

Full Length Research Paper

Determinants of information seeking behavior of smallholder farmers of Tanqa Abergelle woreda, Central Zone of Tigray, Ethiopia

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The purpose of this research is to reveal the determinants of information seeking behavior of the Abergelle woreda smallholder farmers. In this information era, smallholder farmers' information seeking behavior shows difference due to many reasons: change with their geographical location, economic, demographic, psychological and institutional factors. Till now, to the best of the author's knowledge, no study has been done on the topic in the study area, therefore, identifying the research on determinants of information seeking behaviour underline its importance. From the 19 rural kebeles of the wereda, 5 were randomly selected. The sample size was specified based on simplified Yamane (1967) formula and 152 household head were selected by using simple random sampling technique proportion to their population size from the randomly selected five sampled kebeles. The primary data were collected through household survey and secondary data were collected by reviewing published and unpublished materials. The level of respondents information seeking behavior of farmers were analyzed by using mean and standard deviation and the determinants of information seeking behavior identified by ordered logit regression model. Information seeking behavior of farmers' was determined positively and significant by radio, mobile, extension contact, participating in any training, social participation, distance from the nearest market and farmers' perception. In conclusion, farmers' information seeking behavior was determined by: ICT ownership, extension contact, participating in training, social participation and perception. The study recommended that, to create awareness on the importance of information in enhancing rural livelihood, dissemination of information through trusted channels information sources is highly needed, strengthening the existing agricultural training offering practices and extending the training on how to seek information on modern information source further needed and strengthening extension contact through individual extension contact using home and farm visit should supported by modern ICTs.

Key words: Determinants, information seeking behavior, ordered ordinal logistic regression logit, smallholder farmers, Tigray, Ethiopia.

INTRODUCTION

Information is an important factor in the sustained development of any society because getting the required

information on time helps to reduce uncertainty and improves the quality of decision made in solving

problems. Information is power and an important working tool for the advancement of human and society (Apath and Ogunrewo, 2010). According to Malhaam and Rao (2004), knowledge and information have become significant factors for production of goods and services. And the future of food security in the developing world is increasingly becoming dependent more on information and knowledge than inputs (IFPRI, 2004). Agricultural information plays an important role in enhancing agricultural productivity. The demand for agricultural production is growing from time to time but the land for cultivation is fixed while the population size of the study area is increasing. Therefore, improving the productivity of the land through application of new methods of farming and technologies is crucial. It is evident that some categories of actors may have better access to this resource than others (Leeuwis, 2004).

Information seeking behavior is a broad term encompassing the ways individuals articulate their information needs, seek, evaluate, select and use information. According to Pettigrew (1996), information-seeking behaviour involves personal reasons for seeking information, the kinds of information which are being sought and the ways and sources with which needed information is being sought. Information seeking behaviour is purposive in nature and is an outcome of a need to satisfy some objectives. In the course of seeking, the individual may interact with people, face to face or electronically. Thus, the individual recognizes an inadequacy in his/her knowledge that needs to be resolved in order to deal with a problem, which then results in information seeking behavior (Tetlock, 1999; Wilson, 2000). Farmers search information to making an important decision, the farmer will devote time and effort to collect information, considering the alternatives and selecting the best option, in order to minimize the risk of getting it wrong; this process is known as complex decision making (Assael, 1998).

The main reason for choice of information source was proximity, assured quality, only available option and timely availability (Babu et al., 2011). Information seeking behavior of farmers influenced by the activity and problem at hand, that is, if women wanted to know how to apply pesticides, they went looking for information from whomever they thought had the right information (Odini, 2014). In this information society, information and knowledge play a key role in ensuring sustainable development (Koutsouris, 2010). Information seeking behavior is an essential component in the designing and developing of need based information sharing technique.

Without adequate information, particularly to the rural smallholder farmers, there might be lack of information on agricultural innovations. Lack of access to needed information by smallholder farmer reduces their information seeking behavior.

