shocks. Every year for the past two decades, the Government has been appealing to the international community for food aid. Since 2000, out of a total estimated population of 73.8 million, 5 to 14 million rural Ethiopians have needed emergency relief. In order to solve this problem of food insecurity, over the past fifteen years an average of 700,000 metric tons of food aid per annum have been imported to meet food needs (FSCB, 2004).

Access to sufficient food and nutrients is essential for household welfare, as well as for accomplishing other development objectives. Households with insufficient access to food often face other challenges related to food insecurity including poor health and a decline in productivity. These challenges can often create a vicious circle whereby households are unable to produce enough food, even in good years, because they are battling chronic health issues and are unable to work to their full potential (Schmidt and Dorosh, 2009).

In Africa the causes of food crises are numerous, varied and complex. The principal factors attributed to the continent's failure to adequately feed its population include: i) climatic hazards; ii) severe environmental degradation; iii) rapid population growth outstripping agricultural growth; iv) unstable macroeconomic environment and inappropriate government policies in some nations; v) low purchasing power of the people (poverty); vi) the absence of food security policies at national or regional levels; vii) lack of storage facilities; viii) limited access to infrastructure and basic services; ix) civil war; x) inappropriate incentives; and xi) low productivity of agriculture resulting from insufficient fertilizer use and poor control of weeds (Braun et al. 1990; Sijm 1990; Tekolla 1990; ECA 1992; FAO 1994).

Similar to other food insecure areas of the country Dodota is one of the chronically food insecure and vulnerable districts of Oromia regional state. The largest portion of the district (60%) experiences frequent crop failure and usually is vulnerable to food shortage. Thus, relief assistance is provided frequently. In an area where life is full of challenging and miserable situations, it will be of paramount importance to investigate and analyze biophysical, demographic and socioeconomic characteristics of the households and to identify the major causes

of food security. Moreover, assessing the features of the food insecure households as well as their potentials to overcome the problem and analysis of the local coping strategies of the households would help to draw policy options. Hence, the study was conducted to examine major determinants of food security, coping strategies and policy options available to alleviate food insecurity of farm households in Dodota district of the Oromia Region.
The remainder of the paper is divided into 3 sections. The next section describes empirical strategy and estimation techniques. Data information is given in section three. The fourth section discusses the empirical findings of the study. The final section summarizes the results of the study and also presents the possible policy implications emerged from the present study.

2. Methodology of the study

2.1 Sources and Method of Data Collection

The data in the survey were collected by using structured questionnaires, which were prepared and pre-tested for the purpose of the project entitled "Determinants of Household Food Security in Dodota District of Oromia Region-Ethiopia". Four enumerators who speak the local language were recruited from the study area and trained. The enumerators were employed to administer the structured questionnaires. The questionnaires were pre-tested and on the basis of the results obtained necessary modification were made. The formal survey was conducted by administering a structured questionnaire to collect data from 200 randomly selected farmers.

2.2 Sample Size Determination

There are several approaches to determine the sample size. These include using a census for small populations, imitating a sample size of similar studies, using published tables, and applying formulas to calculate a sample size.

This study applied a simplified formula provided by Yamane, (1967) to determine the required sample size at 95% confidence level, degree of variability = 0.5 and level of precision =9%.

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

Where n is the sample size, N is the population size (total household size), and e is the level of precision. Based on the above formula the study was carried out on 200 respondents.

2.3 Sampling Techniques

The farming household is actually responsible for making day-to-day decisions on farm activities and investment on land. Thus, a household was the basic sample unit. A two-stage sampling procedure was used to select sample farmers .In the first stage, 4 peasant association (PAs) were selected using a purposive sampling technique because those kebele are highly food insecure out of 12 kebele in the study area. In the second stage a total of 200 (54 from Dire Kiltu kebele, 53 from Tedecho Gurachaa, 45 from Awash Bishola and 48 from Dilfekar) household heads were selected randomly from the respective list of farmers in the 4 kebeles using probability proportional to sample size sampling techniques.

