The Role of Agricultural Extension Services on Increasing Food Crop Productivity of Smallholder Farmers in Case of Atsbi Womberta Woreda, Eastern Tigray, and Ethiopia.

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Abstract

Agricultural extension still remains one of the most crucial and critical means to reach farming households in the rural areas. Therefore, the main objective of this study was to assess the role of agricultural extension service in improving farmer's productivity in case of Atsbi Womberta Woreda particularly in Zarema Kebele. To achieve this, the study area was selected purposively. The study area had a total of 1213 households and from these 50 respondents were selected using simple random sampling technique. The qualitative and quantitative data collection methods were used to gather primary and secondary data. The primary data were collected using key informant interview, focus group discussion, and questionnaire whereas the secondary data were collected from offices of agriculture and rural development and offices of Woreda's Market Promotion. The collected data were analyzed using descriptive statics such as frequency, table, mean and percentages. The finding showed that the agricultural extension services had a great contribution on increasing food crop productivity. The total average grosses benefit of the respondent was 39065Birr per hectare. The total net benefit of the respondents was 28717 Birr. As the result indicated the productivity of the respondent has increased twice after they accessed to extension services. The major challenge that inhibited farmers to access extension service was lack of capital, cost of input, lack of land, and low educational level, lack of adequate information and poor information seeking behavior of the farmers. The researcher observed that the extension agents were more focused on the model farmers and gave less attention to poor farmers. This led to limit farmers from participating in extension activity. In order to increase farmers' participation in extension activity extension agent should treat all farmers equally.

Key Words: Productivity, Extension Services, Net Benefit, Gross Benefit

1. Introduction

1.1 Back Ground of the Study

Increasing agricultural productivity is a major challenge in developing world where 62% of the population of the developing world depends on agriculture for their livelihoods. Improving the productivity, profitability, and sustainability of smallholders farming is, therefore, the main pathway to get out of poverty. It is widely argued that achieving agricultural productivity growth will not be possible without developing and disseminating improved agricultural technologies that can increase productivity to smallholders' agriculture (Asfaw, 2012).

Agricultural extension is the primary mechanism that developing countries' governments use to assist farmers in expanding their ability to adopt and implement new methods and to relay on information concerning new technologies. Throughout Africa, extension programs have the reputation of being largely ineffective, adding very little to the productivity of farmers (Gautam 2000).

The current extension approach in Ethiopia referred to as Participatory Demonstration and Extension Training System (PADETS) focuses on farmers' demonstration plots and is based on the provision of input credit under local government collateral arrangements, institutional linkages with rural development committees and systematic inclusion of women and the young. Food crops that are included in the extension packages are varieties of maize, wheat, teff, barley, sorghum and millet while high value/commercial crops include coffee, peanuts, onions, tomatoes, cabbages, carrots and sweet potatoes. There are also packages in the livestock sector, post-harvest activities and natural resource utilization and conservation. Artificial fertilizer and improved seeds are the two most important inputs that have been adopted by Ethiopian peasants over the past decade (Bonger et al., 2004).

PADETS has been charged with the task of designing and implementing effective agricultural extension services aimed at increasing the productivity of Tigray farmers, creating an opportunity for research on what conditions allow extension service to be successful. Accordingly, high emphasis is given in the region to strengthen and expand agricultural extension service to

introduce technology and to provide useful information to farmers (Berhanu and Belete, 2005).

In the study area, agricultural extension program is also applicable. Through this program farmers are increasing their productivity from time to time. Through this program, different agricultural technologies are distributed. But the participation level is very low in accessing and adopting agricultural information and improved technology. Therefore, this study was intended to investigate the role of agricultural extension services on increasing the productivity of farmers and identify the factors that affect famers in access and utilizations of extension activity in Atsbi Womberta Woreda.

