

Review on the Role of Agricultural Extension Service on Increasing Farm Productivity in Ethiopia

^{1*}Birhanu Argaw, ²Kalkidan Yehuala & ³Alelign Aschalew

¹Department of Agricultural Economics, Bonga University

² Department of Agricultural Economics, Wollo University

³ Department of Agricultural Economics, Bonga University

*Corresponding Author Email: bireargaw2011@gmail.com

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Abstract

Improving farm productivity either through introduction of modern technologies or by increasing agricultural extension services is vital. Agricultural extension is the primary mechanism that increases agricultural production. Therefore, reviewing the role of agricultural extension on increasing farm productivity has been interesting issue. Cognizant of this fact, reviewing the role of agricultural extension in increasing farm productivity is an important issue for policy makers in order to improve productivity. Consequently, this seminar was aimed to provide information on the role of agricultural extension in increasing farm productivity and to review agricultural extension constraints in Ethiopia. The review shows that agricultural extension service had positive and significant role on increasing farm productivity by increasing the farmer's knowhow on agronomic practices such as pest and disease control and adoption of improved seed varieties as well as soil and water conservation technologies. On the other hand, the review reveals that weak interaction; low participation, lack of technical skills, missed use of services, the weak link of research extension, a lack of incentives, and a lack of suitable adaptation to technologies constrain the extension system across the country. Thus, based on the review the following recommendations are forwarded. Extension services should be increase to farmers by the government agents especially by district agriculture development unit, and NGO's to assist farmers to have easy access to extension so as to increase farm productivity. In addition, to increase the current working conditions of extension agents, including transportation, housing, and proper budget allocation, the government should adopt a very responsible and practical approach.

Keywords: Agricultural extension, Agricultural extension constraints, Ethiopia

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1. Introduction

1.1. Background of the Review

Since the end of World War II in 1945, agricultural and rural development has been defined by shifting goals and issues. Following this conflict and the widespread occurrence of severe starvation, the industrialized world made a concerted effort to expand food production (Reimund *et al.*, 2007). Ethiopia, with a total area of 1.1 million Km², has an estimated population size of 61 million (MEDaC, 1999). The backbone of the Ethiopian economy is agriculture. It produces more than 45% of the nation's GDP and 90% of all export revenue. Also, it's believed that 85% of the labor force is employed in agriculture. Ethiopian agriculture, however, is characterized by extremely poor yield. The average grain yield for various crops was 2.14 ton (CSA, 2018). The low productivity of the agricultural sector has made it difficult to attain food self-sufficiency at a national level.

Aware of these issues, the Ethiopian government introduced the Agricultural Development Led Industrialization (ADLI) strategy in 1993, which focuses on agriculture as a key driver of increased output, employment, and income for the people, and as the spring board for the development of the other sectors of the economy (Kassa&Abebaw, 2004; Gebremedhin *et al.*, 2009; cited in Tsegamariam, 2018). The Participatory Demonstration and Training Extension System national extension package program is one of the key elements of ADLI (PADETES). PADETES aims to accomplish sustainable development in rural regions by raising farm productivity (yield), decreasing poverty, raising the level of food security, raising the quantity and variety of industrial raw materials (primary products), and producing for the export market (Kassa, 2003; EEA, 2006).

The PADETES initiative has been concentrating on supply-driven intensification, which entails increased seed and fertilizer supply and promotion, on-farm demonstrations of improved farming practices and technologies, and close monitoring of farmers' plots (Kassa and Abebaw, 2004; EEA, 2006; Kassa, 2008). Hence, the main operations of the extension program have been the greater diffusion of improved farm technologies, management techniques, and know-how to the smallholder farmers (Kassa, 2003; Gebremedhin *et al.*, 2009; Asfaw *et al.*, 2012). Consequently, the adoption status of better agricultural extension is one topic that has generated a sizable body of literature in Ethiopia (Feleke & Zegeye, 2006; Darcon & Christiaensen, 2007; Gebregziabher & Holden, 2011; Beshir, Emanu, Kassa, & Haji, 2012).