Tanqua Abergelle Wereda has invested so much effort to ensure smallholder farmers access of timely and relevant agricultural information by employing agricultural knowledge worker, health extension worker and different level of public leaders. However, the researcher has observed that many smallholder farmers' information sources are focusing on mobilizing to use hard technology while they faced challenges of meeting their information needs in line with their information seeking behavior. In the light of the above, this study investigates the information needs and seeking behavior of smallholder farmers in Tanqua Abergelle *wereda*. The objectives of the studies were to: evaluating the level of information seeking behavior of the smallholder farmers and identify the determinants of information seeking behavior of smallholder farmers in the study area.

METHODOLOGY

Tanqua Abergelle Wereda is located in central zone of Tigray Regional State. It is found 120 km west of Mekele, the capital city of Tigray region, and 900 km far away from Addis Ababa, the capital city of Ethiopia. A total of 20852 households were counted in this *woreda*, of which 16350 (78.41%) and 4502 (21.59%) are male and female headed households (CSA, 2007). The map of the study area is shown clearly in Figure 1.

The sample size was specified based on simplified Yamane (1967) formula. The study used two stage sampling technique. In the first stage, out of 19 rural kebele in the study Wereda, five rural kebele were selected randomly. In the second stage, 152 small households were selected randomly by using probability proportionate to size from each of the sampled kebele. The study has used both quantitative and qualitative types of data. It used secondary and primary data sources. The collection of primary data was carried out in 2016 by interviewing sample household heads. Pretested semi-structured questionnaire was used to collect primary data from respondents. The statistical analysis for the survey was carried out by using stata version 12.1. The respondent level of information seeking behavior was analyzed by using mean and standard deviation. Finally, the determinant of information seeking behavior was identified by using ordered logit model.

Variable definition and working hypotheses

Definition of the dependent variables

Information seeking behaviour: This is defined in this study as

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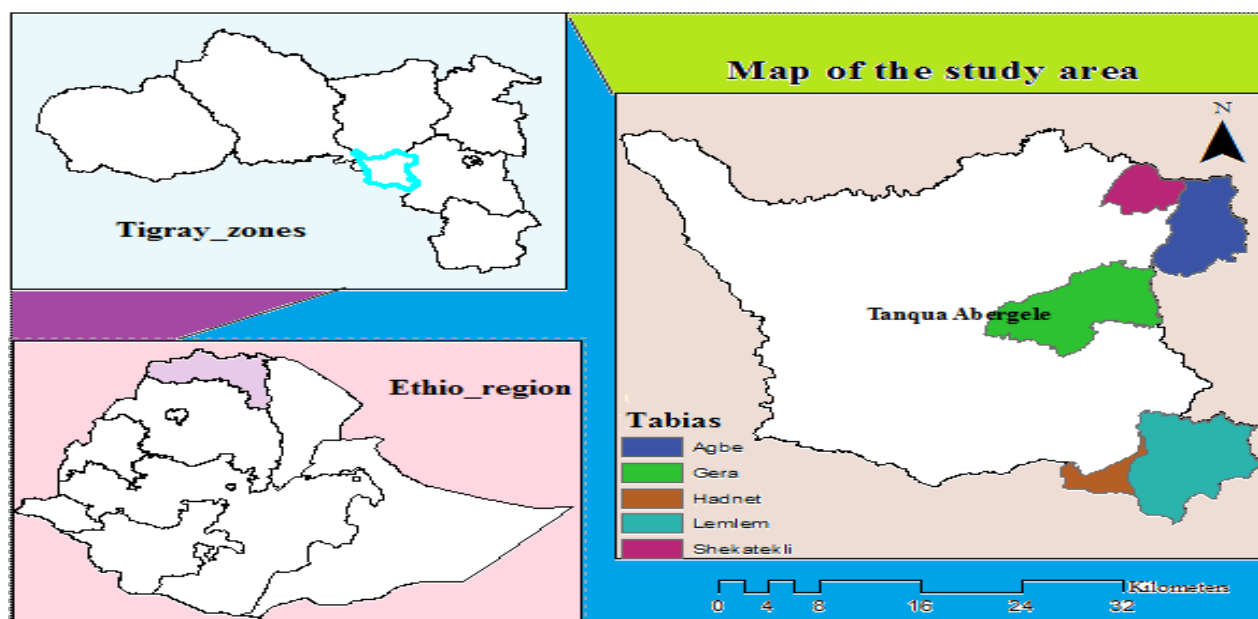