1.2 Statement of the Problem

According to the new strategy, execution of extension programs is entirely a regional affair. The national extension is responsible only for undertaking coordination of interregional policy advice's and technical back up services. Though, the national extension report indicates that the new approach is far better than the previous ones, it also admits the existence of some problems in the proper planning and implementation processes of the program within the different regions of the country. For the various reasons, the report also further states that the degree of these problems to be high in the so-called developing regions of the country (MOA, 2011).

Tigray Regional State is also one of those developing regions. According to the report of the Tigray Agricultural Bureau (2015), although there is a large expense of arable land, the agricultural production is not better than a means of subsistence. The yield obtained from both crops and animal is very low. Due to that, to achieve better agricultural productivity, the state adopted the new extension approach in 1996. In the very beginning, the program was focused on only food crop packages. But now, the program is further expanded to livestock and post-harvest technology.

Accordingly, the study area efforts have been made to provide agricultural extension services to farmers through provision of input subsidies, training farmers and provision of advisory services on proper agronomic practices. Despite these efforts, the farmers have low productivity. Although the extension program delivered different new technology and improved agricultural practices the participation of farmer in extension activity was very

low and there was not significant study undertaken on the role of agricultural extension services in increasing small holder productivity in the study area and whether it was effective or not. So this study stands to evaluate the overall performance of the new extension approach in increasing farmers productivity and identify the major constraint that inhibit farmers to access extension service, this research basically attempts to answer the following questions in relation to the main food crops (Maize, wheat, and Teff) of the study areas. These are: - What does the perception of farmers towards the effectiveness extension program look like? Is it effective or not? What is the overall contribution of the program in increasing the food crop productivity of the farmers? What factors are affecting farmer's participation in extension activity?

1.3 Objective of the Study

1.3.1 General Objective of the Study

The general objective of the study was to assess the role of agricultural extension service in increasing small holder farmer productivity in case of Atsbi Womberta Woreda, particularly in Zarema Kebele.

1.3.2 Specific Objective of the Study

The specific objective of the study was;

- To assess the role of agricultural extension service in increasing farmers productivity in the study area.
- To assess the perception of the farmers towards the effectiveness of agricultural extension services in the study area
- To identify the constraints that inhibit farmers to access agricultural extension service in the study area

1.4 Research Question

- What is the role of agricultural extension service in increasing farmer's productivity in the study area?
- How do farmers perceive the effectiveness of agricultural extension service in the study area?
- What are the factors that hinder farmers to access and utilize agricultural services in the study area?

1.5 Scope of the Study

The scope of the study was on the role of agricultural extension service in improving the productivity of small holder farmers in the study area. The research focused on the attitude of farmers towards the performance of existing agricultural extension service and the challenge that inhibited farmers to access agricultural extension service in case of Atsbi Womberta Woreda particularly in Zarema Kebelle.

1.6 Limitation of the Study

This research was limited to deal only with the role of agricultural extension service in improving small holder productivity with specific kebele; due to financial, time constraints; that forced the researcher to limit the sample size. Though, there were different packages being implemented in the areas, the study focused only on activities related to the main food crop packages such as maize, barley, and Teff, and wheat. There were also some difficulties to collect data on the productions of the major food crop before farmer's access to extension services.

1.7 Significant of the Study

This study could generate very essential information on performance of the agricultural extension package intervention program that can help policy makers and development practitioners to correct the problems in the extension program. The study can initiate other researchers to generate and add information on existing knowledge on the role of agricultural extension service in improving the productivity of households. Further, the findings of the research provide multipurpose information to different users, including practitioners in development agents, donors, policy planners, academicians and the public at large.

2. Methodologies

Under this chapter, description of the study area, method of data collection and method of data analysis were explained.

2.1. Description of the Study Area

2.1.1 Location

Atsbi Womberta district is found in Eastern zone of Tigray Region at about 65km from Mekele regional city. It is located in the north east of the regional

city at 13º 36``N and 39º36``E. It has an altitude at Dega (highland), which ranges from 2400 m to 3000 m and at Weinadega (midland) ranging from 1800 m to 2400 m above sea level. The District has a total area of about 1223 sq. km (AWORDA.2016).

