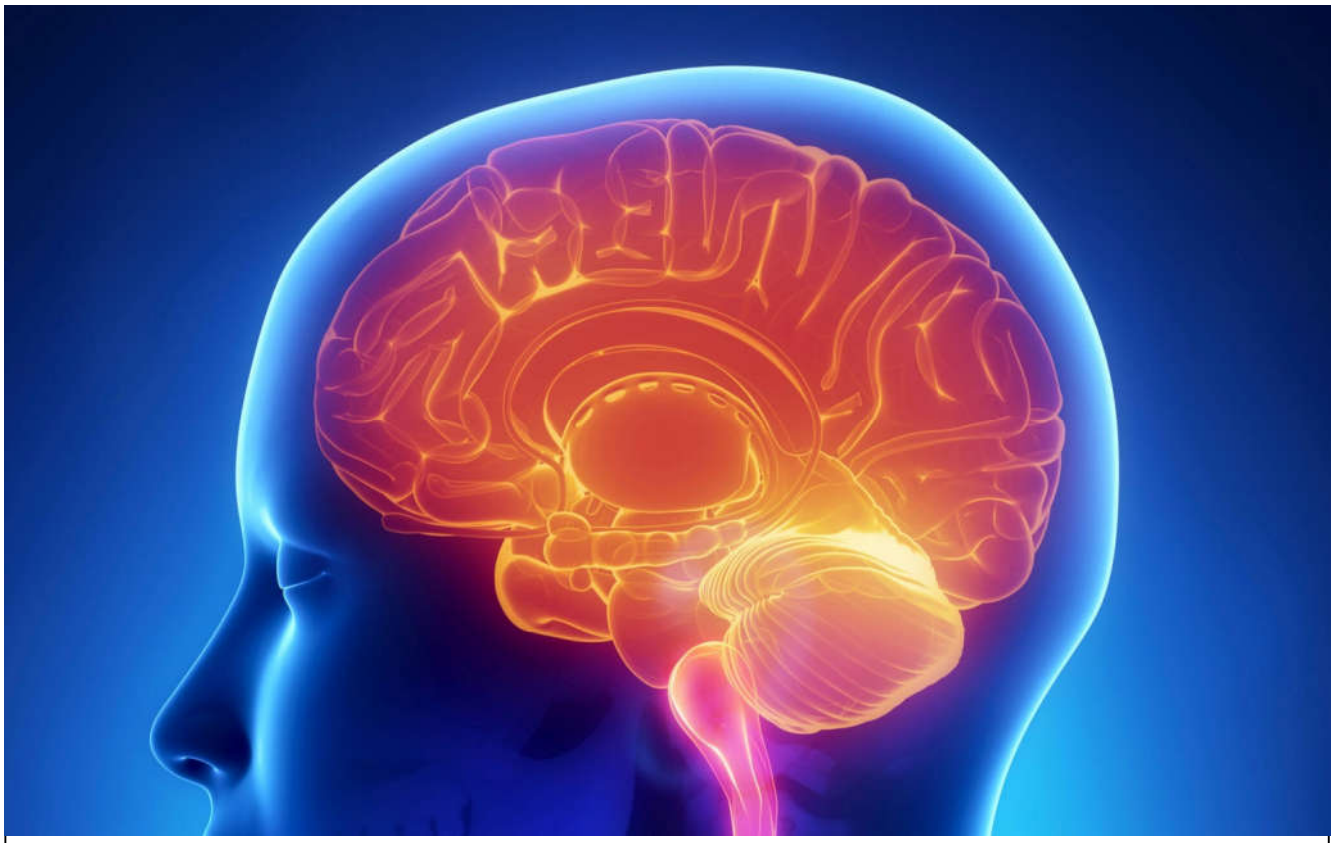

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RESEARCH ARTICLE

ECONOMETRIC INVESTIGATION OF FARM HOUSEHOLDS' ACCESS TO AGRICULTURAL INFORMATION: THE CASE OF MAIZE FARMERS IN DALE WOREDA

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ABSTRACT

This paper is thus intended to analyze the determinants of farmers' access to agricultural information with especial reference to maize farms in Yirgalem (Dale) woreda The main objective of this paper is to assess maize farmers' access to relevant agricultural information, and to identify the determinants of intensity of access to agricultural information in Dale woreda The result of the study indicated that, there are statistically significant differences in access to agricultural information between male headed household and female headed households in favor of male. Male headed households are observed to benefit from different extension services. This disparity is attributable to the age old problem that binds females to stick to household chores. Due to many socio-cultural values taboos and norms, males have freedom of mobility and participation in different meetings. Evidence in the literature and also from the study indicated that female-headed households have less access to agricultural information and improved Technologies credit, land, and extension services

