Majority of Ethiopian farmers have been using traditional way of agricultural practices which persist to low productivity. To solve these problems, governmental and non-governmental organizations have made efforts to bring about change through Agricultural extension strategy. But these efforts notwithstanding, the rural population still practices subsistence. The agricultural extension service is one of the institutional support services that has a central role to play in the transformation process, but facing new extension challenge. There were many studies conducted to identify role and challenges of extension service in Ethiopia in different regions, but there is limitation of summarization of current state of understanding. However; governments of developing countries are confronting new extension challenges: on the one hand, there is a need to increase production to provide food for all citizens, raising the income of the rural population and reducing poverty; on the other, hand there is a need to manage the natural resources in a sustainable way with new technologies developed. The mandate of extension services, whether public or private, has always been rural human resources development with an aim to increase food production. The major challenge currently facing agricultural extension service delivery in Ethiopia has its impact on the development of country.

Keywords: Extension, challenge, Role, Agriculture, Ethiopia.

INTRODUCTION

Eighty-three percent of the population depends directly on agriculture for their livelihoods, while many others depend on agriculture-related cottage industries such as textiles, leather, and food oil processing (IFPRI, 2009). Agriculture contributes 43 percent of gross domestic product (GDP), 85% of employment and up to 90 percent of total export earnings (MoADR, 2010). In spite of the vast agricultural potential, Ethiopia has been under the state of widespread and persistent food insecurity since the 1970. People in different parts of the country receive food aid (Birhanu et al., 2016)

Majority of Ethiopian farmers have been using traditional way of agricultural practices. This has contributed for low productivity of the agricultural sector (Yishak and Punjabi, 2011). To solve these problems, governmental and non-governmental organizations have made efforts to bring about change in agricultural production system of peasant farmers. But these efforts notwithstanding, the rural population still practices subsistence (Birhanu et al., 2016).

Agricultural extension has a role to play in agricultural development through 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. Agricultural extension service could be the government agency or ministry responsible for promoting the adoption and utilization of new scientific farming practices through educational procedures (Asiabaka et al., 2012; Christoplos, 2010; Birner et al., 2006 and Dragic et al., 2009).

However; criticism was also created with regards to the roles of agricultural extension service delivery due to a lack of national framework for extension, but in this 21st
century, extension and advisory services needs to reinvent itself and clearly articulates its roles in the rapidly changing rural and agricultural context in order to improve their relevancy (Magoro and Hlungwani, 2014). Extension services needs staff with good understanding of technical knowledge and skills to manage social processes.

The public extension services in developing country started experiencing some challenges in the last decade due to socio-economic changes and agricultural sector reforms taking place (Zwane, 2012). According to Rivera et al (2001) and Biratu (2008), governments of developing countries are confronting new extension challenges: on the one hand, there is a need to increase production to provide food for all citizens, raising the income of the rural population and reducing poverty; on the other hand there is a need to manage the natural resources in a sustainable way in a rapidly changing world with new technologies developed all the time. The mandate of extension services, whether public or private, has always been rural human resources development with an aim to increase food production through the introduction of improved agricultural technology. The need to increase agricultural productivity to enhance food security and reduce poverty in Africa is widely acknowledged (World Bank, 2007).

There were many studies conducted to identify role and challenges of extension service in Ethiopia in different region (Belay and Degnet, 2004; Belay, 2002; Belay & De misse, 2014), but there is limitation of summarization of current state of understanding on challenges and role of agricultural extension service or previously published studies on topic. Review of challenges and prospectus for a particular region is crucial for future policy formulation. This study has identified some of the challenges and prospectus of agricultural extension service.

**METHODOLOGY**

Data were obtained from document analysis. It was undertaken using in-depth review of related literature from the Internet and up to-date extension service challenges reports of Ethiopian government. Published articles and books, reports from government and non-government organizations, archives of stakeholders’ organizations and some media reports (print and electronic) were also explored.

**RESULT AND DISCUSSION**

**Emerging challenges for sustainable agricultural development**

Emerging challenges for sustainable agriculture during the past fifty years was agricultural development policies have been remarkably successful at emphasizing external inputs as the means to increase food production (FAO, 1998). This has led to growth in global consumption of pesticides, inorganic fertilizer, animal feed-stuffs, and tractors and other machinery. However, agricultural extension has value as policy instruments to achieve government goal of increasing food production, stimulating economic growth, increasing the welfare of farm families and promoting sustainable agriculture (Van den Ban and Hawkins, 1998). The basic challenge for sustainable agriculture is to make better use of internal resources. This can be done by minimizing the external inputs used, by regenerating internal resources more effectively, or by combinations of both. Evidence is now emerging that regenerative and resource-conserving technologies and practices can bring both environmental and economic benefits for farmers, communities, and nations (FAO, 1998).