2.1.1. Climate

The climate of Atsbi Womberta ranges from cool to middle warm. The average temperature of the area is 16'c. Generally the climate of the area is characterized as highland and middle land. The district has 70% and 30% Dega and Weinadega, respectively. Rainfall is usually intense and short in duration, with an annual average of about 667.8 mm (AWORDA.2016)

2.1.2. Population

According to the information from District Agricultural and Rural Development Office (2016), Atsbi Womberta has a total population of 112,639 of which male and female are 55, 359 and 57,280, respectively. Urban and rural population is 9609 and 103,030 respectively.

2.1.3. Economic activities

According to the information from Atsbi Womberta District ARD Planning Office (2016), the economic activity of the study area is mixed crop livestock production. The dominant cereals crops of the area are barley, wheat, Teff, maize and sorghum. Among the pulses, beans, field, and pea are the major dominant crops. There are also cattle, equines, sheep, goat, camel, and beekeeping.

2.2. Data Sources and Types

The study collected data from two types of data sources. They were primary and secondary data. Primary and secondary data were used to obtain the desired qualitative and quantitative data types in order to meet the study objectives. Primary data has been obtained from the respondents and potential informant who were working for the organization delivering the scheme. The secondary data were gathered from document of the Rural Development and Agricultural Extension Office in the study area.

2.2. Research Design

Seeing that the study examined the role of agricultural extension service in increasing food crop productivity and to find answers to the research questions

with respect to the objectives and nature of the research questions, cross sectional research design was employed. The design allowed data to be collected at a single point in time to capture important aspects on the role of agricultural extension service on improving food crop productivity

2.3. Method of Data Collection

Primary data was gathered through key informant interviews, observation and focus group discussion.

Key informant interview

The interview helped to gather the necessary qualitative and quantitative information through asking questions and writing down the response of the respondents which built research purpose. It was proposed to those people selected as a sample. In the case of key informants. Three key informants have been identified based on their responsibilities in implementing and supporting the kebele agricultural extension services.

Focus group discussion

Focus group discussion was used by the researcher to obtain qualitative data. FGD allowed a dialogue among participants and stimulated them to openly express their views on the issues raised. Accordingly a total of three FGDs were conducted with 11, 13, 15 respondent in respective days.

Questionnaires

Questionnaires are cheap to administer with the help of an interpreter to respondents who are scattered over a large area. It is convenient for collecting information from a large population within a short span of time. For this study, detail data was collected through questioners' survey from all samples household. Data collected through this questionnaire include: respondents' household profile; socioeconomic characteristics constraints in accessing agriculture extension service; agricultural production. The data was collected using questionnaires with open and closed ended questions. The structured questions was used in an effort to conserve time and money as well as to facilitate easier analysis as they were in immediate usable form; while the unstructured questions were used to encourage the respondent to give an in-depth and felt response without feeling held back in revealing of any information.

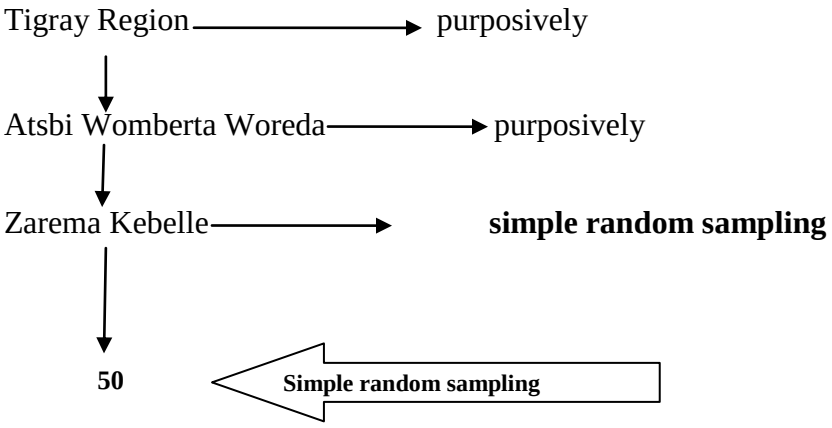
Secondary Data

The secondary data was gathered through reviewing of documents, reports and records of published and unpublished documents. It is the main source of information and these data were easily available, inexpensive, and obtained quickly. The secondary data was collected from Bureau of Rural Development and Market Promotion.