INTRODUCTION

Agriculture in Ethiopia, like other sub Saharan countries, is the foundation of the country's economy which accounts for over 40 percent of GDP, 80 percent of exports, and 80 percent of the labor force employment. Agriculture also remains to be the economy's most important sector. Ethiopia has great agricultural potential because of its vast areas of fertile land, diverse climate, generally adequate rainfall, and large labor force. Despite this potential, however, the Ethiopian agriculture has remained underdeveloped because of drought, which has persistently affected the country since the early 1970s, and poor economic base (low productivity, weak infrastructure, and low level of technology). Yet agriculture is the country's most promising economic sector. [P.Thomas *et al*, 1991; Demeke and Ferede, 2005]

Despite the fact that agriculture is the foundation of the nation's economy, it has not yet addressed the age old question of food security. Ethiopia has been a food deficit country since the early 1970s. A closer look at the performance of the Ethiopian agriculture reveals that over the last three decades it has been unable to produce sufficient quantity to feed the country's rapidly growing population. Furthermore, the country has been experiencing several droughts that claimed the lives of several thousands of people. It can easily be evoked that food aid has been accounting for a significant proportion of the total food supply in the country. For instance, Ethiopia received 726,640 metric tons of food aid yearly over the 1985-2000 periods which amount to 10 percent of the national food grain production. (Daniel, 2008, Samuel 2006)

Although potential exists for self-sufficiency in grains and for export development in livestock, grains, vegetables, a large part of the agricultural sector is under developed. One of the principal causes of the prevailing problems of agriculture is the low level of utilization of output enhancing inputs. The agricultural production system in Ethiopia is highly dominated by traditional farming and the application of modern inputs has been extremely limited. In this regard studies pointed out that the Ethiopian farmer continues to use low fertilizer rates which are estimated to be an average of 7 Kg of nutrients per hectare of arable land as compared to a sub-Saharan average of 9 Kg nutrients per hectare of arable land. The world average stood at 65 Kg per hectare. (Daniel, 2008)

Agricultural intensification has a lot to do with the Mellenium Development Goal of the United Nations in general and Ethiopia in particular. Poverty reduction, hunger eradication, and technology transfer are among the issues high on the global agenda on sustainable development after the approval of the Millennium Declaration by the General Assembly of the United Nations (UN, 2000). This declaration resulted in the formulation of eight Millennium Development Goals (MDGs):

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a set of goals and targets to guide international policies. Some of the most important issues of MDGs are poverty, hunger and technologies transfer. These, in developing countries, are strongly linked to agricultural sustainable development at national, regional or local levels. (Javier, 2008 ; Rosebud *et al*, 2006).

When we come to our nation, the development strategy of Ethiopia strongly hinges on the development of peasant agriculture. The government has been promoting the new extension program as an effective mechanism to bring about the desired growth in the agricultural sector. The intervention is composed of a package of improved technological inputs such as chemical fertilizers, improved seeds, better cultural practices, and expert support. Progressively a number of peasants are joining the project; hence it is hoped that agricultural productivity could be significantly increased. Its success will definitely depend on the wider availability, accessibility and utilization of agricultural information. The effectiveness of the technological packages and the extent to which a significant number of peasant households are willing and able to adopt the package and apply it on a continuous and sustainable manner is highly dependent on how well in formations pertaining to the above issues are both accessed and utilized (Abebe and Mulat, 2003; EEA/EEPRI, 2007; Edilegnaw, 2003).

Furthermore it is very well noticeable and not far away from intuition that, farmers differ in their level of access to agricultural information from extension service and other sources. The causes of the diversity are attributable to various demographic, social, economical, or institutional factors. Uncovering the reasons behind such diversity and understanding farmers' current level of access to agricultural information is of paramount importance. This paper is thus intended to analyze the determinants of farmers' access to agricultural information with especial reference to maize farms in Yirgalem (Dale) woreda.

Objectives of the paper

The main objective of this paper is to assess maize farmers' access to relevant agricultural information, and to identify the determinants of intensity of access to agricultural information in Dale woreda.

The specific objectives of the paper are to:

- assess whether or not relevant agricultural information is accessible,
- identify determinants of access to agricultural information by farming households in the study area

Research Questions

The study pondered over the following research questions

- What is the level of access to agricultural information of maize farmers of the study area?
- What are the factors that influence access to agricultural information of maize farmers in the study area?

Review of empirical studies on determinants of Access to agricultural information

Empirical studies on the adoption and diffusion of innovations were conducted by a number of researchers. With respect to determinants of access to agricultural information, however, there is limitation in the vivacity and comprehensiveness of the studies. This is part of the reasons as to why this study was aimed at. Therefore, in this study partly access to different agricultural information is expressed interns of access to agricultural technology utilization; because agricultural knowledge and information can be accessed, shared and utilized through material embodied form the technological packages. The empirical investigation has been useful to investigate and find answers to the following set of questions:

- What decision making pathways do individuals follow when considering whether or not to have an access in to agricultural information?
- Which sources of information are important?
- What are the differences among people who access agricultural information quickly or slowly or don't even worry about accessing pertinent agricultural information?