Figure 1. Map of the study area. Source: Extracted from ARC-GIS.

the degree to which the respondents are eager to get information from various sources to do different roles. It is ordinal variable grouped into 1, 2 and 3 if the respondent were low, medium and high in their information seeking behavior, respectively. It was measured using the score given for agricultural information sources by smallholder farmers. Hence, the sampled respondents were ordered into low if the respondent score is less than ($<$) mean minus SD, medium if a respondent scores in the interval of mean plus or/and minus SD, and high also if a respondent scores is greater than ($>$) mean plus SD based on the information seeking behavior they actually scored.

Definition of the independent variables and hypothesized relations

Independent variables are variables that influence the information seeking behaviour of small-holder farmers. The variables used in the research and their expected sign of these variables on the information seeking behaviour are listed as follows.

Age: It refers to age of the household head. It is continuous variable measured in terms of the respondent's number of years of age at the time of data collection. Young farmers are eager to have better information than older ones (Jemal, 2010). Age of the household head is hypothesized to influence negatively the information seeking behavior of respondent.

Sex: Sex refers to biological differentiation of household head. It is dummy variable 1 if male, 0 otherwise. Male headed household farmers were culturally having better chance of exposing to different agricultural information source when compared with women headed household. Therefore, it is hypothesized that sex of the household head influence the farmers information seeking behaviour positively.

Education level: It refers to education level of the household head.

It is categorical variable which have a value of 1) Illiterate, 2) from grade one-four, 3) from grade five- eight, 4) from grade nine and above. The level of education might have steered the respondents to be exposed to more sources and channels of information and it is positively associated with the dependent variable (Gunawardana and Sharma, 2007; Dinpanah and Lashgarara, 2011). Therefore, it is hypothesized that education may positively influence information seeking behavior.

Family size: It refers to the total number of household members who live and eat with the same home at least for six months. It is continuous variable. Family size in rural community play great role in contributing labor to agricultural production. Any household that have higher family size in number gives a room to eagerly seek labor intensive agricultural technologies. Therefore, it is hypothesized to influence positively, the information seeking behavior of respondents.

Land holding: This refers to the size of the farm land under the legal holding of the household. It is classified as continuous variable measured in hectare (ha). Size of land holding by smallholder farmers is positively associated with their information seeking behavior (Dinesh, 2012; Dinpanah and Lashgarara, 2011). Therefore, it is hypothesized that land holding of the household head may positively influence farmers' information seeking behaviour because land gives the opportunity to participate in different agricultural practice.

Livestock holding: Livestock holding refers to the total number of livestock holding of the household. It is a continuous variable measured in TLU (Storck et al., 1991). Livestock holding by smallholder farmer is exposed to information needed to improve livestock management and health (Dinpanah and Lashgarara, 2011). Therefore, it is hypothesized that livestock holding may be positively associated with outcome variable.

Radio ownership: Refers to farmer's ownership of radio. It is

dummy variable that will have a value of 1 for farmers who own radio, 0 otherwise. Owners of any of the ICTs tools had a higher level of climate change awareness than non-owners (ATPS, 2013; Bakare, 2011). Therefore, it is hypothesized that ownership of radio by farmers may positively influence his/her information seeking behavior.

Mobile phone ownership: Refers to farmer's ownership of mobile phone. It is dummy variable that takes value of 1 for farmers who own mobile phone or 0 if otherwise. The familiarity with media is positively related with information seeking behaviour (Dinpanah and Lashgarara, 2011). Therefore, it is hypothesized that access to mobile phone by farmers may positively influence information seeking behavior.

Perception: Deals with how the smallholder farmers perceive the different agricultural information sources in supplying relevant information from his/ her point of view. It is ordered variable measured in two point Likert-scale (agree=1 and disagree=0) on the relevance and importance of the different agricultural information sources. Perception influences information seeking behavior of smallholder farmers positively (Adesina and Baidu-forson, 1995). Therefore, farmers' perception of the agricultural information sources is hypothesized to influence positively, the information seeking behavior of respondents.