2.4 Method of data Analysis

Econometric Method of Analysis

Food security at the household level is best measured by direct survey of income, expenditure and consumption and comparing it with the minimum subsistence requirement. The government of Ethiopia has set the minimum acceptable weighted average food requirement per adult equivalent (AE) per day at 2200 kcal. The determination of the adult equivalent takes into account the age and sex of each household member. Hence, for this study 2200 kcal per adult equivalent per day is employed as a cut-off value between food-secure and food-insecure households. Thus, those households who have energy per AE below the minimum subsistence requirement (2200 kcal) are deemed to be food insecure, and those who managed to attain the 2200 kcal per AE per day are considered to be food secure households.

Once the groups are categorized as food-secure and food-insecure, the next step is to identify the demographic and socio-economic factors that are correlated with food security. It is hypothesized that some farm and household characteristics such as household size, land size and level of agricultural production have got relative importance in determining whether a household is food secure or not.

A variety of statistical models can be used to establish the relationship between these household characteristics and food security. Conventionally, linear regression analysis is widely used in most economic and social investigation because of availability of simple computer packages, as well as ease of interpreting the results.

However, results derived from linear regression analysis may lead to fairly unreasonable estimates when the dependent variable is dichotomous. Therefore, the use of the logit or probit models is recommended as a panacea of the drawback of the linear regression model. Which model to choose between logit and probit is,

however, difficult for they are similar in most applications, the only difference being that the logistic distribution has slightly fatter tails. This means that there is no binding reason to choose one over the other but for its comparative mathematical and interpretational simplicity many researchers tend to choose the logit model.

Therefore, this study employed the logit model (the log-odds ratio) following the footstep of these researchers. The dependent variable in this case, food security status , was a binary variable which took a value one if a household was found to be food secure, zero otherwise.

The cumulative logistic probability model can be econometrically specified as:

$$\mathbf{Pi = F(\ Zi\ )=F(\alpha+ \beta i\ xi)\ =\ \frac{1}{1+e^{-(\alpha+\sum\beta ixi)}}} \quad (1)$$

Where **Pi** is the probability that an individual is being food secure given Xi

Xi represents the i^{th} explanatory variables

αi & **βi** are regression parameters to be estimated.

e is the base of the natural logarithm

For ease of interpretation of the coefficients, a logistic model could be written in terms of the odds and log of odd. The odds ratio is the ratio of the probability that an individual or household would be food secure (**Pi**) to the probability of a household would not be food secure (**1- Pi**). That is,

$$\left(\frac{pi}{1-pi}\right) = e^{Zi} \quad (2)$$

and taking the natural logarithm of equation (2) yields:

$$\ln\left(\frac{pi}{1-pi}\right) = Zi = \alpha + \beta 1X1+\beta 2X2+\ldots+\beta mXm \quad (3)$$

If the disturbance term Ui is taken into account, the logit model becomes:

$$ZI = \alpha + \sum_{i=0}^{m} \beta\ iXi + Ui \quad (4)$$

The parameters of the model, α and β, can be estimated using the maximum likelihood (ML) method.

3. Definition of model variables

3.1. Dependent Variable (response variable)

HFSS= Household Food Security Status (HFSS): is a dichotomous dependent variable in the model and it takes 1 if the household is food secure, 0 otherwise.

3.2. Explanatory Variables Included In the model are:

AG = Represent Age of household and it is considered as continues variable and measured age of HH head in year.

FS = Represent Number of Family size and it is considered as a continues variable and measured by the total numbers of people under the specific household.

SHH=Represent Sex of House Hold and it is considered as a dummy variable where:0= for female head household; 1= for male head household.

EDUC=Represent Education Status of House Hold and it is considered as a dummy variable: 0= For illiterate which cannot read and write;1=For literate which can read and write

FI= Represent Farm Income and it is considered as continues variable and measured by the total amount of money earned from crop production livestock and livestock products sale.