2.4. Sampling Techniques and Sample Size

The sampling technique used in this study was multistage sampling technique. Firstly Atsbi Womberta Woreda was selected purposively because of time, energy, and financial limitation. Finally, Zarema Kebelle was selected using simple random sampling technique to assess the role of agricultural extension service in increasing farm productivity. The Kebele has 1213 total households. From these, 50 respondents were selected using simple random sampling technique.

Figure 1 Sampling procedure



2.5 Method of Data Analysis

The collected data was analyzed using quantitative and qualitative method of data analysis. The quantitative data was analyzed using table, frequency, mean and percentage. The qualitative data was analyzed using narration and quotes.

3. Results and Discussion

3.1 Demographic Characteristics of Respondent

The demographic characteristics involve: age, sex, educational levels, and land size and family size of the respondents

3.1.1 Age of Respondent

The study that show that 28 or 56% of the respondent are age of 31-40 and 8 or 16% between the age 18-31, 12 or 24% between 45- 50, and the rest 2 or 4% respondent are above 50 years of age..

Table 1: Age of respondents

Variable	Respondent	%
18-30	8	16
31-40	28	56
41-50	12	24
>50	2	4
Total	50	100

The above table shows that 96% the respondents are in their productive ages.

3.1.2 Sex of Respondent

Table 2: Sex of the Respondent

Sex	Respondent	%
Male	30	60
Female	20	40
Total	50	100

Table 2 indicates that most of (60%) the respondents were male whereas 40% of them were females. These proportions of respondents suggest that more males were participating in extension service than females. So males had more chance of accessing to improve technology and extension service.

3.1.3 Education and Marital Status

Below Table 3 shows that 66% of them are married, 10% single, and 12 % widowed and 14% divorced. This suggest that more married respondents are participating in agricultural extension service. Regarding their educational level 7 or 14% are illiterate, 25 or 50% can read and write 17 or 34% completed primary school and one respondent or 2% completed secondary school..

Table 3: Education and Marital Status

Variable		Frequency	%
Marital status	Married	33	66
	Single	5	10
	Widowed	6	12
	Divorced	7	14
Educational level	Illiterate	7	14
	Read and write	25	50
	Primary	17	34
	Secondary	1	2

Source field survey, 2016

3.1.4 Family Size of the Respondents

The table below indicates that the average family size of the respondent is 4.3

Table 4: Family Size

Family size	Frequency	%	Mean
1-3	15	30	
4-6	25	50	4.3
6-8	10	20	
Total	50	100	

Source field, 2016

Land Size of the Respondent

Table 5: Land Size of the Respondent

Farm size	Frequency	%	Mean
0.25-.5	15	30	
0.5-1	22	44	0.9125
1-2	11	22	
3-4	2	4	
Total	50	100	

Table 5 indicates that the average land size of the respondent is 0.9125 hectare.

3.2 The of Role of Agricultural Extension Service on Increasing Farmers Productivity

This section generally compared the average yield of products of farmers before and after the intervention of agricultural extension services. As the survey result indicated the respondents were able to produce wheat 963 kg/hectare, maize 1080kg/hectare, Teff, 750kg/hectare, and barley 1050 kg hectare after intervention of extension services whereas before the intervention of the extension service respondents were able to produce

maize500kg / hectare, wheat 350kg / hectare, barley 290kg /hectare, and Teff 435.33kg/ hectare. This in short means that the average yield of crop that was obtained after the implementation of extension programme was significantly higher than the yield before the application of extension services.