Extension contact: This refers to the number of contact made between the household head and extension agent with a given production year. It is a continuous variable measured by the number of days she/he had contact with development agents in the 2014/2015 production year. The higher extension oriented farmers try to get more sources and channels of agriculture information for acquiring knowledge on improved farming practices and new agricultural technologies, so it is positively related (Gunawardana and Sharma, 2007; Dinpanah and Lashgarara, 2011; Girma and Dawit, 2014). Therefore, it is hypothesized that increase in access to extension contact may influence positively, the information seeking behavior.

Participation in training: It explains the participation of household head in any training. It is a continuous variable measured in number of days of participation in any training in 2015/2016 production year. Therefore, this explanatory variable is hypothesized to influence the information seeking significantly and positively.

Social participation: It refers to membership of the household head in any of the local organization. It is a continuous variable measured in number of days of participation in those social events per year. The social participation positively influence information seeking behavior (Daniel, 2008; Jari and Fraser, 2009; Dinpanah and Lashgarara, 2011; Daniel et al., 2015). Therefore, it is hypothesized that farmers' participation in local organization may positively influence the dependent variable.

Distance from farmers training center: Refers to how far it is from the participant's resident home to the FTC he/she uses. It is a continuous variable that was measured in km. Farmers who live close to the FTC may have better exposure to contact with DA which are the main source about modern agricultural information.

The distance between the farmer's residences and the FTC is negatively related with information seeking behaviour (Dinpanah and Lashgarara, 2011). Therefore, it is hypothesized that it negatively influence the dependent variable.

Distance from the nearest market: Distance from nearest market refers to how far it is from the participant's resident home to the

nearest market he/she uses. It is a continuous variable measured in km. Farmers who live close to market may have opportunity to get more information sources from reliable senders. Therefore, it is hypothesized to influence negatively the information seeking behaviour of smallholder farmers.

RESULTS AND DISCUSSION

Descriptive analysis of the categorical variables

The descriptive analysis of the categorical variables is shown in Table 1. The sex of sampled smallholder farmers who had low, medium and high information seeking behavior were 75% male headed households and 25% female headed households. Education levels of smallholder farmers were 43.42% illiterate, whereas the rest 28.29, 22.03 and 5.26% sampled smallholder respondents studied grade 1 to 4, 5 to 8 and grade 9 above, respectively. From the 152 respondents, 77 (50.66%) of them own radio and 75 (49.34%) did not own radio. The study confirmed about 84 (55.26%) of them own mobile phone, whereas 44.74 did not own. Perception refers to how the smallholder farmers perceive the different agricultural information sources from his or her point of view. About 86.84% of the respondent agreed on the relevance and importance of the different agricultural information sources and 13.16% of them disagreed on the importance of agricultural information source.

Descriptive analysis of the continuous variables

The descriptive information on the continuous variables used for the study was estimated (Table 2). The minimum and maximum age of the respondents was 22 and 81 years, respectively. The SD ages of low, medium and high information seeking behaviour of respondents are 13.15, 12.46 and 12.06, years, respectively. The minimum and maximum family size of the sampled households was 2 and 10, respectively. The result of the study demonstrates the mean of livestock holding is 5.02 TLU with SD of 3.38. The average land holding of the low, medium and high information seeker respondents are 1.14, 1.39, and 1.17 ha, respectively. The minimum and maximum distant score from the resident's home were recorded as 1 and 14 km, respectively. The result of the study indicated the mean distant of his /her residence of the low, medium and high information seeker categories were 4.79, 4.26, and 4.21, respectively.

Information seeking behaviour of smallholder farmers

The researcher asked the sampled respondents to report

Table 1. The descriptive analysis of categorical variables.