Improving farm productivity either through introduction of modern technologies or by increasing agricultural extension services is vital. Agricultural extension is the primary mechanism that enhances agricultural production. Albeit there are many empirical studies regarding to agricultural extension in Ethiopia, reviews regarding to the role of agricultural extension programs on increasing farm productivity are very limited. However, in countries like Ethiopia, it is justifiable to provide information regarding to the role of agricultural extension on increasing farm productivity. Therefore, reviewing the role of agricultural extension in increasing farm productivity as well as identifying agricultural extension constraints has great advantage in Ethiopia. The general objective of this seminar is to review the role of agricultural extension on increasing farm productivity in Ethiopia.

2. Literature Review

2.1. Theoretical Review

There are many definitions, philosophies, and approaches to agricultural extension, and the views of what extension is all about have changed over time. Extension originally was conceived as a service to “extend” research-based knowledge to the rural sector to improve the lives of farmers. It thus included components of technology transfer, broader rural development goals, management skills, and non-formal education. The traditional view of extension in Africa was very much focused on increasing production, improving yields, training farmers, and transferring technology (Christoplos, 2010).

Today’s understanding of extension goes beyond technology transfer to facilitation; beyond training to learning, and includes assisting farmer groups to form, dealing with marketing issues, and partnering with a broad range of service providers and other agencies. Thus many people are now using the phrase, “agricultural advisory services,” instead of extension (which can imply a top-down approach and may ignore multiple sources of knowledge. As a system, extension facilitates the access of farmers, their organizations and other market actors to knowledge, information and technologies; facilitates their interaction with partners in research, education, agribusiness, and other relevant institutions; and assists them to develop their own technical, organizational and managerial skills and practices (Christoplos, 2010).

Agricultural extension can be defined as the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods and well-being (Birner *et al.*, 2006). This can include different governmental agencies (formerly the main actors in extension), producer organizations and other farmer organizations, and private sector actors including input suppliers.) Extension is both a political and an organizational instrument implemented to facilitate development and it ranges from transfer of mono-crop technology to participatory problem solving educational approaches, which aims at reducing poverty and enhancing community involvement in the processes of development (Rivera and Qamar, 2003).

2.2. Evolution of Agricultural Extension in Ethiopia

In Ethiopia, agricultural Extension service is said to be operational since 1930’s. However, a formal extension was started only after the establishment of the Haramaya College of Agriculture. Extension is underway in the country for over 70 years. Over this period, several development as well as extension approaches were employed side by side (Belay, 2009). During the first five year plan (1998–2002), the program of community Development (CD) was initiated as a strategy for stimulating population efforts to identify and tackling problems of a given community through self-help projects. This program continued until the third five year plan (2008–2013).

The other program where extension has been exercised was the package program that emerged during the third five-year plan. The typologies of package approaches implemented in Ethiopia since 1960’s were formulated as a project. The first, Comprehensive package project was that of Chilalo Agricultural Development Unit (CADU). This is the long-standing major project in the country was started as CADU in the Chilalo District of Arsi region in 1967. It was established with the assistance of the Swedish International Development Authority (SIDA) and World Bank.

Besides the Chilalo District, the project later on in 1976/77 was expanded to cover the other two District of Ticho and ArbaGugu in the region (Tesfaye, 2006). The extension method employed by CADU was the “Model farmer” approach until 1975. But the model farmer’s approach to extension was criticized both from outside and within CADU itself. Empirical Studies concluded that the approach was only partly successful and that it was not the most efficient way of disseminating knowledge (Waktola, 2005).

The second comprehensive package project was initiated in Wolayita province in 1970 under the Wolayita Agricultural Development Unit (WADU). Understanding the weakness of CADU’S model farmer approach, WADU avoided the “model farmers” approach and instead demonstrated technologies on peasants’ farms that were relatively resource poor. Technology transfer under WADU’S approach has been found to be more effective than that of CADU. As early as the 1970’s, it was apparent that it would not be feasible to implement the comprehensive package projects through the whole country. Hence, the minimum package program (MPP) was initiated in Ethiopia with a claim to address the problems of the lower income bracket farmers and also with greater reliance on people’s participation.