LS= Represent Land Size and considered as continues variable and measured by the total hectare of land a household owns.

FERT= Represent Fertilizer and considered as a dummy variable where:0=when the household not used fertilizer;1-=when the household uses fertilizer

IS= Represent Improved Seed and considered as a dummy variable where: 0 =for household not use improved seed; 1=for household use improved seed.

IRG= Represent Irrigations and considered as a dummy variable where:0 =for household not use irrigation ; 1=for household use Irrigation

SF= Represent Soil Fertility and considered as a dummy variable where: 0 =for household whose cultivated land is infertile; 1=for household whose cultivated land is fertile.

OFI= Represent Off farm Income and considered as a dummy variable where: 0 =for household who does not participate in off farm activity; 1=for household who participate in off farm activity

DS= Represent Distance and considered as continues variable and measured by distance to market.

TLU= Total Livestock Unit and considered as a continues variable and measured by the total numbers of TLU under the specific household

OX = Represent Number of Oxen and it is continues variable and measured by numbers of oxen in sampled

households.

CR= Represent Credit and considered as dummy variable where 1 if the household receive credit, 0 otherwise and measured by number of credit receiver.

4. Empirical findings

4.1. Results of Logit Regression Analysis

As it has been observed in table 1, the model is estimated by considering household demographic variables and livelihood assets on food security status of sample households. In the model the odds ratio, indicate whether a particular variable is associated with household food security statistically significantly or not. If the value of the odds ratio is greater than 1, the probability to be food secure is high for that group in relation to reference category; whereas if the odds ratio is less than 1, the likelihood to be food secure is low for that particular category. Moreover, if the odds ratio is 1, that the given variable has no effect on food security status of the given household.

Table 1: The maximum likelihood estimates and marginal effects of binary logit

Explanatory Variable	Coefficient	Robust SE	P value	Odd ratio	Marginal effect Dy/dx
SEX	-1.0288	0.2850	0.197	0.3574	-0.0328
AGE	0.0097	0.4479	0.827	1.0098	0.0003
EDUC	2.3984	9.4308	0.005***	11.0057	0.0764
FASIZE	-0.0102	0.0043	0.018**	0.9898	-0.0003
LAND	1.0309	1.2339	0.019**	2.8035	0.0328
TLU	0.1510	0.1542	0.400	0.8598	0.0048
OXEN	1.0895	1.3398	0.016**	2.9727	0.0347
IRR	4.1554	95.2605	0.005***	63.7743	0.1324
OFFFARM	1.7351	4.4073	0.026**	5.6697	0.0553
FERT	0.9248	3.3802	0.490	2.5215	0.0295
IMPSEED	5.0812	161.731	0.000***	160.9704	0.1619
SOI	2.8480	26.1488	0.060*	17.2539	0.0907
CREDIT	3.4459	40.3605	0.007***	31.3744	0.1098
DISTANCE	-0.9542	0.1187	0.002***	0.3851	-0.0304
FARM INCOME	0.0001	0.0000	0.028**	1.0001	2.72e-06
Constant	-10.6626	3.6411	0.003		

Number of obs =200
Log pseudo likelihood = -20.511783
Wald Chi^2 (15) =79.57
Prob > chi^2 =0.0000
Pseudo R2 =0.8098

*Source: Model output, own calculation from the survey data. The star on the top of the predictor variables reflect that the predictors are discrete while the remaining refers to continous ones. The stars on the top of p-value such as *, **, *** reflects that they are statically significant at 10 percent, 5percent and 1 percent respectively*

We can also present the above table in equation forms as follows.

$$Y= -10.66 -1.03X_1+0.01X_2+2.39X_3-0.01X_4+1.03X_5+0.15X_6+1.09X_7+4.16X_8+1.74X_9 +0.92X_{10}+5.08X_{11}+2.85X_{12}+3.45X_{13}-0.95X_{14}+0.0001X_{15}$$

The model result in table 5 of the logistic regression model estimate indicates that out of the 15 explanatory variables included 11variables (***Education level of the household, family size, size of cultivated land,number of oxen, Access to irrigation, off farm activities, using Improved seed, soil fertility, access to agricultural credit, distance from the market, farm income***) were found to have a significant influence on the probability of being food secure at 1%, 5% and 10% and it also verified that most explanatory variables in the model had sign that confirmed to the prior expectations and hypotheses of this study .