Table 7: Average Crop Yield (kg/ha) for Farmers

Crop	After intervention on (kg/ha)	Before
Maize	1080kg/ha	500.25kg/ha
Wheat	963	350kg/ha
Barley	1050	290
Teff	750	435.33

Source, field survey, 2016

2. Gross Benefit and Net Benefit of the Farmers

The researcher has calculated the net benefit and found that the net benefits of the respondents after access to extension was more by 13892.3 Birr than the benefit before the extension services. As the survey result showed, there were also variations of gross benefits of different crops that were produced after intervention of agricultural extension services and before access to extension services.

As Table 8 revealed that after extension services, farmers' gross benefit was 8650 Birr for maize, 7825 Birr for barley,12000 Birr for Teff, and 10593 Birr for wheat. It also indicated that their net benefit after the extension services for the four major crops was 2644 Birr for maize, 10312 Birr for Teff, 7114 Birr for barley and 7337 Birr for wheat.

On the contrary, their income before the implementation of extension services was 449.22 Birr/ hectare for maize, 575.79 Birr / hectare for sorghum and 872.00 Birr hectare for Teff. These gross benefits were directly related to the average yield obtained from the respondent (see Table 8). This means the more the yield the higher the gross benefits. The study reveals that extension services had major role in increasing small holder farmers' productivity.

Table 8: Net Benefit of Respondent Before and After Access to Agricultural Extension Services

Crop	After intervention			Before access to extension services		
	Gross benefit	Cost of input	NP	GB	Cost	TNP
Maize	8650	2644	6006	4900	960	4840
Teff	12000	1685	10315	6665	1120	5540
Barley	7825	2659	7114	3190	725.3	2374.7
Wheat	10593	3360	7337	4375	1500	2875
Total	39065	10348	28717	19130	4305.3	14824.7

Source field survey, 2016

4.3 Perception of Farmer towards the Role of Agricultural Extension Services

Table 9 shows the advantages of agricultural extension services as perceived by respondents. Results showed that 90% of respondents reported that there was possible advantages of access to extension service in increasing farm management skills, 96% of farmers said that extension service helped to transfer knowledge on crop production,82% of the respondents reported that extension service helped them in solving problems associated with crop production, 96% of respondents said that extension services helped them to participate in training services, 76% of the respondents said that extension service helped them in improving their bargaining power in crop markets.

Table 9: Advantages of Extension Service

Possible Advantage	**Yes**	**%**	**No**	**%**
1 Increase farm management skill	45	90	5	10
2 It increase knowledge of farmers on crop production	48	96	2	4
3 It help solve problem associated with crop production	41	82	9	18
4 provide training service	48	96	2	4
5 disseminate new technology	40	80	10	20
6 increase bar gaining power of farmer on agricultural production	38	76	12	24
7 increase farm income	49	98	1	2

Source field survey 2016

This study used Likert Scale type of questionnaire to assess whether the extension service delivery to the famers was effective or not. Set of questions were forwarded to the respondents to find out whether AEAs transfer improved the practice of new varieties of maize seeds, proper time for planting, weed control methods, pest control methods, disease control

methods, irrigation practice, fertilizer application, harvesting and demonstration methods. Respondents were requested to vote whether they strongly agree, agree, disagree or strongly disagree against each statement. Strongly agree and agree were treated as positive perception towards effectiveness of extension service in transferring knowledge to farmer, and strongly disagree and disagreed were treated as negative perception towards extension service. Table 10 below shows that 78 %, 80%, 80%, 82%, and 74%, 82%, 100% of respondents agreed that they were advised by extension agents about using improved seed at a time, planting in row treating seed , controlling pest and disease, facilitating linkage of farmer with credit institution, training on farm practices, using fertilizer..