The MPPs were designed to cover large areas so that as many farmers as possible could be reached for extension, input supply, credit provision and marketing services. Thus, under Ministry of Agriculture, the Extension Project Implementation Department (EPID) was created in 1971 to provide peasant farmers production and to carry out the minimum package program started in 1970. Under this program, the basic unit of development was the MPP areas that contained about 10,000 farm families and extended 5km on either side of a 75-km stretch of all-weather roads. MPP- I adopted CADU’s grain technology and also applied its extension methodology. Although the minimum package concept worked well in the limited areas of its operation under MPP- I (1971-74), certain shortcomings like inadequacy of manpower at the Woreda level and little or no in service training for the extension staff became apparent as the program was extended to more farmers (Tesfaye, 2006).

At the termination of MPP- I in 1974, there was a plan to undertake an expansion of MPP. – I under the name of MPP- II which was implemented starting from 1980/81 after efforts were done to adapt it with the new socio- economic and political system of the country. The main objective of the project was institution building and strengthening of infrastructure while of the same time extending the use and availability of inputs to the small holder farmers. After the termination of MPP in 1985, Peasant Agricultural Development Project (PADEP) was initiated to promote agricultural development in the dominant small holder sector. The program was designed on the basis of experiences gained from the past two MPPs.

2.2.1. The current agricultural extension approach in Ethiopia

Drawing on lessons of past experience, the Federal Democratic Republic of Ethiopia (FDRE) has formulated an “Agricultural Development– Led Industrialization (ADLI)” Strategy, taking agriculture as the development base focusing on raising the productivity of the small scale farmers as key actors. Formulated within ADLI is the new system of agricultural extension, termed “participatory Demonstration and Training Extension System (PADETES)”. As the name implies, the system is based on demonstrating and training farmers on proven technologies in participant manner. The system which had been developed after a critical evaluation of the past extension

approaches has also given enough room to accommodate present changes in extension philosophy involving the utilize subsystem i.e. research, education and extension as part of the knowledge system. In contrast to the past extension system where focus was limited either to technology transfer or human resource development, PADETES gives equal emphasis to human resource development (organization, mobilization, empowerment) along with its effort in promoting appropriate technologies to users.

According to the new strategy, the responsibility of the Ministry of Agriculture at the federal level is to formulate agricultural policies, design packages, organize and conduct training activities to upgrade the knowledge and skill of all partners in agricultural development, coordinate interregional activities, render policy advice and technical backstop. The planning, execution, monitoring and evaluation of extension programmers, however, fall within the power and duties of the regional agricultural bureaus.

The new system acknowledges package approach as a means for enhancing the desired change in agricultural development. The intervention strategy in this involves a package approach geared towards three different farming systems, namely: reliable moisture, moisture stress, and nomadic pastoralist areas. Distinction can also be made among areas being exposed for the first time to extension, where extension messages should be simple focusing improved cultural practices (crops, livestock); areas where there is already minimal extension and where improved agricultural practices combined with the use of purchased inputs can be allocated; and finally areas which are already involved in large-scale production, where moderate or high input technology may be appropriate. Supporting services and means of communication may also vary accordingly (MOA, 1998).

The system that has been developed after a critical assessment of past extension system, including the recent effort by the Sasakawa Global 2000 project has become operational since 1995. The assessment carried out enabled identifying the merit and demerit of each approach and as a result, the new extension system is benefiting from the strong extension management principle of the T&V system and is merged with the most practicable technology diffusion experience of the SG 2000 project approach.

According to MOA (1998) the following are known to be the main objectives of PADETES:

- a. Improve the standard of living of the Society through improving productivity
- b. Empower farmers to actively participate in the development process.
- c. Increase the level of food self-sufficiency.
- d. •Increase the supply of industrial and export crops.
- e. •Ensure the rehabilitation and conservation of the natural resource base of agriculture.

Unlike the top – down extension method of the past, demonstration in PADETES is designed to ensure farmers participation. The farmers are involved at all stages of activities, from planning to evaluation. In the implementation of the extension program, the role of the government is to assist in: -

- a. Timely delivery of production inputs.
- b. The provision of credit.
- c. The delivery of extension and training services.

- d. Deploying development agents at the village level.
- e. Facilitating logistics (MOA, 2008).