Increased reliance on chemicals may have negative consequences for the environment and raises the question of both economic and environmental sustainability, and the consequences of such inputs on the quality of livelihoods. Pretty et al. (1996) call for greater emphasis to be placed on ‘sustainable agriculture’ noting that ‘a massive increase in inorganic fertilizers and pesticides is not a necessary condition for feeding the world [although] in certain agro-ecological systems, moderate applications of fertilizers will be necessary to ensure the appropriate balance of plant nutrients and minerals in the soils.’ A more sustainable agriculture pursues a number of goals - the incorporation of natural processes such as nutrient cycling; minimization of the use of external and non-renewable inputs; the participation of farmers and rural people in all processes of problem analysis and a greater use of local knowledge (Shah, 1994; SWCB, 1994; Pretty, 1995).

According to Rivera et al (2001), governments of developing countries are confronting new extension challenges: on the one hand, there is a need to increase production to provide food for all citizens, raising the income of the rural population and reducing poverty; on the other hand, there is a need to manage the natural resources in a sustainable way in a rapidly changing world with new technologies developed all the time. Therefore, it is important that policy-makers are aware of the key role that extension plays in the national economy development before modernizing and reforming the existing agricultural system (Qamar 2005). Though achievements in crop improvement in the last 20 years are undeniable, poor farming families’ needs are unaddressed. On the other hand, exotic cultivars can give better yields under selected demonstration sites with good management, but under conditions that prevail in most peasant farms, where there is low inputs and varying climatic conditions, local landraces usually perform better than exotic ones (Lakew et al., 1997).
Role of agricultural extension service on farm productivity

A role may be defined as a set of norms, values and interaction patterns associated with a given category of individuals (Anaeto et al., 2012). It is therefore, the job or function attached to a given status. It can be clarified with the economic concept of division of labour, which states that individuals work in different sectors of the economy (Mengistie and Belete, 2015). Agriculture extension has a role to play in agriculture development. Agricultural extension service could be the government agency or ministry responsible for promoting the adoption and utilization of new scientific farming practices through educational procedures (Asiabaka et al., 2012).

Agriculture commercialization

The rate of agricultural growth in Ethiopia in turn depends on the speed with which the current subsistence oriented production system is transformed into a market orientated production system (Berhanu et al, 2006). Among the many institutional support services that need to catalyse/support the transformation process, the agricultural extension service plays a critical role, since it contributes to change farmers skill, knowledge and attitudes in agricultural technology, farming activities and agricultural marketing (Berhanu et al, 2006; Biratu, 2008; Belay, 2003).

Role of agricultural extension in a commercialized agricultural system is different from such service in subsistence farming system. In the commercialized agriculture the extension service will mainly concentrate on the resourceful big farmers, with favorable environmental conditions and higher socio-economic status few the number of farmers and large farm size (Rohana & Bandara, 2006). But Agriculture Organization (FAO) has categorized farmers into three different groups based on the marketable surplus as a percentage of total production in the following manner (FAO, 1989): Subsistence farmers (Marketable surplus under 25% of the total production), Transition farmers(Marketable surplus ranging between 25-50% of total production) and Commercial farmers (Marketable surplus more than 50% of the total production). Do we have to accept this concept under each and every situation? We think the answer is “no”. By using improved technologies farmers can move towards commercial agriculture without considering the size of land.

Helping farmers to reach their goals

Extension agent gives timely advice to make them aware of a problem and helps farmers to decide most important goals (Van den Ban and Hawkins, 1998).

Farmers’ organization

Farmers in industrialized countries have organized themselves in many different ways to serve their collective interest (Van den Ban and Hawkins, 1998). Such organizations play crucial roles in agricultural development in these countries. In less industrialized countries which organizations either do not exist or tend to be ineffective. Establishment of effective farm organization is at least as important as the introduction of scientific production technology in many of these countries. Extensionists are well trained in terms of local organizational development; they can build farmer institutions, organizing farmers into associations and commodity groups and other forms or cooperative activities. The success of extension in Taiwan and Korea has been equated to farmer associations which extension has played significant role in promoting institutional technology (Rivera, 1989: 95).

