

Review on the Contribution of Agricultural Extension on Increasing Smallholder Farm Productivity in Case of Ethiopia

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1. Introduction

Increasing agricultural productivity is a major challenge in Sub-Saharan Africa (SSA), where 62% of the population (excluding South Africa) depends on agriculture for their livelihoods (Staatz & Dembele, 2007). Since the 1960s, agricultural production in SSA has failed to keep up the pace with population growth (Benin, 2006). Improving the productivity, profitability, and sustainability of smallholders farming is, therefore, the main pathway to get out of poverty (World Development Report [WDR], 2008). 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 smallholder agriculture (Asfaw, Shiferaw, Simtowe, & Lipper, 2012).

However, lack of adequate farm management practices, low level of modern inputs usage, the depletion of soil organic matter and soil erosion, highly rain fed dependent agriculture system are major obstacles to sustain the agricultural production in the country (Grepperud, 1996; Pender & Gebremedhin, 2007; Kassie, Zikhali, Manjur, & Edward, 2009).

In cognizant of these problems, the government of Ethiopia launched a strategy which is known as the Agricultural Development Led Industrialization (ADLI) in 1993 that sets out agriculture as a primary stimulus to generate increased output, employment, and income for the people, and as the springboard for the development of the other sectors of the economy (Kassa&Abebaw, 2004; Gebremedhin, Jalata, & Hoekstra, 2009). One of the major components of ADLI is the national extension package program known as Participatory Demonstration and Training Extension System (PADETES). The objective of PADETES are to achieve sustainable development in rural areas through increasing farm productivity (yield), reducing poverty, increasing the level of food security, increasing the volume and variety of industrial raw materials (primary products), and producing for the export market (Kassa, 2003; Ethiopian Economics Association [EEA], 2006).

The PADETES program has been focusing on supply-driven intensification which consists of enhanced supply and promotion of improved seeds, fertilizers, on-farm demonstrations of improved farm practices and technologies and closes follow up of farmers' plots (Kassa & Abebaw, 2004; EEA, 2006; Kassa, 2008). Hence, wider dissemination of improved farm technologies, management practices and know-how to the smallholder farmers have been the major activities of the extension program (Kassa, 2003; Gebremedhin et al., 2009; Asfaw et al., 2012).

However, the performance of the agriculture sector has been very dismal in spite of implementing the national extension package program-PADETES. The impacts of the implemented technologies have been mixed, with increased use of fertilizer but poor productivity growth (World Bank, 2006). The country is still vulnerable to recurrent food shortfalls and national food insecurity (Abate et al., 2011). For instance, between 1998 and 2012 the average number of Ethiopians in need of food assistance fluctuated between 3 million and 14 million (IRIN, 2012). The country ranks at 173th out of 187 nations in terms of Human Development Index (UNDP, 2013).

In Ethiopia, there is relatively large literature dealing with issues related to an agricultural extension like adoption status of improved agricultural technologies (Feleke&Zegeye, 2006; Darcon&Christiaensen, 2007; Gebregziabher& Holden, 2011; Beshir, Eman, Kassa, & Haji, 2012 among others). Although these studies provided useful information on the rate of adoption and factors influencing adoption, rigorous impact evaluations of agricultural extension interventions are scanty (Anderson & Feder, 2007; Gebremedhin et al., 2009; Nega et al., 2010; World Bank, 2010). A study of the role of agricultural extension is vital because it provides with information that will enable effective measures to be undertaken so as to improve the living standard of the people and bring the success of development programs through improving farm productivity.

It will also enable development practitioners and policymakers to have better knowledge as to where and how to intervene in rural areas to increase farm productivity to minimize the absolute poverty. The positive role of the extension in terms of ensuring productivity is measured by the contribution of the GDP. Although production is low in Ethiopia has never been overcome during the last three decades, the extension agent is playing a significant role to reduce the low productivity in Ethiopia. Therefore, this seminar aims at reviewing of the positive impacts of agricultural extension program (AE) participation in smallholders' farm productivity.