Variables	Information seeking behavior							
	Low		Medium		High		Total	
	No	%	No	%	No	%	No	%
Sex								
Male	24	15.7	64	42.1	26	17.1	114	75
Female	9	5.92	19	12.5	10	6.58	38	25
Illiterate	15	9.87	34	22.37	17	11.18	66	43.42
Grade 1-4	8	5.26	22	14.47	5	3.29	35	22.03
Grade 5-8	2	1.32	5	3.26	1	0.66	8	5.26
Grade >=9	66	43.42	43	28.29	35	22.03	8	5.26
Radio								
Yes	6	5.92	41	26.97	30	19.74	77	50.66
No	27	15.79	42	27.63	6	5.92	75	49.34
Mobile								
Yes	9	5.92	44	28.95	31	20.39	84	55.26
No	24	15.79	39	25.66	5	3.29	68	44.74
Perception								
Agree	19	12.5	78	51.32	35	23.03	132	86.84
Disagree	14	9.21	5	3.29	1	0.66	20	13.16

Source: Computed from own survey, 2016.

Table 2. Descriptive analysis of the continuous variables.

Variables	ISB								
	Low			Medium			High		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Age	33	48.3	13.15	83	46.05	12.46	36	43.53	9.69
Family size	33	6.36	1.78	83	6.51	2.08	36	5.86	2.11
LivestockH	33	5.17	3.85	83	5.22	3.47	36	4.41	2.66
Land H	33	1.14	0.53	83	1.39	0.92	36	1.17	0.63
Dmarket	33	5.34	2.13	83	5.36	2.64	36	6.02	3.42
DFTC	33	4.79	2.75	83	4.26	2.93	36	4.21	2.79
ExtensionC	33	5.42	4.51	83	10.81	9.69	36	17.81	10.3
Training P	33	0.82	1.47	83	0.78	1.38	36	2.43	1.3
Social p	33	1.9	1.16	83	2.52	1.24	36	2.58	1.23

Source: Computed from own survey, 2016.

their information seeking behavior in three options (low = 1, medium = 2 and high = 3) ordered based on the score gotten from the information sources. The actual score computed from the interview were 25 and 45 for minimum and maximum, respectively. The total mean score of the information seeking behaviour was 32.72 with SD of 5.3 (Table 3). The descriptive analysis revealed that the sampled smallholder farmers had, low 33 (21.71%),

medium 83 (54.61%) and high 36 (23.68%) level of information seeking behavior.

Determinants of information seeking behavior

The variance inflation factor (VIF) and contingency coefficient post estimation test show that all 14

Table 3. Smallholder farmers category based on their information seeking behaviour

Information seeking behavior	Score	Frequency	
		No.	%
Low	25-27	33	21.71
Medium	28-38	83	54.61
High	39-45	36	23.68
Total		152	100

Sources: Computed from own survey, 2016.

Table 4. Maximum likelihood estimation of the ordered logit model.

ISB	Coef.	Std.Error	Marginal effect		
			Low (1)	Medium (2)	High (3)
Sex	-0.313	0.525	0.0251	0.0076	-0.0326
Age	-0.022	0.012	0.0019	0.0003	-0.0021
Family size	-0.92	0.017	0.0079	0.0012	-0.0091
Education category					
Illiterate	-0.009	0.11	0.002	0.0003	-0.0023
Grade 1-4	-0.325	0.946	0.0294	0.0008	-0.0302
Grade 5-8	0.091	0.953	-0.0076	-0.0015	0.009
Livestock holding	-0.194**	0.08	0.0166	0.0025	0.0081
Land holding	0.754***	0.285	-0.0643	-0.0097	0.074
Radio ownership	1.664***	0.495	-0.1509	-0.0183	0.1692
Mobile ownership	1.318***	0.432	-0.1227	-0.0035	0.1262
Distance from market	0.186**	0.079	-0.0159	-0.0024	0.0183
Distance FTC	-0.036	0.071	0.0031	0.0005	-0.0035
Extension contact	0.080***	0.023	-0.0068	-0.001	0.0079
Participation in training	0.359***	0.122	-0.0306	-0.0046	0.0352
Social organization part	0.360**	0.168	-0.0304	-0.0046	0.035
Perception	2.134***	0.674	-0.3262	-0.2042	0.122

Number of obs=152; LR $\chi^2(16) = 110.77$; Prob $>\chi^2 = 0.000$; Log likelihood=-97.09; Pseudo $R^2 = 0.3632$. ** and ***, refers significant level at 1 and 5%, respectively. Source: Computed from own survey, 2016.

hypothesized research variables have no problematic multicollinearity, indignity. The model estimation in this study has a high likelihood ratio and is significant at less than 1% levels of significance, indicating that the ordered logistic model with 14 independent variable is more effective than an intercept-only at predicting cumulative probabilities for each level of the information seeking behavior. The LR of 110.77 with 16 degree of freedom in the model output also indicates that, the parameters included in the model were significantly different from zero (Table 4).