2.2.2 Conceptual framework of the review

The conceptual framework illustrates how agricultural extension program that is used to enhance farmers' knowledge and skills, as well as promote and expand improved technologies affect farm productivity of Ethiopian smallholders. It is a general fact that, agricultural extension and advisory services play an important role in agricultural development and can contribute to improve the welfare of farmers and other people living in rural areas. In spite of this, there are many factors that condition the relationship between extension inputs and outcomes, and these factors act in complex ways Anderson and Feder (2003).

According to Anderson and Feder (2003) productivity improvements are only possible when there is a gap between actual and potential productivity. They suggest two types of 'gaps' that contribute to the productivity differential, the technology gap and the management gap. Extension can contribute to the reduction of the productivity differential by increasing the speed of technology transfer and by increasing farmers' knowledge and assisting them in improving farm management practices (Feder, Murgai, & Quizon, 2004). To make it understandable and consistent with the objective of this seminar and design of agricultural extension program in Ethiopia the path ways showing how extension program impact on agricultural productivity are illustrated in figure1below.

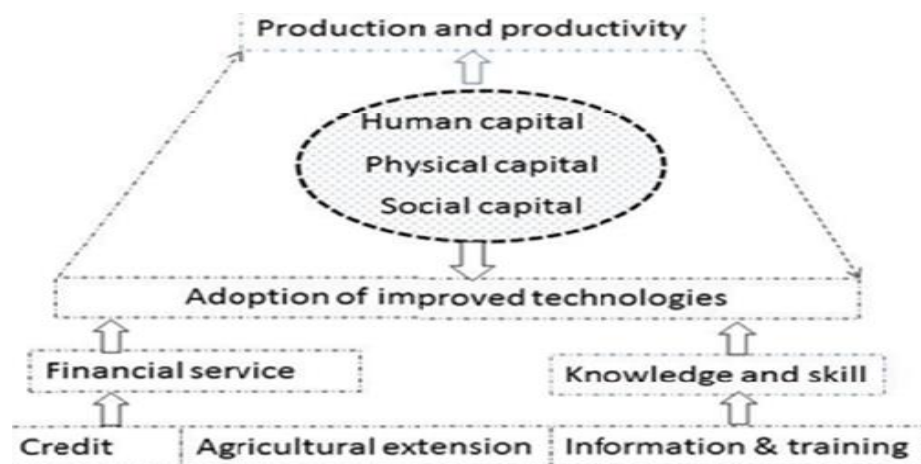


Figure 1.Role of agricultural extension on farm productivity

Source: Tsegamariam (2018)

3. Discussion

The review is involved quantitative and qualitative analysis of the role of agricultural extension service on increasing farm productivity and constraints of agricultural extension in Ethiopia. Accordingly, various empirical study results have been used to review the role of agricultural extension on increasing farm productivity and constraints of agricultural extension in Ethiopia. Thus, quantitative and qualitative results from various researchers on the role of agricultural extension on increasing farm productivity and agricultural extension constraints were used for the review. Accordingly, the reviews are provided as follow.

3.1. Role of Agricultural Extension on Increasing Farm Productivity

Asres *et al.* (2013) conducted research on the effect of agricultural extension program participation on farm productivity taking three case study kebeles (peasant associations) in Ethiopia. The study employed Ordinary Least Square (OLS) method, Heckman Treatment Effect Model (HTEM) and Propensity Score Matching (PSM). The review showed that in the OLS estimation result extension participation increases farm productivity by about 6%. However, both HTEM and PSM clearly showed the presence of selection bias in extension program participation which leads to underestimation of the OLS estimates. Thus, the participation could have increased farm productivity by up to 20% had it not been to the serious selection bias related to non-farming factors such as involvement in kebele administration, and wealth status of the participants observed during program placement. Moreover, the review indicated that the PSM analysis also verifies the positive effect of extension program participation on farm productivity.

Mussema *et al.* (2015) examined Ethiopia's crop diversification factors. Extension services reportedly had a beneficial and considerable impact on crop diversification as well as productivity. According to their justification, having access to extension services promotes the adoption and spread of new technologies through the provision of technical advice, credit availability, input supplies, and even the dissemination of market information and the development of farmer capacity, both of which may be directly related to the productivity and diversification of cereal crops.