Improved Extension under Ethiopian context will have the following positive social benefits: is primary to increase productivity this enhances to;

- increase local food availability

- increase farmer income
- increase sustainability of agricultural practices

1.2 Statement of the Review

Endowed with considerable agricultural potential, Ethiopia had been self-sufficient in production and was classified as a net exporter of food grains till late 1950. It was reported that the annual export of grain to world market amounted to 150,000 tons in 1947. However, since early The 1960s, the country's domestic performances of extension situation has been declining and failed to meet the food requirements of the people. Particularly, from the beginning of the mid-1980s, production has exhibited a downward trend. The inadequate structure and performances of extension agent have led to increasing low productivity in many parts of Ethiopia over the past decades. Some of the principal causes of inadequate growth in production, and increasing poverty, according to FDRE (1996) are: inadequate and unreliable rainfall, soil degradation, civil war and ethnic conflicts, poor transport and infrastructure in the rural areas, misguided economic policies such as land tenure, geographical diversity, rapid population growth, outdated production technology and small land holding, lack of storage, disease, inadequate nutritional knowledge, heavy workloads for women, etc. The country is also known to possess the largest occurrences' of resources population in Africa. However, low productivity remains as the major challenges to achieve economic development in Ethiopia and especially in the rural area of the country. This is due to the subsistence nature of

Ethiopian agriculture, its mere dependence on rainfall and the existing backward technologies, has made peasants highly vulnerable to famine and food insecurity (Alem, 1999). This can be substantiated by the UN release which indicated the proportion of Ethiopian population living below a poverty line of one USD a day in 1998 was 50 % of the total population, which is approximately about 29 million people (World Bank, 1992).

1.3. Objectives of the Review

General objective

- ✓ To review on the contribution of agricultural extension on increasing smallholder farm productivity in case of Ethiopia

Specific objective

- ✓ To review the history of agricultural extension in Ethiopia
- ✓ To review the role of agricultural extension to farm productivity in Ethiopia
- ✓ To review the constraints facing agricultural extension in Ethiopia

2. Literature Review

2.1 Definition and concept

Agricultural Extension; 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.

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).

In its broadest sense, the extension is an educational process with communication being its core component. The author's van den Ban and Hawkins (1996) define the term extension as the conscious use of communication of information to help people form sound opinions and make good decisions. As a system, extension facilitates the access of farmers, their organizations and other market actors with 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).

The 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, Davis, Pender, Nkonya, Anandajayasekeram, Ekboir, et al., 2006). This can include different governmental agencies (formerly the main actors in extension), non-governmental organizations (NGOs), producer organizations and other farmer organizations, and private sector actors including input suppliers, purchasers of agricultural products, training organizations, and media groups (Neuchâtel Group, 1999).

Agricultural productivity is measured as the ratio of agricultural outputs to agricultural inputs. While individual products are usually measured by weight, their varying densities make measuring overall agricultural output difficult. Therefore, the output is usually measured as the market value of final output, which excludes intermediate products such as corn feed used in the meat industry. This output value may be compared to many different types of inputs such as labor and land (yield). These are called partial measures of productivity.

Agricultural productivity may also be measured by what is termed total factor productivity (TFP). This method of calculating agricultural productivity compares an index of agricultural inputs to an index of outputs. This measure of agricultural productivity was established to remedy the shortcomings of the partial measures of productivity; notably that it is often hard to identify the factors cause them to change. Changes in TFP are usually attributed to technological improvements.

2.1.1 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 Alemaya College of Agriculture. The extension is underway in the country for over 70 years. Over this period, several developments as well as extension approaches were employed side by side (Belay, 1959). During the first five year plan (1958–62), 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 (1968–73). The other program where an extension has been exercised was the package program that emerged during the third five-year plan. The typologies of package approach 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 ChilaloAwraja of Arsi region in 1967. It was established with the assistance of the Swedish International Development Authority (SIDA) and World Bank.

Besides the ChilaloAwraja, the project later on in 1976/77 was expanded to cover the other two Awrajas of Ticho and Arba Gugulu in the region (TesfayeBesha, 1996). The extension method employed by CADU was the "Model farmer" approach until 1975. But the model farmer's approach to the 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, 1975). The second comprehensive package project was initiated in Wollamo province in 1970 under the Wollamo 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 resourced 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 the 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 (TesfayeBesha, 1996).