For simple presentation, the variables are categorized as household demographic variables, socio-economic factors, psychological variables and institutional factors.

Table 1 Demographic characteristics of sampled households

Variable		Frequency	Percent	Cumulative percent
Age	Below 20	0	0	0
	20-30	15	12.5	12.5
	31-40	35	29.2	41.7
	41-50	40	33.3	75
	51-60	18	15	90
	Above 60	12	10	100
	Total	120	100	
Sex	Male	95	79.2	79.2
	Female	25	20.8	100
	Total	120	100	
Education	Illiterate	29	24.2	24.4
	1-6	49	41	65.4
	7-8	28	23.3	88.6
	Above 8	14	11.7	100.
	Total	120	100	
Family size	1-3	15	12.5	12.5
	4-6	71	59.2	71.7
	7-10	32	26.7	98.4
	Above 10	2	1.6	100
	Total	120	100	

Source Own survey and calculation (2004)

Demographic variables

Household's personal and demographic variables are among the most common household characteristics which are mostly associated with farmers' behavior of access to agricultural information. From this category of variables age, sex, education, family was reviewed in this study. With regard

to age different studies report different results. For example a study conducted by Katungi (2006), on social capital and information exchange in rural Uganda reveal that older men are less likely to engage in simultaneous receiving and providing of information, perhaps due to the low ability to communicate associated with old age. Similarly, Pedro *et al* (2009) on their study on improving technology adoption in agriculture through extension services in Uruguay and Techane (2003) in his study on fertilizer use and marketing in Ethiopia reported that age had a negative effect on the adoption of technologies. However, there are also others who reported positive relationship of age with adoption. For instance, Edilegnaw (2003) on the study conducted on the opportunity cost of growing traditional wheat varieties (implications for the design of targeting principles of adoption of improved varieties in Ethiopia) reported positive relationship between age and adoption. Gender differentials are one of the most important factors that limits access to agricultural information. Due to long history of cultural and social grounds in many societies of developing countries, women have less access to household resources and also have less access to institutional services and agricultural information. Regarding the relationship of household's sex with adoption of agricultural technologies, many previous studies reported that household's gender has positive effect on adoption in favor of males. For example, Mulugeta (2009), in his study on determinants of intensity of adoption of old coffee stumping technology in Dale Wereda found that male headed households are more likely to adopt fertilizer than female headed households. Similarly Habtemariam's (1996) study shows that, there is a gender bias against women and among extension workers. With regard to education, there is a general agreement that education is positively associated with adoption because education is believed to increase farmers' ability to make a rational, objective and optimal decision. obtain, and analyze information that helps him to make appropriate decision. Studies conducted Tewodaj *et al*. (2009); Mauricer *et al*. (2009);Tesfaye *et al*. (2001) have reported that education had positive relationship with adoption and access to agricultural information. Pipy, (2006), found that, significant difference between different educational level in poultry production sources of information and utilization of information. In most studies, family size had positive relationship with adoption of improved agricultural technologies. For instance, Dessalegn (2008) on the study he conducted on social network and diffusion of agricultural technology of sorghum production reported positive and significant relationship of family size with adoption.

Socio-economic factors

Differences in social status can affect perceptions, access to knowledge and, crucially, the importance and credibility attached to what someone knows. Often, the knowledge possessed by the rural poor, in particular women, is overlooked and ignored (FAO, 2004). Therefore, the access to information and adoption decisions highly depends on the individual social and economic status. (Daniel 2008). Economic factors influence household's adoption decision of agricultural technologies. According to Mulugeta (2009) economic factors such as household's resource ownership and economic objectives play a great role in determining the willingness and ability to invest in the adoption of agricultural technologies. Tadese (2008) and Techane (2002) revealed that livestock holding has positive influence on adoption of improved agricultural technologies. A study conducted by Tadese (2008), indicated positive relationship between off-farm and adoption decision. Contrary to this, (Makokha *et al* 2007) on their study on adoption of dairy technologies in Kenya reported the negative influence of participation in off-farm income on farmers' adoption of dairy technologies. Thus there are contending results. Availability of household labor is the other important variable which in most cases has an effect on household's decision to adopt new technologies and quest for agricultural information. Several studies reported the positive effect of household size on adoption of improved agricultural technologies. For instance, Shiferaw and Tesfaye (2006) in their study on adoption of improved maize varieties in southern Ethiopia found positive effect of household size availability on adoption of improved maize varieties. Similarly the studies of others on acquisition and utilization of agricultural packages revealed household size, which is a proxy for labor availability, is positively related with adoption probability.