Another study conducted by Aregawi (2017) analyzed the role of agricultural extension services on increasing food crop productivity of smallholder farmers in case of Atsbi Womberta Woreda, Ethiopia. This study was mainly concerned with to assess the role of agricultural extension service in improving farmer's productivity in Atsbi Womberta Woreda. The review showed that the agricultural extension services had a great contribution on increasing food crop productivity. Consequently, the review verified that the total average grosses benefit of the respondent from agricultural extension services was 39065 Ethiopian Birr per hectare. In addition, the total net benefit of the respondents was 28717 Birr. As the review indicated the productivity of the respondent has increased twice after they accessed to extension services. On the other hand, the review find that the major constraint that inhibited farmers to access extension service were 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. Finally, the review finds 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.

A study conducted by Benefit (2020) indicated extension services boost land productivity. The extension offers a range of organic and inorganic fertilizers to boost land output. According to this study, these fertilizers can subsequently be employed to increase agriculture production all around the nation. However, there was little solid data in this study to support the amount of fertilizer that should be applied at the time. The types of fertilizers that should be utilized to increase fertility are not yet well described in this result.

3.2. Constraints of Agricultural Extension Services in Ethiopia

Kassa Belay (2002) assessed obstacles to agricultural extension work in Ethiopia. According to the review, various extension approaches have been biased against the livestock sub-sector, extension programs and policies have been developed without taking farmers' opinions into account, and research and extension activities have been carried out by various organizations without proper coordination. Moreover, the survey results show that extension work in the country has not been participatory in nature, that there has been very little connection between research and extension, and that extension agents have been engaged in a variety of activities outside the scope of their regular responsibilities.

Tigst *et al.* (2017) examined the obstacles and difficulties that came up when adopting agricultural extension methods in the case of north Gondar in Ethiopia's Amhara Region. The aim of this study is to assess the challenges faced by rural youth and women farmers, as well as the limitations of the extension system's ability to educate farmers in the study area about agricultural technologies. According to this study, public agricultural extension services are currently provided in an institutional, technological, and technical manner. They also address issues like gender and the environment in broader contexts, allowing for an examination of current endogenous and exogenous restrictions.

Ethiopia's poor level of agricultural production is partly due to the absence of farmer participation in extension efforts. With such little input, the demands of all extension stakeholders could not be taken into account. According to past studies (Tesfa, 2008; Aregawi, 2017; Asfaw, 2018; Waktole, 2020; Tariku *et al.*, 2021), farmers in Ethiopia rarely participate in agricultural extension activities. On the other hand, it was not known what degree and what kinds of participation led to expansion. Similarly, the extension system employs strict centralization during the design phases (Berhanu & Hoekstra, 2006; Gerba, 2018). The extension services are delivered and created using a top-down methodology. This study was primarily focused on planning while excluding monitoring, execution, and assessment.

4. Summary

In summary, the reviewed literature indicated that there is a limited work in area of the role of agricultural extension with a special emphasis on increasing in farm productivity in Ethiopia. However, the review on the role of agricultural extension indicated that, extension service had positive and significant role on enhancing farm productivity. Moreover, the review asserted that farm productivity can be increased by increasing agricultural extension services. This implies that farmers who getting more frequent extension services could increase their farm productivity. Ultimately, this review asserted that agricultural extension had an important role on increasing the farmer's knowhow on agronomic practices such as pest and disease control and adoption of improved seed varieties as well as soil and water conservation technologies resulting increase in

farm productivity. On the other hand, the review reveals that weak interaction; low participation, lack of technical skills, missed use of services, the weak link of research extension, a lack of incentives, and a lack of suitable adaptation to technologies constrain the extension system across the country.

Based on the review the following recommendations are forwarded. Agricultural extension services should be increase to farmers by the government agents especially District Agriculture Development Unit, and NGO's to assist these farmers to have easy access to extension so as to increase farm productivity. The review shows that extension agents faced many constraints while working. To enhance the current working conditions of extension agents, including transportation, housing, and proper budget allocation, the government should adopt a very responsible and practical approach. Finally, there is a need for further studies on the role of agricultural extension services with a special emphasizes on increasing farm productivity in the country to obtain adequate data.

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