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 to the new socio-economic and political system of the country. The main objective of the project was institution building and strengthening of infrastructure while at the same time extending the use and availability of inputs to the smallholder farmers.

After the termination of MPP in 1985, Peasant Agricultural Development Project (PADEP) was initiated to promote agricultural development in the dominant smallholder sector. The program was designed on the basis of experiences gained from the past two MPPs.

2.1.1.1 The Current Agricultural Extension Approach of the Country

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

Unlike the top-down extension method of the past, the 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: -

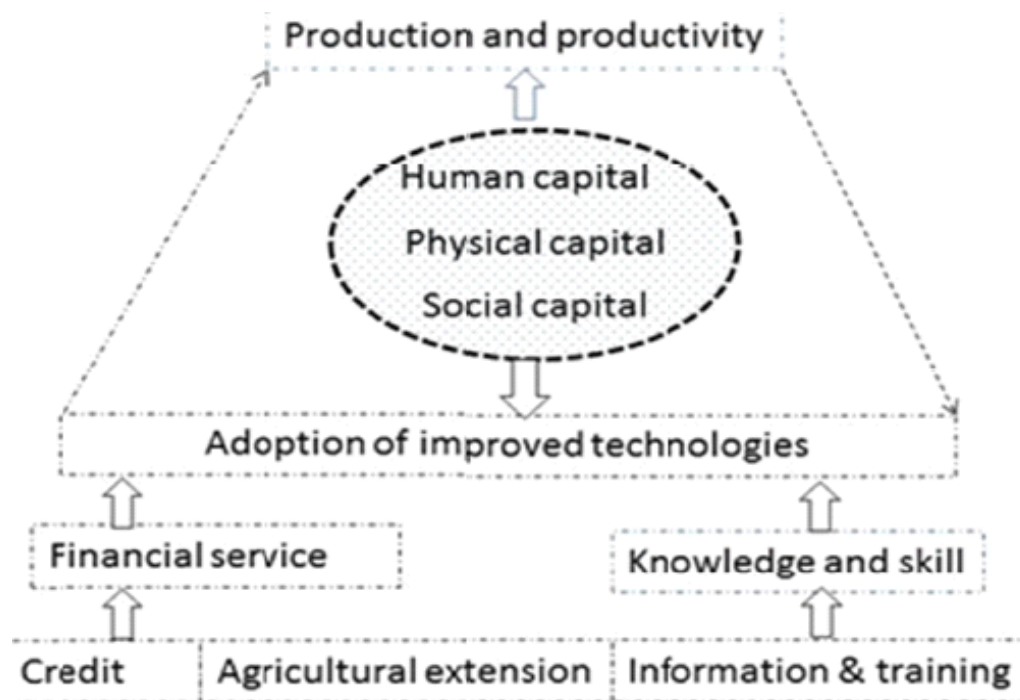
- Timely delivery of production inputs.
- The provision of credit.
- The delivery of extension and training services.
- Deploying development agents at the village level.
- Facilitating logistics (MOA, 1998).

2.1.1.2 Conceptual Framework of the role of agricultural extension on increasing farm productivity

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 improving 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.

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. An 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 pathways showing how extension program impact on agricultural productivity is illustrated in figure 1 below



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Figure 1. Role of agricultural extension on farm productivity

The mechanism to increase production and productivity through agricultural extension services are mainly fixed with the adoption of improved seeds, inorganic fertilizer, agrochemicals (herbicide, and pesticide) and credit for the Ethiopian smallholder. By facilitating credit service via cooperatives and microfinance institutions (e.g. credit on cash or in kind), the extension program enhances farmers financial capacity which leads farmers leads to adopting improved technologies as well as practices that will ultimately, help increase agricultural productivity. However whether farmers actually adopt improved technologies and practices being promoted by the program is conditioned by several other household and farm level factors as well as, human capital (sex, age, education level, labor); physical capital (land size, livestock ownership) , social capital (membership in farmers organization) and others(soil type, slope of land , and farm management practices like intensity of ploughing frequencies).