Table 2 Mean comparison of demographic characteristics and farm assets of information Seekers and non-seekers

Variable	Mean		Coefficient of Variation		ttest of paired means
	Seekers	Non seekers	Seekers	Nonseekers	
AGE	40.95(12.41)	51.95(12.28)	30.31	23.64	5.26
EDUCN	1.66(0.84)	0.63(0.76)	50.60	121	-6.91
HH SIZE	4.13(2.13)	4.39(3.09)	51.57	70.39	0.57
LAND	0.58(0.48)	0.93(1.49)	82.76	160	1.85
PMKT	98.76(109)	56.77(58.19)	110	103	-2.44
TLU	2.74(2.83)	1.69(1.25)	103.28	74	-2.42

Source: Own survey and calculation (2004)

Table 3 Relationship between dependent and dummy independent variable

Dummy Dependent Variable	Rho	P-value
EDUCN	0.093	0.3123 NS
CRDT	0.2581	0.0044*
SOCIAL	-0.0756	0.4118NS
ATT	0.8064	0.000*
OFFRM	0.212	0.0201**

*,**, NS = significant at 1%, 5%, level and not significant at 10%: Source, own survey, 2004

Table 4 Relationship between dependent and continuous independent variable

Continuous Dependent Variable	Rho	P-value
AGE	-0.5040	0.0000*
HHSIZE	0.2337	0.0105*
LAND	0.32200	0.0004*
TLU	0.0036	0.9691NS
PMKT	-0.4260	0.0000*
HEALTH	-0.1966	0.0322**

*, **, NS = significant at 1%, 5%, level and not significant at 10%Source, own survey, 2004

Institutional and psychological Variables

Farmers make decisions within a broader environment or context. Institutional factors are part of such broader environment which affects farmers' decision of accessing agricultural information and technologies. In line with this, study conducted by Shiferaw and Tesfaye (2006) on the

adoption of improved maize verities in southern Ethiopia indicated that credit availability significantly affected adoption of improved maize especially of resource poor households. Studies conducted by Botha (1986) and Duvel & Botha (1999) revealed the positive and significant relationship of a favorable attitude with adoption behavior.

Table 5 Maximum likelihood Estimation of Tobit Model for Intensity of Access to Agricultural Information

Deapendent variable: ACCESS SCORE				
Explanatory variable	**Estimated Coefficients**	**Standard Error**	**t-ratio**	**P-value**
AGE	0.004921	0.0038396	1.28	0.203 NS
SEX	0.2376736	0.1021273	2.33	0.022**
HHSIZE	0.0224526	0.0194091	1.16	0.250NS
EDUCN	0.1199019	0.1201088	1.00	0.320NS
LAND	0.013568	0.0537953	0.25	0.801NS
TLU	-0.0038623	0.0159387	-0.24	0.809NS
PMKT	-0.002973	0.0005186	-5.73	0.000*
CRDT	0.2230764	0.0837317	2.66	0.009*
ATT	-0.0045932	0.1099021	-0.04	0.967NS
SOCIAL	0.0293248	0.1092254	0.27	0.789NS
HEALTH	-0.0006877	0.001042	-0.66	0.511NS
OFFRM	0.2174415	0.0795141	2.73	0.007*
CONSTANT	0.0997944	0.2447933	0.41	0.684NS
Number of observation =120				
LR Chi2(12)= 74.54				
Prob> Chi2 =0.0000				
Pseudo R2=0.3865				

*, **, NS = significant at 1%, 5%, and level and not significant at 10%
Source: own survey, 2004

METHODOLOGY

The model

In the field of agricultural economics and studies on adoption of technologies and demand for information, the commonest practice is when the dependent variable is strictly measured as a dichotomous response variable [0 = non – adoption of innovation /non participation in program or no information seeking behavior and 1= adoption of innovation / participation in a program or revealed behavior of information seeking] whereby discrete regression models are used.

Discrete regression models are models in which the dependent variable assumes discrete values. The three most commonly used approaches to estimating such models are the linear Probability models (LPM), the Logit model and the Probit models. The linear probability model has an obvious defect in that the estimated probability values can lie outside the normal 0-1 range and it also assumes that the marginal or incremental effect of explanatory variables remains constant, that is Pi= E (Y=1/X) increases linearly with X. Thus this model is discarded from the alternatives. The Logit and Probit models are the convenient functional forms for models with binary variable. The choice between the two is one of mathematical convenience (Amemiya1981; Gujarati, 2007).