5. Discussion of determinants of food security status

In this section, the logit regression results of variables were examined and interpreted in accordance with its effects on food security status of households.

Sex of Household Head: Most empirical evidences suggest that sex has a positive and significant on food security. However, my result reveals that negative and insignificant effect with coefficient -1.0288 and with p value 0.339. The possible reason that sex for the negative and insignificant impact could be explained due to sampling or other reason that the study could not capture or need further investigation. From the result, women

are more likely to be food secured than men are. The result is consistence with the research finding by Abebaw (2011).

Family Size: the result showed that the family size of the household is statistically significant at 5% probability level. This negative relationship indicates that odds ratio in favor of the probability of being food secure decreases as family size increases. If all other things are held constant, the odds ratio of 0.9898 for family size implies that, the odds ratio in favor of being food secure decreased by a factor of 0.9898 as family size increase by one person or one adult equivalent. The result indicated that larger household size tends to be food insecure compared to smaller family size. Therefore, this agrees' with the hypothesis that family size with high dependency ratio have role to play in affecting the probability of households food security status.

The marginal effect (which is one of the result of logistic regression shows us what the effect of change in a given predictor on the output response variable) of family size -0.0003 indicates that the probability of being food secure will decrease by approximately 0.03% percent with one additional family member in adult equivalent. The result is consistence with the research finding by Abebaw and Bazezew (2012), Tihras A.(2012) and Frehiwot F.(2007)

Educational status of household head:

This variable is significant at a probability of 1% and has positive relation of educational status of household head and the dependent variable brought the odds ratio in favor of food security to increase by a factor of 11.0057 as head of the household becomes literate. It is explained in terms of contribution of education on working efficiency, competency, diversify income, adopting technologies and becoming visionary in creating conducive environment to educate dependants with long term target to ensure better living condition than illiterate ones. Thus, being literate reduces the chance of becoming food insecure in the sample households.

Marginal effect at the mean for education is 0.0764.This indicates that expected probability of being food secure is 0.0764 higher for households that are literate (that can read and write) than for illiterate (that do not read and write) household keeping other variables constant at their mean values. The result is consistence with the research finding by Tirahas (2012) and Mulugeta T.(2002)

Number of Oxen Owned: Oxen are among the most important factors of production and hence determine household food security status. This variable is significant at a probability of 5% and has positive association with household food security. As hypothesized, this variable affects household's food security. The more the number of oxen available to households the larger is the probability of being food secure. The positive sign of this variable indicates the contribution of this resource towards ensuring food security. The interpretation of the result shows that if other things are held constant, the odds ratio in favor of the probability of food security increases by a factor of 2.9727 as the farm household's oxen holding increases by one.

Marginal effect at the mean for oxen is 0.0347.This shows as a one unit oxen increase results in 3.5% increase in the probability of being food secure household keeping other variables constant at their mean values. The result is consistence with the research finding by Haile.K and Alemu .G (2005), Tiharas (2012).

Size of Cultivated Land: Size of cultivated land, which is significant at 5% probability level, has positive influence on the probability of farm household's food security in the study area. It implies that the probability of being food secure increases with cultivated farm size. This agrees with the hypothesis that farmers who have larger farmland holding would be less food insecure than those with smaller land size, due to the fact that, larger farmers are associated with higher possibility to produce more food. With greater wealth and income which increases availability of capital that could increase the probability of investment in purchase of farm inputs which increases food production and hence ensuring food security of farm households. The odds ratio of 2.8035 for the total cultivated farm size implies that other things kept constant, the odds ratio in favor of being food secure increases by a factor of 2.8035 as the total cultivated farm size increases by one hectare.