Educating farmers

One definition of agricultural extension widely used in the FAO publications sees extension as a service or system which assists farm people, through educational procedures, in improving farming methods and techniques, increasing production efficiency and income, bettering their levels of living and lifting the social and educational standards of rural life (Swanson, 1984). Extension agents in agricultural extension solve farmer’s problems through education. It is believed that in agricultural extension the main way to improve farm efficiency and to increase farm production is to educate farmer (Van den Ban and Hawkins, 1998). Extension is viewed as a provider of non-formal agriculturally related continued education for multiple audiences such as farmers, spouses, youth rural community and urban horticulturists (Rivera, 1989: 94).

Food security

Food security is often defined in terms of food availability, food accessibility and food utilization (USAID, 1995) as cited by Rivera and Qamar (2003). Extensionists have received training which combines technical knowledge and communication skills. They can apply this knowledge to help in improving farming, farm yields and thereby reduce poverty (Neuchatel Group, 2008). A general consensus exist that extension services, if properly designed and implemented, improves agricultural productivity, Romani (2003).

Conservation of Natural resource

Farmers and communities have little urged to conserve resources unless they are forced by legislation (Zwane, 2012). An extensionist does not use force but known strategies of persuasion to assist farmers and communities to conserve natural resources.
Dissemination of useful Information

For many years it thought that farmers’ conservatism was the reason for their failure to adopt new technology developed for them by agricultural scientists (Van den Ban and Hawkins ,1998). Extensionists usually persuade farmers to adopt new practices mainly because they have access to research and its results (Zwane, 2012). They have received proper training that can be executed to benefit the farming communities. Extensionists should access different information needed by farmers in terms of production, cultural practices, markets and marketing. Depending on their tasks they can broaden it if possible to include farmer education and problem solving advice (Rivera, Röling, 1988: 37; Bembridge, Leagans, 1961: 3). Other priority information may have to be identified for dissemination. According to (Arion, Merce, Mihasan & Horvat, 1991: 1) what extension should disseminate to farmers may include: - technology transfer; - offering economical advice (including book-keeping); - developing agricultural markets and informational system; - developing small enterprises and discovering new alternatives for obtaining profits. It is important to note that information and knowledge transfer are important factors for accelerating agricultural development through appropriate production planning, adoption, management for developing to countries realize their full potential (Pontius, et al, 2002)

Promote sustainable agriculture

According to Mengistie and Belete (2015), extension could play a central role in fostering sustainability through its educational programs but there has been a growing realization that traditional extension models have not been sufficiently effective in promoting adoption of sustainable agricultural practices. Since sustainable agriculture is a knowledge intensive system, it requires a new kind of knowledge, which differs from other forms on the basis of conventional agricultural practices. In fact, conventional extension system cannot accomplish sustainability in agriculture; because today's agricultural extension must consider environmental implications, social issues, and overall economic growth within the agriculture sector (Mohammad, 2009). One of the tasks of extension is the emphasis on developing the human capital, enhancing his or her capacity to make decisions, to learn and manage the communication process with others, to analyze the environment, to be a leader, to stand up to oppression and to organize (Röling,1988: 37).

Challenges of agricultural extension service in Ethiopia

The major challenges of the past and current agricultural extension service delivery in Ethiopia are :absence of the national framework of agricultural extension policy that has been developed in a participatory manner, top down, unclear extension approach ,lack of suitable adaptation of technology packages to local conditions, frequent restructuring of the extension institutions, high turnover of staff,—limitation in the quality of field and technical staff, inadequate budget for the implementation of the extension system, limited private sector involvement in service delivery, administrators unnecessary interferences on technical matters, lack of monitoring and evaluation of the extension system, weak system of agricultural inputs supply and distribution (seeds, fertilized, credit, subsidies etc) systems, involvement of experts on duties other than extension responsibility, weak market linkage and information system, weak linkage of research-extension farmer, absence of public private partnership in extension service delivery, not enough attention given to indigenous knowledge of local people and absence of irrigated agriculture focused extension and research systems(IFPRI, 2009;Belay et al and Belay, 2002; Birhanu et al, 2016 ;Tilahun, 2008 and Belay ,2014).Moreover; According to Mengistie and Belete (2015) current extension service challenge in Ethiopia has top-down approach, non-participatory, supply driven not demand driven, gender bias extension services, lack of staff moral, capacity and capability of staff, development agents involvement in non-extension activities, lack of qualified extension supervisors,—insufficient appropriate and relevant technology options both for on crops and livestock sector and inadequate public funding. According to Belay (2014) the challenges are categorized as technical, financial, institutional and administrative. The major challenges of the current agricultural extension service delivery in Ethiopia are:

Institutional

Institutional concern challenges of agricultural extension service are top down, limited private sector involvement in service delivery, lack of monitoring and evaluation of the extension system, leak system of agricultural inputs supply and distribution, involvement of experts on duties other than extension responsibility, weak market linkage and information system, weak linkage of research-extension farmer, absence of public private partnership in extension service delivery, Not enough attention given to indigenous knowledge of local people and absence of irrigated agriculture focused extension and research systems(IFPRI, 2009;Belay. and et al and Belay, 2002; Birhanu et al, 2016 ; Tilahun, 2008 and Belay ,2014).

Top-down/non-participatory/supply driven

According to Biratu (2008) a good agricultural extension system accepts and incorporates farmers’ traditional knowledge in research processes and sees farmers as partners during decision making. However, in most cases the problem with science in agriculture and extension is that it has a poor understanding of the knowledge from very poor, indigenous rural people. For many scientists, in
order to develop those rural people, formal research and extension has to transform their knowledge into another knowledge system, because their knowledge is considered as unscientific and primitive (Röling and Pretty, 1997). This is true when it comes to the case of agricultural extension in Ethiopia. In most cases, the approach is top-down, whereby technologies are developed somewhere and the farmers are told what to do by the development agents (EEA, 2006; Belay, 2002; Belay, 2003; Abeshia et al, 2000; Wale and Yalew, 2007) and as it was indicated by Simane. (2004), much of the agricultural inputs imported and distributed are supply driven, without giving due consideration to the demand from the farmers’ side.

**Weak research-extension linkage**

According to Belay and Dawit (2017) earlier empirical studies in developing countries have identified weak links between research and extension as the major factor limiting the flow of information, knowledge, useful new technologies, and resources among actors in the technology-delivery utilization system and recommend measures to overcome the widely acknowledged weaknesses (Agbamu, 2000; Anderson and Feder, 2004; Asiabaka, 2002; Belay, 2002, 2003). Under normal conditions, agricultural extension service serves as a farmer organization that expresses the concern and feeling of farmers to the public and conveys information from research institute to farmers and from the farmers back to research institutes (Birkhaeuser, et al 1991). Contrary to this fact, agricultural research in Ethiopia is poorly linked to extension (Belay, 2003; EEA, 2006; Wale and Yalew, 2007) because of the fact that extension and research activities have been carried out under different institutions with zero or minimal coordination between them (Belay, 2002).

**Gender biased service**

Gender issues should be afforded the highest priority in Ethiopian extension. Failure to take into account gender relationships leads to unsuccessful extension activities, the marginalization of the disadvantaged sector of society and a large part of the agricultural workforce (Vince, 2005; Olawoye, 2005 and Odebode, 2008). It includes focusing on the relationship between men and women, their roles, access to and control over resources, the division of labour, and other needs. Thus, understanding gender relationships and adjusting methods and messages to them is crucial. A holistic approach to research and extension that considers the total socio-economic system is more likely to result in technology solutions being more family and women friendly

**HIV/AIDS epidemic**

Challenge of an HIV/AIDS epidemic on agricultural extension services in sub-Saharan Africa is quite unusual as it affects both staff and clientele and involves human emotions to a depressing degree, that is, in addition to technical aspects. The spread of HIV/AIDS is counteracting gains in human development and has the potential for serious social dislocation especially in rural areas (Vince, 2005; Kalim , 2003). From nature of extension work most of the extension staff themselves have their genetic roots in rural families. They travel frequently in rural areas, many times spending nights away from home, and being offered “hospitality” in villages due to their status. Also, they are in touch with so many widows forced into farming because of their husbands’ death, who need extension advice. Thus, the extension workers have ample opportunities of getting involved with multiple sex partners (Kalim, 2003). All these factors expose the extension staff to the maximum risk of HIV infection, especially with their very limited knowledge of the epidemic. Reductions and disruptions in staff is the other dimension of challenges extension service. According to Kalim (2003) discussions made with government extension service officials reveal that their capacity for delivering satisfactory services is being affected by HIV/AIDS. This is due to disruption in their programmes caused by deaths, protracted sickness and frequent absences of staff.