Livestock holding

The marginal effect result of the ordered logit model

indicate that holding other independent variables constant at their mean value, a unit increase in the TLU holding of the household head decrease more likely to low level of information seeking behavior by 1.66% (Table 1). The finding did not agree with that of Kyalo and Holm-Müller, (2013). However, the unexpected result of this finding might be due to poor attention of supplying livestock related information provision practice of the existing agricultural information sources.

Land holding

It may give room to smallholder farmers to engage in the production of different commodities including cash crop like sesame, ground nut and cowpea that demands more

information. The result in line with the researcher's expectation and the marginal effect of the ordered logit model indicated that one hectare increment in land holding leads more likely to high level of information seeking by 7.45% (Table 1).

Radio ownership

The marginal effect result of the model demonstrated that keeping the other explanatory variables constant at their mean, radio ownership of the household head increased information seeking behaviour more likely to high level by 16.92% (Table 1).

Mobile phone ownership

The marginal effect shows keeping other case variables constant, mobile phone ownership of respondent showed increased information seeking behavior more likely with high level by 12.62% (Table 1).

Distance from the nearest market

It was hypothesized to be influenced negatively, but the model output indicated that, a unit increase in distance from respondents' residence home to the nearest market, increases information seeking behavior of the smallholder farmer by 1.83% to the favor of high level (Table 1). This might be that farmers' far from the market may have the habit of using traditional ICTs like radio.

Extension contact

The marginal effect of the finding indicates that holding other explanatory variables at their mean value, a unit increase in extension contact enhance information seeking behavior of the respondents by 0.79% more likely to high level (Table 1) and the result is similar to that of Girma and Dawit (2014). Since, majority of the farmers are illiterate with low level of communication technology usage, they need to have contact with extension agent in order to get demand based information.

Training participation

The marginal effect on model result revealed that holding other explanatory variables constant, a unit increase in number of days of participation in any training improves information seeking behavior of the respondents more likely to a high level by 3.52% (Table 1). This might

influence farmers' information seeking behavior by informing farmers that agriculture is skill, knowledge and information intensive. Training may also help in building trust with information sources.

Social participation

The result also revealed that social participation has positive and significant relationship on information seeking behaviour at less than 1% significant level (Table 1). The marginal effect on model result confirmed that holding other case variables constant, a unit increase in number of social organizations participation in a year by household heads, drive the information seeking behavior more likely to high level by 3.5% (Table 1) and this result is consistent with the results of Habtu et al. (2014) and Jari and Fraser (2009).

Perception of the individual

The ordinal logit model result confirmed that the individual way of perceiving the information sources from message and giving meaning to it was significant and positively related to information seeking behavior (Table 1). The marginal effect indicated that keeping other explanatory variables constant, a respondent who agreed on the importance of the agricultural information sources in supplying relevant information, had increase in the dependent variable to high level by 12.2% (Table 1) and the result is consistent with that of Kyalo and Holm-Müller (2013).

Conclusions

In conclusion, keeping in view the above facts, farmers' perception of the relevance of the information sources, training participation, membership of rural local organization, extension contact, radio ownership and mobile ownership are determinant factors of information seeking behavior of smallholder farmers. Based on research results, the study has suggested: creating awareness on the importance of information in enhancing rural livelihood more or equal to the physical agricultural technologies, disseminating information through trusted information sources which is highly needed, strengthening the existing agricultural training, offering system and extending the training on how to seek information from modern information source, and strengthening extension contact through individual extension contact using home and farm visit should be support by modern ICTs.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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