Table10: Percentage Distribution of Farmer Perception towards Effectiveness of Agricultural Extension Service Delivery

Possible Improved Practices	SA		A		Di		SD		
	No	%	No	%	No	%	No	%	
Introduce improved seed at a time	27	54	12	24	11	22	0	0	
Training row planting	26	52	9	18	15	30	0	0	
Advise on seed treatment	23	46	17	34	7	14	3	6	
Pest and disease control	18	36	23	46	9	18			
Facilitate linkage of farmer with credit institution	33	66	4	8	13	26			
Training on farm practices	6	12	35	70	8	16	1	2	
Application of fertilizer use	43	86	7	14	0		-	-	

Source field survey 2016

4.4 Constraints that Inhibited Farmers to Access and Participate in Agricultural Extension Service

Table 11: Constraints that Inhibited Smallholder Farmers Access and Utilization in Agricultural Extension Services

No	Constraints of Access and Utilization of Agricultural Information	No	Rank
1	Lack of DAs appropriate support in delivering information of extension services to farmers	32	1
2	Information not address my interest	27	4
3	Low educational level (illiteracy)	28	3
4	Lack of money to purchase input and high cost of input	26	5
5	Lack of inadequate information sources and poor information seeking behavior	23	8
6	Lack of season relevant and updated agricultural information	31	2
7	Long distance of institutions like FTC to get information and its un-functionality of the center	17	10
8	Lack of awareness and Lack of time to attend the extension meeting	24	7
9	Lack of Affordability of agricultural information through mass media tools like mobile, radio, television, etc.	25	6
10	Lack of access to infrastructure that support mass media tools like power, network etc.	21	9
11	Development agent's bias	16	11

As indicated in Table 12, the most important constraints that inhibited smallholder farmers to access and utilization of agricultural information were evaluated, ranked and identified by the respondents. Some of these with the highest score included: lack of DA's appropriate support in delivering information of extension services to farmers, low educational level (illiteracy) and poverty level, Lack of money to purchase input and the high cost of input, lack of adequate information and poor information seeking behavior of the farmers, lack of seasonal and updated agricultural information, the long distance of the area from institutions like FTC, negative attitude of farmers to access and utilize scientific information, lack of affordability of agricultural information through mass media tools like mobile, radio etc. and lack of access to infrastructure that support mass media tools (like electric power, network etc.), and lack of support from NGOs and stakeholders. These and other factors were taken as major constraints.

Lack of appropriate support, in delivering information about extension services, from DA's to farmers was the first major constraint. During focus

group discussions (FGDs), the smallholder farmers said, 'Even if DA's are assigned at kebele level, not all of them support the smallholder farmers by providing the necessary information about crop production practices'. In the public extension system, the provision of agricultural information highly depends on the government employed DAs. In the absence of appropriate support of DAs, the provision, access, and utilization of agricultural information on crop production may not be successful.

Lack of adequate source of information and poor information seeking behavior of the smallholders farmers were the second major constraint to access and utilize agricultural information. In the study area, there were very few sources of agricultural information. Information seeking behavior of farmers was also very little. Therefore, in order to alleviate this problem, the government and NGOs intervention is very indispensable to improve the quality and quantity of agricultural information

The third constraint indicated by 27 respondents of farmer was their low educational level and poverty. As described in the FGDs, their low educational level and poverty limited them from many things that support agricultural production system of coffee. They said:

> we are illiterate; mostly we do not easily understand the modern agricultural technologies. We are also too poor to access and utilize better coffee technologies and package programs. If we were educated, we could have been able to read written materials and accept the new ideas. As the DAs want'.

The smallholder farmers strongly believed that educated and economically supported smallholder farmers could understand the information and search for the modern agricultural services.

The fourth constraint revealed by the respondents was the propagations of irrelevant information or dissemination of unwanted information to smallholder farmers. This problem was the sixth rank for both respondents. During the group discussion some farmers clarified that,:

> The development agent efforts do not address our immediate problems instead, through quota system, they are forcing us to take

different agricultural inputs without our interest and also we are not benefited from the new technologies. As a result, we have limited communication with DAs and we are not interested to have close contacts with the development agents.

Lack of money for purchasing technological inputs was the fifth constraint pointed out by respondents. Lack of money inhibited them to access and to utilize agricultural information. In the study area, smallholder farmers live on low economic status. For purchasing crop input, adoption of technology and utilization of accessible agricultural information, credit access is needed. As a result, most of the farmers were forced to look for credit suppliers.