**Technical**

**Lack of suitable adaptation of technology packages to local conditions**

Available evidence shows that yields of major crops under farmers’ management are still far lower than what can be obtained under research managed plots (Abate, 2006; EIA, 2007). This is the result of research and extensions that were put in place used one size-fits for all types of extension methods and there is no extension that suits for all categories of adopters (EEA, 2006). Inadequate research outputs on the felt needs of farmers/pastoralists factors limit the contribution of agricultural extension to the growth of agricultural output and productivity (Birhanu G. et al, 2016; Tilahun, 2008). To summarize, research process and agricultural extension services in Ethiopia lack preferences, criteria and conditions of the farmers (Wale and Yalew, 2007) and a well-articulated national research and extension policy is not yet developed in the country (Demese, 2004 as cited in Wale and Yalew, 2007).

**Financial**

**Inadequate public funding**

One generic problem confronting the extension service is inadequate public funding. The problem is especially acute with regard to operational budget. Operating costs are usually liable to budget cuts. Shortages of operating costs seriously affect the effectiveness of the extension service (Berhanu et al, 2006 and Axinn, 1988).
Administrative

Lack of qualified extension supervisors and worker

According to Birkhaeuser et al (1991), agricultural extension service needs agents for two main activities: in the first place to transfer required information to the farmers and secondly to report the problems faced by the farmers. However, many front-line extension staff in Africa lack the competences (skills, knowledge, attitude and resulting behavior) they need to be effective in their work with farmers (Lindley, 2000; Belay and Degnet, 2004; Belay, 2003). In the same line, a worldwide analysis of the status of agricultural extension reveals the low level of formal education and training of field extension agents in developing countries (Swanson et al., 1990).

Involvement of experts on duties other than extension responsibility

Agricultural extension agents in Ethiopia (named as Development Agents), are involved in different activities which are not necessarily related to their normal work such as collection of fertilizer credit, being government spokesmen, or agents for other government bureaus and this will highly affect their relation with the farmers (Belay, 2003; Biratu, 2008). In this respect, Howard et al. (1999) noted that many of the extension agents interviewed expressed concern about their heavy involvement in credit administration not only because it kept them from their technical responsibilities (advising farmers on use of improved technologies), but also because their role as credit collection agents had a negative impact on their personal relationships with farmers.

Lack of staff moral

Fieldwork in many developing countries is characterized by conditions that foster low morale: lack of mobility, virtually no equipment and extremely low salaries (Belay, and Degnet, 2004). These difficulties contribute to a high turnover rate; those who remain in extension are typically people with few employment opportunities elsewhere (Kaimowitz, 1991).

CONCLUSIONS

Agricultural extension ensures important and relevant information on improved agricultural technologies and good practices are communicated to farmers with the main objective to improve their agricultural production and productivity. The Role of agricultural extension service on farm productivity is commercialization of Agricultural activity, Helping farmers to reach their goals through advice, organizing farmers to collectively act, educating farmers, bringing food security, Conservation of natural resource, dissemination of useful information and promote sustainable agriculture. However; the major challenge in the past and current agricultural extension service delivery in Ethiopia are HIV/AIDS epidemic, gender biased service, absence of the national framework of agricultural extension policy that has been developed in a participatory manner, top down, Unclear extension approach, lack of suitable adaptation of technology packages to local conditions, frequent restructuring of the extension institutions, high turnover of staff, limitation in the quality of field and technical staff, inadequate budget for the implementation of the extension system, limited private sector involvement in service delivery, administrators unnecessary interferences on technical matters, lack of monitoring and evaluation of the extension system, weak system of agricultural inputs supply and distribution (seeds, fertilized, credit, subsidies etc) systems, involvement of experts on duties other than extension responsibility, weak market linkage and information system, weak linkage of research-extension farmer, absence of public private partnership in extension service delivery, not enough attention given to indigenous knowledge of local people and absence of irrigated agriculture focused extension and research systems. Most of the challenges are institutional which require administrative commitment, but further research must enquire about suitable adaptation of technology packages to local conditions.

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