The econometric model applied for analyzing factors influencing the level or intensity of access to agricultural information, however, is the Tobit model. This model is chosen because; it has an advantage over other competing models (LPM, Logistic, and Probit) in that, it reveals both the probability and intensity of access to agricultural information. (Maddala, 1992; Amemiya, 1985) As was remarked already a strictly dichotomous variable often is not sufficient for examining the intensity of usage for such problems. Consequently, in this study the ratio of actual maize farmers' agricultural information access from extensions activities to potential information access score was taken as a dependent variable of the model. Thus the need for a Tobit model

Model specification

The econometric model applied for analyzing factors influencing access to agricultural information is the Tobit model shown below. As was said already this model is chosen because it has an advantage over other discrete models (LPM, Logistic, and Probit) in that; it reveals both the probability of access and the intensity of access to agricultural information. Thus the Tobit model for the continuous variable (in this study intensity of access to agricultural information pertaining to maize production) can be defined as: (Maddala, 1992; Amemiya, 1985)

$$AI_i^* = \beta_0 + \beta_i x_i + u_i i = 1,2,3 \dots n$$
$$AI_i = AI_i^* if \beta_0 + \beta_i x_i + u_i > 0$$
$$= 0 \quad if \beta_0 + \beta_i x_i + u_i \leq 0$$

Where:

AI_i = the observed dependent variable which is the ratio of access index (access score) for the i^{th} farmer
AI_i^* =the latent variable which is not observable
x_i= vector of factors affecting intensity of access to agricultural information pertinent to maize production
β_i = vector of unknown parameters
U_i= is the error term which is normally distributed with mean 0 and variance σ^2

The parameters of the model are estimated by maximizing the Tobit likelihood function of the following form (Madala, 1997, Ameniya, 1985,)

$$L = \prod_{AI_i^*>0} \frac{1}{\delta} f\left(\frac{AI - \beta_i X_i}{\delta}\right) \prod_{AI_i^* \leq 0} F\left(\frac{-\beta_i X_i}{\delta}\right)$$

Where f and F are the density function and cumulative distribution function of AI*

The marginal effect of an explanatory variable on the expected value of the dependent variable is given by

$$\frac{\partial E(Y_i)}{\partial X_i} = F(Z)\beta_i Where \frac{\beta_i X_i}{\delta} isdenotedbyz$$

The change in the probability of information access per a change in the explanatory variable X_i is given by

$$\frac{\partial F(Z)}{\partial X_i} = f(Z)\frac{\beta}{\delta}$$

The change in the intensity of information access with respect to a change in an explanatory variable is given by:

$$\frac{\partial E(AI_i / AI_i^* > 0)}{\partial X_i} = \beta_i \left[1 - Z\frac{f(Z)}{F(Z)} - \left(\frac{f(Z)}{F(Z)}\right)^2\right]$$

Where:

F (Z) is the cumulative normal distribution of Z
F (Z) is the value of the derivative of the normal curve at a given point (i.e. unit normal density)
Z is the z –score for the area under normal curve.
βis a vector of Tobit maximum likelihood estimates and $\delta$is the standard error of the error term

Definition and explanation of dependent variable

Accessscore

The ratio of actually gained farmers' agricultural information pertaining to maize production to potential information access scoreIn this study intensity of access to agricultural information of maize production is operationally defined as receiving messages related to maize production activity from extension service (advisory service, training, field days, demonstration and the like), including its frequency. The dependent variable in this study is the level of access to agricultural information of maize production by farmers of dale woreda. It was designed to measure intensity of access to agricultural information of maize farmers. In order to measure the farmers' access to agricultural information of maize production, five information requiring activities were identified in collaboration with woreda extension staff and models used by previous researchers. Then, the information access of respondents was rated using properly designed frequencies. This gave a possible maximum potential score of 15 for access to agricultural information with respect to maize production (see the appendix).Consequently, in this study, the ratio of actual gained farmers' agricultural information pertaining to maize production to potential information access score was taken as a dependent variable of the tobit model. In short it is called access score (ACCESS SCORE) (Daniel, 2008, Hunter, 2007, Nkonya, E. *et al*., 1997)

Definition of independent variables and hypothesis

The following independent variables were hypothesized to influence access of agricultural information of maize production in the study area.

Demographic Variables

Age of the household head (AGE)

It is measured in terms of the respondent's number of years of age at the time of data collection. Even though previous studies provide contending results, in this study it is believed that young farmers are keen to get knowledge and agricultural information of maize production than older ones.

Sex of the household head (SEX)

It is nominal variable used as dummy (1 if male, 0 otherwise). Due to many socio-cultural values taboos and norms, males have freedom of mobility and participation in different meetings. Evidence in the literature indicates that female-headed households have less access to and utilization of agricultural information and improved technologies, credit, land, and extension service. Thus it is hypothesized that male household farmers would have more access to agricultural information of maize production.

HH Size

The household size represents the number of potentially active family members participating in extension demands for the proper management of farm operation. Thus, households with higher endowment with labor is expected to have greater probability of access to agricultural information of maize production

Education level (EDUCN)

Educational level of the household head is a categorical variable. It is 1 if illiterate, 2 if able to read and write, 3 if primary school, and 4 if secondary school and above. The educational level of the individual is one of the important factors capacitating the individual to receive, absorb and utilize new ideas to be more productive. Therefore it was assumed that the level of education attained by the household head would enhance the access to agricultural information of maize production.