Lack of seasonal and updated agricultural information was the sixth problem mentioned by the respondents. Some of agricultural information was not provided on the appropriate season and time. For example, the DAs provided the availability of seed information after farmers had already prepared their own local seed and planted it.

Long distance of the study area from the supporting institutions like FTC was the other serious problem. The distance prevented framers from getting information form supporting institutions. And poor practicality of the centers also constraints farmers to access and to utilize agricultural information. They did not provide any functionality regarding utilization of agricultural information of food crop production practices by the help of different materials that provide agricultural information. Consequently, smallholder farmers were expected to travel long distances to get agricultural assistance from the DAs and FTC.

The other constraint revealed by many of the respondents was development agent's bias. The farmers believed that, DAs had frequent contact with the users and rich farmers and gave less attention to the poor farmers. On the other hand, some of the user also believed that invitation of training and good communication of DAs was biased towards the resource rich farmers. Therefore, in the absence of fair development agent communication, the agricultural information access was limited and the farmers were developing strong dislike for agricultural institutions. On the contrary, the DAs justify that those farmers they mostly contacted were model farmers because model

farmers play important roles in the dissemination of new agricultural information.

5. Conclusions and Recommendation

5.1 Conclusion

Concerning the overall productivity of the current extension program, survey was made to assess both before and after access to extension services. As the findings of this survey reveals, average yield, gross benefits and net benefits of the respondent were better after access to extension services. On the other hand, due to additional costs of modern inputs (DAP, Urea, and improved seeds); respondent had higher variable costs (10348).The study concluded that the extension services had great role in increasing farmer's productivity. The finding of the study also showed that the net benefits of the respondents increased with the help of agricultural extension service. The total net benefits of the sampled respondent were 28717 Birr per hectare after access to agricultural extension services. The majority of smallholder farmers had positive perception on the effectiveness of AEAs in knowledge transfer and thought AEAs had large advantage to them.

Finally, the constraints that inhibited smallholder farmers from access to and utilization of agricultural information were identified and ranked by the respondents. Accordingly, the most significant challenges identified by the respondents were: lack of DAs appropriate support, lack of focus on farmers' interest, low educational level (illiteracy) of the farmers and poverty level, bias of development agents, lack of support from development agents..

5.2 Recommendations

On the basis of the findings of this study, the following recommendations were suggested for overcoming challenging factors that hindered farmer's participation on agricultural extension service. The recommendations are also useful for policy makers and implementers to follow the correct pathway to promote different agricultural technologies. These are:

- The extension agents have to give more focus to model farmers and little consideration to poor farmers. This reduces farmer's participation in extension activity or programmes. Therefore, extension workers should give equal attention to all farmers. All farmers should be treated equally. In addition to this, poor farmers who are in short of money to

buy agricultural input should be supported to access to credit service. Credit service provision is an important programme because it can influence farmers to participate in agriculture extension service and adopt new ideas of the extension services. Therefore, the credit service, to achieve the intended goals of the agricultural program through technology adoption, must be done on need assessment. Besides credit system, in collaboration with the credit delivering institutions especially with DE debit micro-finance and the cooperatives in the Woreda facilitates conditions for farmers to save and accumulate capital.

- As the result of the study indicated, the farmers have poor information seeking behavior but information seeking behavior and being membership to social organizations creates a positive relationship with access and utilization of agricultural information. Therefore, it is recommended that any intervening governmental or non-governmental organization should work on the perception of agricultural information seeking behavior of the smallholder farmers in agricultural production systems and also on the attitudes of smallholder farmers to participate in any formal and informal organization as a membership of the group organization creates high linkage among them to share different agricultural information that are vital for agricultural production.
- Farmers consider only the price increase on inputs rather than comparing and considering the price increase on the yield of the commodity through the use of inputs. In relation to this, concerned bodies must aware and demonstrate to consider the yield increase through the use of improved agricultural inputs like fertilizer, chemical herbicides and pesticides and improved seed to produce higher productivity.

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