Marginal effect at the mean for cultivated land 0.0328 indicates that probability of being food secure will increase by 3.3% with one unit size increase in the unit of size cultivated land, keeping all other variables constant at their mean values. The result is consistence with the research finding by Bazezew A. (2012) and Mulugeta T.(2002)

Farm Credit Use: The logit model analysis revealed that credit has a significant positive association with food security status (at a probability level of 1%). This is in agreement with the prior expectations about the impact of the differential access to credit service. This is because farm households who have the opportunity of accessing farm credit would build their capacity to produce more through purchasing of agricultural inputs. The households with more access to farm credit have possibility to reduce the probability of being vulnerable to food insecurity. The odds ratio in favor of food security increases; other things remain constant, by a factor of 31.3744 as farm households get access to farm credit.

Marginal effect at the mean for access to credit 0.1098 this indicates that the probability of being food secure for households that have access to credit increased by 11% compared to households that do not have access to credit, keeping other variables constant at their mean values. The result is consistence with the research finding by Lewin Paul and fisher monica(2010), Tsega G.(2009), Firehiwot F.(2007),Tihras A.(2012) and

Abebaw S.(2003)

Off-farm/non-farm income

This variable is significant at a probability of 5% and has positive relation with household food security status. The odds ratio is 5.6697 and therefore we may say that when off-farm/nonfarm income increases by one unit, the odds that the household is being food secure increase by a factor of 5.6697, when other variables are controlled. From its marginal effect of 0.0553, it is possible to conclude that the probability of being food secure increase by approximately 5.5 % with one unit additional off-far/non-farm income. The result is consistence with the research finding by Firehiwot F.(2007),Tihras A.(2012) ,Abebaw S.(2003),Bogale A.and Shimelis (2009) and Bazezew A.(2012).

Use of improved seed: This variable has positive influence on the probability of food security situation, which is significant at 1% level. This means that those farmers who have access to improved seed use are more likely to be food secure than those who have no access to improved seed use. The result indicates that, other factor kept constant, the odds ratio in favor of being food secure increases by a factor of 160.9704 as a farm households improved seed use increases by one unit.The marginal effect of this variable i.e., 0.1619 indicates that the probability of being food secure increases by approximately 16 percent with an additional improved seed used per hectare. The result is consistence with the research finding by Firehiwot F.(2007),Tihras A.(2012) , Haile.K and Alemu .G (2005),Abebaw S.(2003) and Tega G.(2009).

Soil Fertility Status: Soil fertility is assumed positive related with food security .This finding is consistence with the expectation. The coefficient for this variable was found to be positive and was significant at 10 % significance level. The odd ratio for the variable was 17.2539 the indication is that the odds of being food secure for households that are using fertile soil for cropping is higher than otherwise. More specifically, the likelihood of being food secure for households with the farm plots with fertile soil is about 17.2539 times more likely as compared to households that do not have farm plots with fertile soil, keeping other variables constant.

Marginal effect of soil fertility 0.0907 indicates that the probability of being food secure for households that have plots with fertile soil increased by 9% compared to households that do not have plots with fertile soil, keeping other variables constant at their mean values. The result is consistence with the research finding by Dhur (2011), Bogale A.and Shimelis (2009) and Bazezew A.(2012).

Access to irrigation service

In the study district rainfall variability and drought is high and for substitute this variability of rain irrigation is very important. Consistent with this expectation, households that access to irrigation water service were found to be positive and are significant 1% level of significance. The odd ratio of the use of irrigation service was 63.77.This implies that the odds of being food secure for households that use irrigation service were more likely as compared to households that do not access and use irrigation services. Specifically, keeping all other variables constant the odds of being food secure for households that use irrigation services was about 63.77 times more than house that do not use irrigation services.

Marginal effect for irrigation 0.1324 shows that the predicted probability of being food secure is 0.1324 higher for households that use irrigation schemes than for households with not using irrigation schemes, keeping other variables constant at their mean values. This finding is consistent with the research result presented by Lewin and Fisher (2010), Haile.K and Alemu .G (2005) and Tiharas (2012).