Health Status of the household head (HEALTH)

It is a continuous variable measured in number of days per year that the household head is sick as a proxy to health status. To acquire and utilize agricultural information, physical wellbeing of the farmer is important. Sick household farmers will face the problem of getting information or a restricted access to agricultural information than a healthy household head. Therefore, good health status of a household head is expected to influence positively access to agricultural information of maize production.

Socio-Economic Variables

Off-farm income (OFFRM)

Participation in an off-farm work. It is 1 if household head works in an off-farm activity, 0 otherwise. The more the participation in an of farm income the more probable the farmer will value the importance of information and thus the more likely is a household to seek relevant agricultural information of maize production.

Farm size (LAND)

Total farm size owned by the household in hectare. Hosting extension demonstration, it is believed, requires approximately half a hectare. Thus farmers with larger landholdings are likely to participate in the extension project which will enhance their information questing ability. Thus the higher the land size or farm size of the household the more likely is a household to seek relevant agricultural information.

Tropical livestock units (TLU)

Tropical livestock units, which is a composite index of all the units of livestock owned by a household it is assumed that TLU will positively affect the probability of access to agricultural Information of maize production

Institutional Variables

Access to credit (CRDT)

Credit availability is measured as a dummy variable that respondents received in the form of credit from Governmental or non-governmental organizations. Credit provision from formal institutions is mostly meant for boosting agricultural production and protection, training and awareness creation in order to achieve the desired purpose of credit. It is expected that those who have better access to credit will be more inclined to seek agricultural information and utilize agricultural technology packages. Therefore, access to credit (dummy variable 1 if there is access and 0 otherwise) is expected to influence the access to agricultural information of maize production positively.

Market distance (PMKT)

It will be measured based on distance of market in walking minutes from the residence of respondent. Proximity to market center in walking minutes significantly affects households' access to agricultural information of maize production. Households nearer to market center are likely to have access to information on new information and thus positively related to the dependent variable.

Social Participation (SOCIAL)

Affiliation and involvement in social activities or in any formal (such as market cooperative, School council etc.) or non-formal organization (Iqub, Religious club etc.) will give higher exposure to the valuation of information. Therefore this variable is expected to influence access to agricultural information of maize production positively .It is a dummy variable where 1 is for farmers who have participation in any formal or informal organization and 0 otherwise.

Psychological variable

Attitude towards improved farming practices (ATT)

It is operationally defined as inclination of farmers toward improved or better farming practices. It tries to capture weather maize farmers in the study area have positive or negative opinion towards improved farming practices. In this study it is a dummy variable (1 for positive attitude and 0 otherwise.) Positive attitude towards improved farming is one of the factors that can speed up the farm changing process. It is hypothesized that positive attitude towards improved farming influences access to agricultural information of maize production positively.

Data Type, Data source and Sampling Design

Both primary and secondary data were used in conducting the study. The main source of the data for this study, however, was the questionnaire survey conducted on a sample of farmers from the study area. Secondary data on several other relevant issues was obtained from agricultural development offices in the study area. This is in order to fill the gap and substantiate the findings from the primary data as deemed appropriate. Sample size determination has its own scientific approach. But in this study to determine sample size, in addition to introspection, different factors such as research cost, time, human resource, accessibility and availability of transport facilities and sample size of previous researches on related topics were taken into consideration. By taking these factors and other intuitive reasons of the researcher into account, 120 household heads were selected from the different Peasant Associations (PAs) of the study area. The study has employed a multistage sampling technique to select a sample of 120 farmers. In the first stage a certain number of peasant Associations (PAs), were selected purposely where farmers' participation in an extension service and information seeking behavior is relatively skewed. These were then stratified in to groups based on their proximity to the major town of the district, and peasant associations from each stratum were selected randomly .In the final stage, farm households were selected using systematic random sampling. The samples were selected in such a way that the numbers of sampled households are proportional to the total number of households in each peasant association.

RESULT AND DISCUSSION

Descriptive Statistical analysis

Agricultural information is operationally defined as the various sets of information and messages that are relevant to agricultural production activities of farmers such as crop production and protection, animal production and management, and natural resource production and conservation. It is obvious that the development of agriculture is highly dependent on the new knowledge and information. In most of adoption literatures, access to information is cited as the major determinant of technology adoption.

The study is intended to identify the determinants of household decision to acquire agricultural information of maize production in the study area, Dalle Woreda, using both descriptive statistics and multivariate econometric analysis. In this section, descriptive statistics such as mean, standard deviation, percentage, frequency tabulation, and t test of paired means were employed. Evaluation of the impact of certain characteristics, in an attempt to seek and hence acquire agricultural information, on farmers' behavior is dealt in the subsequent discussions with reference to certain characteristics of the sampled farmers that are deemed to reflect their economic and social conditions by using an econometric analysis.