2.2 The overall Roles of Agricultural Extension

A major role of the agricultural development policy in most countries is to increase food production at a similar rate to there at which the demand for food is increasing and at a cost, which is competitive on world markets. It is appreciated more and more that such development must be sustainable, and that often it must be done in a different way than it was in the past. An effective agricultural extension organization is critically important in this situation, especially in less industrialized countries. The major role of extension in many countries in the past was seen to be the transfer of new technologies from researchers to the farmers. Now it is seen more as a process of helping farmers to make their own decisions by increasing the range of options from which they can choose and by helping them to develop insight into the consequences of each option (Vanden Ban & Hawkins, 1996).

Extension work has now become part and parcel of rural development strategy in most nations of the world. The World Bank has also contributed significantly of late, towards strengthening extension organizations in less developed nations. There is tremendous faith in extension's potentials to work with rural people. Like it is said that Rome was built in order, it was not mastered minded by one individual at a place rather it evolved through hard work of several people around the world for over more than a century now (Kumar & Hansra, 2000).

The level and dynamics of agricultural productivity affect well-being, structural transformation and development in LDCs (Gollin, 2010; Johnston and Mellor, 1961). Agricultural productivity growth is, therefore, an essential precondition for poverty reduction in the short and medium term, contributing through several channels. Rising agricultural productivity helps to lower food prices, effectively raising real rural and urban wages, since food is a major component of wage goods, and benefiting landless and other rural food-deficit households (Block, 2010; Sahn, Dorosh and Younger, 1999). "Food security exists when all people, at all times,

have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”(World Food Summit, 1996).

2.3. Challenges of the current agricultural extension program in the country

As the overall results of the study in Ethiopia clearly show, each farmer knows at least about the existence of the current extension program. On the other hand, average yield; gross benefits and net benefits of extension plots are found better than non-extension plots. The program is also found contributing a significant change in food intake of the farmers. But, on activities like demonstrations, field visits, and group discussions; supports given to farmers are not much satisfactory. Besides to that, the role of farmers is not also well considered in the overall planning and implementation process of the program. The literature identifies the main problems that have been challenging the overall planning and implementation processes of the current extension program. The literature shows, there are social, economic, institutional and infrastructural problems that have been challenging the overall performance of the current agricultural extension program. In this review; the following are identified as the main problems of the current agricultural extension in Ethiopia.

Socio-economic problems Institutional and infrastructural problems According to Hailu Kassaye (2002) study done on Benishangul Gumuz shows socio-economic problems on extension program includes;

- ✓ Illiteracy
- ✓ Language
- ✓ Gender
- ✓ Capital and
- ✓ Credit

Although in his study result identified that institutional and infrastructural problems of extension service include;

- ✓ Market
- ✓ Transportation
- ✓ input delivery and Research institution

3. CONCLUSION

Increasing agricultural productivity is a major challenge in Sub-Saharan Africa (SSA), where 62% of the population depends on agriculture for their livelihood. Like in many other SSA countries, agriculture is the most important sector for sustaining growth and reducing poverty in Ethiopia. However, lack of adequate farm management practices, low level of modern inputs usage, the depletion of soil organic matter and soil erosion, highly rain fed dependent agriculture system are major obstacles to sustain the agricultural production in the country. Improving the productivity, profitability, and sustainability of smallholders farming is, therefore, the main pathway to get out of poverty. The seminar reviews that, achieving agricultural productivity growth will not be possible without developing and disseminating improved agricultural technologies that can increase productivity to smallholder agriculture.

In Ethiopia, agricultural extension is said to be operational since the 1930s. However, a formal extension was started only after the establishment of the Alemaya College of Agriculture. The extension is underway in the country for over 70 years. Over this period, several developments as well as extension approaches were employed side by side. Currently, Ethiopia is following a 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.

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. The ministry also assists to coordinate interregional activities, render policy advice and technical backstop. The planning, execution, monitoring, and evaluation of extension programs, however, fall within the power and duties of the regional agricultural bureaus. Nevertheless, In Ethiopia ; high illiteracy rates, language, marginalization of women, declining in crop prices, financial problems, lack of access to credit services, absence of input delivering agencies, poor transportation, and absence of research institution are identified to be the main problems (challenges) of the current extension program in present time.

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