Distance to the main market center: Infrastructure involves distance to access services as well as exchanging good and services in the market place. The proxy to the main market center household's travel to sell their agricultural products, to purchase other food items and the responsibility of price for their products matter most for the rural households to get their benefit. The accessibility of market has a positive relation with food security. In other words, as the distance farmers travel (walk) by hour increase, there is negative relationship to food security because they cannot easily transport their agricultural and livestock products and at the same times, information about the market situation is not accessible. In addition, the households may not easily reach to formal support in times of uncertain risk and shocks.

The result from the model indicated that, keeping all variables constant, for one-kilometer increase in the distance that the farmer travel to the main market center, there was a 0.3851 factor decrease in the odds of food security of the household.

Marginal effect at the mean for distance from the main market center is -0.0304.This means for one hour walk increase in the distance that the farmer travel to the main market center produce 3% decrease the probability of being food secure keeping other variables constant at their mean values. This finding is consistent with the research result presented by Lewin and Fisher (2010) on the Determinants of Food Insecurity in rural Malawi.

Farm income: This variable was hypothesized to have positive influence on food security. In agreement with the hypothesis, its coefficient came out to be positive and significant at 5 percent probability level. The probable explanation is that those farmers who have better access to different types of farm income are less likely to become food insecure than those households who have little access. The odds ratio in favor of

food security increases by a factor of 1.000 as the farm income increases by one unit.

Total farm income has a marginal effect of 2.72e-06, which indicates the probability of being food secure will increase by approximately 2.72e-06 with one unit additional farm income. It is a common knowledge that as an individual has a better farm income he/she can use modern inputs, purchase and consume food on the market, improve means of living and then be better secured than those who do have little income. The result is consistence with the research finding by Haile.K and Alemu .G (2005).

6. Conclusions and Recommendations

6.1 Conclusion

The results of the study showed that about 23% and 77% of sample households were found to be food secure and food insecure, respectively. The result of the logistic regression model indicates that household a family size has a negative effect on the probability of food security and significant (at 5% probability level).

Moreover, production factors such as; education, cultivated land, soil fertility, access to irrigation ,off-farm income, use of improved seed and oxen number had positive and significant influence on food security through their role on food production and income generation.

The study suggested that distance from the main market center has a negative effect on the probability of food security and significant at 1% probability level this shows that farmers far from market centers cannot easily transport their agricultural and livestock products and at the same times information about the market situation is not accessible.

In general, with reference to a base group of food insecure households we conclude that an increase in land holding size, increase in oxen ownership, decrease in household size, decrease in distance to input sources, increase in fertilizer and improved seed use, increase in educational level of household head, access to irrigation and credit increase the likelihood of a household to be classified into the group of food secure households in the study area.

6.2 Recommendations

Based on the findings of the study the following issues are forwarded as recommendation to improve household food security status of the study area.

- The study found that the use of improved seed and food security status were positively related. To this effect the government intervention in rural areas need to be intensified and making available the inputs in the farm households' backwards is essential; not only making available but ensuring an affordable and fair price for the inputs and must help farmers to create unions that are capable of distributing these inputs to farmers at the right time.
- The study found that the use of irrigation and food security status were positively related. The study area is prone to drought and as a result depends on erratic rainfall and this has consequences for food insecure households as well as the long term poverty of individuals and households. To solve this problem, irrigation water from various sources is very important. There are huge ground waters with the potential of serving the woreda community including Awash River. Therefore, both the underground water and irrigation water should be used in small-scale and self –engaging schemes in the study area.
- Rural credit service can help farmers in solving capital problem to buy farm oxen, modern farm inputs, use for trade, off-farm activities, and further enhancing use of technologies etc. Therefore, Enhancing and expanding rural credits to subsistence farmers in the district should be one of the primary areas of intervention and policy options.

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