Demographic Characteristics

In order to understand the sample households, it is worthwhile to describe their demographic characteristics. Household's personal and demographic variables are among the most common household characteristics which are mostly associated with farmers' behavior in seeking information. From this category of variables, sex, age, education and family size were reviewed in this study.

As can be understood from Table 1, out of the total of 120 respondents in the sample, 95 respondents were men and the rest 25 were women. Thus the gender structure reveals that the sampled households are dominantly headed by male. It amounts to 79.2% of the total sample. When we come to age, as is indicated in the Appendix I, the average age of respondents is 45 years with the standard deviation of 12.32. The maximum age of the respondents 80 years while the minimum age was 25 years one can also observe from the table above that 24.2 % of the sampled households are illiterate while 41 % had stayed in school at primary level of education. The remaining 23.3 % and 11.7% of the respondents attended formal education up to the level of 7-8 and above 8 years of schooling, respectively. With more than 85% of the sampled households equal to or below general primary education, there remains a lot to be done.

Table two tried to make a comparative analysis of maize farmers who are deemed as seekers and non-seekers of agricultural information with regard to maize production vis-à-vis their demographic characteristics and farm assets the mean age of information seekers is 40.95 while it is 30.31 for non-seekers. Presumably enough the table uncovered that the more the year the greater the experience a given farmers will have and the better they will value the value of information. The computed t-value of 5.26 reveals that the difference in age between seekers and non-seekers is significant at one percent level of significance. By so looking at the coefficient of variation of the mean age of seekers and non-seekers, one can observe that there exists wide disparity in terms of age among those farmers who do not show an observed behavior of questing for information.

Table 2 reveals also that seekers are more educated than their counterpart and this difference is significant. On average a farmer that has revealed his due preference for information falls in the category of primary education while a non-seeking farmer is illiterate. Besides there is greater dispersion in their distribution among non-seekers than that of seekers there is a slight difference, though significant, in terms of total farm size owned by seekers and non-seekers. An average non seeking farmer has slightly less than one hectare of land when actually it is half hectare for the average information seeking farmer. When we see their distribution, seekers are relatively more stable than non-seekers as can be evidenced from the coefficient of variation When we come to the question of proximity, it seems that non seekers are far closer, to the nearest market place than seekers. This is because, the table reveals, it will take 98 minutes, for an average seeker to arrive at the nearby market. The figure decreases to 57 minutes for the average non seeker. And this result seems to be counter intuitive. The source of the disillusion can be clarified by the fact that there 42 non-seekers and 78 seekers in the total sample size. And hence their respective sum and average may not convey the real meaning. An econometric analysis of the tobit (see the discussion that follows) model has resolved the dispute. As expected the variable proximity to the nearest market (PMKT) is negatively related with the dependent variable. The mean tropical livestock unit is greater for the seekers than the non-seekers and the difference is significant.

Relationship Between Dependent and Independent Variables

Before passing to the Tobit econometric model analysis, it is worthwhile to summarize the degree of association between the dependent and independent variables (five dummy and six continuous variables). To analyze the relationship between dependent and independent variables Spearman's rho is employed. The result is presented in the table below The result of the correlation analyses , as displayed in the table above, shows that among the five explanatory dummy variables three of them (Attitude, Credit and Of farm income) have significant relationship with access to agricultural information of maize production . Accordingly farmers' accesses to credit and of farm income and also their attitude towards improved farming practices are found to be detrimental in paving all the way for farmers to have an access to agricultural information. Social participation and Education are not observed to have a significant relationship with the probability and intensity of farmers to have an access to agricultural information on maize production.

Similarly the above table displays the relationship between the dependent variable and the continuous explanatory variables. Accordingly six variables, namely age of the household head (AGE), size of the household (HHSIZE), farm size of the household (LAND), proximity to the nearest market (PMKT) and the number of days that the household was sick during the year2002-2003(HEALTH) were found to have a significant relationship with the dependent variable. Tropical livestock unit (TLU), on the other hand, is not significantly related with the dependent variable.

Econometric Analysis

RESULT OF THE TOBIT ECONOMETRIC MODEL

The study of factors affecting farmers' behavior in their attempt to seek information pertaining to their farming activities is useful since the variables are the main vehicles through which government programs influences decision in the agricultural sector. In general farmers' decision to seek and acquire agricultural information is primarily affected by the administration of a program that enhances farmers' access, acquisition and utilization of agricultural information for one cannot participate in a program that does not exist. On the demand side, however; there are some household and socio-economic variables affecting farm households' decision. This part examines the various factors affecting maize farmers demand for agricultural information. It was hypothesized that a number of variables affect demand for agricultural information. These are: the age of the household head (AGE), sex of the

household head (SEX) household size (HHSIZE), educational level of the household head (EDUCN), total farm size owned by the household (LAND), number of domestic animals owned by the household as measured by tropical livestock unit(TLU), the proximity of the residence of farmers to the nearest market center (PMKT), credit availability (CRDT), farmers attitude toward better farming practices/technology (ATT), farmers' participation and or involvement in social affair in their villages (SOCIAL), health status of the respondents (HEALTH) and participation in an off-farm activity (OFFRM). These variables hypothesized to affect farmers' decision to participate in seeking agricultural information of maize production were selected to fit the Tobit model and it was displayed in the table five below.

The tobit regression results in Table 5 revealed that all of the variables expected to affect access to agricultural information are of the expected sign except for AGE, TLU and ATT. The unexpected sign of the dependent variable is partly attributable to the facts that respondents are lying about their age. The researcher has personally witnessed that household heads that appear to be 60 years of age were seen to have reported 35. Among the variables hypothesized to affect access to agricultural information four variables, namely SEX, PMKT, CRDT and OFFRM significantly impact the intensity of access to agricultural information of maize production while the rest have the expected signs even though they are statistically insignificant. The likelihood ratio chi-square of 74.54 with a p-value of 0.0000 tells us that our model as a whole is statistically significant.

Access to credit

As the tobit model result indicated, the variable access to credit has a positive and significant influence on the intensity of access to agricultural information of maize production at 1% level of significance. Thus it can be argued that those farmers who have access to credit of any sort are more able to have an access to the information that pertains to maize agricultural undertaking than those without access. If a farmer, who has not been using credit facilities, tries to use one, his/hers intensity of access to agricultural information would increase by 0.2 unit. Access to credit explains the variation in access to agricultural information by 22.3% keeping all other factors constant. Earlier study also show similar results (Legesse, 1992, Tesfaye and shiferaw, 2001)

Proximity to the nearest market

The stata result also displayed that farmers' proximity to the nearest market, as measured by walking minutes, significantly and positively affected their intensity of access to agricultural information of maize production at 1% level of significance. Farmers whose residence is close to the market may have an opportunity to frequently visit the nearby market and in due course they will be prone to innovation and acquisition of information. Keeping all other factors constant, proximity to the nearest market explains 0.3% of the variation of intensity of access to agricultural information. The result also opens a clue that, ceteris paribus, if proximity decreases by one minute, then an averages' farmers' intensity of access to agricultural information of maize production will increase by 0.3 unit

Off-farm income

Farmers are observed to move out of their village for prolonged time in order to earn a living. The amount of income that they get together with their on farm income could enhance their financial strength that may pave the way for their ability to seek agricultural information. Besides in due course of their offarm undertaking, which usually takes place in the nearby town or markets, they may also learn to value the importance of information. The result to the tobit model also justified this reasoning as this explanatory variable is positively and significantly related with access score to agricultural information of maize production at 1% level. It accounts for 22% of the variation . Thus farmers who are engaged in an off-farm activity are more probable to intensify their access to relevant agricultural information by 22 units than those who do not have an off-farm engagement.

Sex

Sex is one the important variable that explains the motivation behavior and opportunity of individual to have accessed agricultural information. It influenced, according to the result, access score to agricultural information significantly and positively in favor of men at 5% level of significance accounting for 24% of the variation. Men are observed to have more likelihood of maximizing the acquisition of agricultural information. Keeping all other factors constant farm households headed by men will have 24 units more intensified access to agricultural information of maize production than their female counter parts

Implications

The finding of this study revealed that the main factors that gives significant explanation for the variation of the intensity of access to agricultural information of maize farmers among the sampled farmers is difference related to access to credit. So provision of credit and enhancing the financial strength of the farmers will be of paramount importance for farmers to have the due strength to seek and utilize agricultural information. Thus, access to credit should be improved by rescuing indebted farmers, promoting other sources of micro credit, and developing appropriate credit collection schemes.

Farmers with greater proximity to the nearby market are found to be in a better position to have maximized the intensity of the acquisition of agricultural information. Thus, it is highly recommended that infrastructures-roads, and the like be built besides integrating the fragmented markets advisable which intern will enhance the ability of farmers to have access to information and make informed decisions.

The result of the study indicated that, there are statistically significant differences in access to agricultural information between male headed household and female headed households in favor of male. Male headed households are observed to benefit from different extension services. This disparity is

attributable to the age old problem that binds females to stick to household chores. Due to many socio-cultural values taboos and norms, males have freedom of mobility and participation in different meetings. Evidence in the literature and also from the study indicated that female-headed households have less access to agricultural information and improved technologies, credit, land, and extension services.

Once appropriate agricultural information is made available and/or accessible to females, there is no earthly reason that they will disregard it. They can utilize it as their male counterparts are doing. Therefore, it is highly recommended that development agents, professional experts, planners and related organizations should consider as to how females could be beneficiaries from any source of information that may enhance their agricultural productivity.

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