







### **Agricultural Research in Ethiopia**

Agriculture is the main-stay of Ethiopian economy and agricultural research has a long history in the country. Of late, the country is implementing agriculture-led industrialization/development policy. More importantly, raising agricultural productivity and improving rural welfare remains a fundamental challenge in the country (Spielman *et al.*, 2002). According to Spielman *et al.* (2002), the growth and innovation of the sector are still weak. For instance, between 1996 and 2005, agricultural GDP per capita grew only by 0.48 per year. Moreover, the growth shows fluctuation year to year (Spielman *et al.*, 2002). According to Spielman *et al.* (2002) this day's Ethiopian agriculture is changing as new actors, relationship, and policies influence the way smallholder farmers' access and use agricultural information and knowledge in their production activities. But still the impact these changes have made on the lives of the smallholder farmers and the change it made on their innovative activities are not quantified. This calls for further analysis of the impact of the aforementioned changes in the agricultural sector brought about on the life of farmers and innovating ability of the farmer as well as their involvement level in technology development and dissemination.

### **3. The State of Agricultural Information Transfer System in Ethiopia**

Agriculture and extension have a long history in Ethiopia, but the extension or information system was not efficient to reach all the relevant agricultural information to farmers/users. Moreover, the agricultural information/technology transfer approach designed without the participation of the end users, particularly for whom the technology is planned to reach (Kassa, 2008). According to Kassa (2008) the system also makes the farmers near the main roads beneficiary and ignores those located far away from the easily accessible areas. Similarly, the number of intermediaries is small compared to the number of farmers in the country. Consequently, it reduces the efficiency of information/technology flow. Currently, Ethiopian agriculture is changing in the way farmers get access to information and knowledge and use it in their production decisions (Spielman *et al.*, 2002) through assigning development agent workers in each locality who provide theoretical and practical assistance to farmers. According to Spielman *et al.* (2002), the change in the agriculture system of the country are assumed to create better opportunities for farmers, but the applicability and ultimate impact of this change on the farmers livelihoods is less visible. This warrants the analysis of the current states of information system and the role of different actors in the agricultural sector towards the improvement of the information and knowledge system as well as the change in productivity of the sector in the country. Adoption rate of agricultural technological package by the farmer mainly depends on the information and knowledge available for farmer about the technology. This is because farmers need being informed about the importance, method of application, application rate of the developed and disseminated technology. A study by Spielman *et al.* (2010) described the imperfect knowledge about new technology as one of the main barriers for less adoption and practice of agricultural technologies and

indicated information and experience as an important tool to reduce this constraints and hasten the dissemination, acceptability, adoption of technologies and thereby contribute to the improvement of the productivity of the agricultural sector and improve the economic situation of the farmer in particular and the country economy in general (Spielman *et al.* 2002). Information for agricultural sector comes from different sources. According to Spielman *et al.* (2002) for Ethiopian smallholder farmers, agricultural research institutes, agricultural extension agents, and higher education institutes are the most dominant sources of information, technology and inputs. According to (Rycroft and Kash 1999 as cited in Spielman *et al.* 2002) an array of social networks is an important element of an innovation system since different innovation actors interact with one another, or the set of individuals or organizations in which each has connections of some kind to some or all of the members of the set. This calls for the involvement of all innovation actors in the agricultural sector of the country so as to improve the development and adoption level of the technology and thereby improve the livelihood of the smallholder farmers in particular and the country's economy in general. This is because the economy of the country is agriculture dependent (ICRA 2010; Spielman *et al.* 2010; Kassa, 2008). Moreover, the change in productivity of the agricultural sector is not only impacts the smallholder farmers rather it contribute a lot to the improvement of the country's economy as a whole.

### **4. Barriers to Research and Dissemination of Technology and Information**

Executing research needs a lot of expenses and if followed by proper dissemination of the developed technology the investment becomes meaningful. The effective development of technology and dissemination of the knowledge/information obtained from the research challenged by different factors. According to Day *et al.* (1994) lack of efficient communication is among the major barriers in the execution of research, dissemination of results to the desired user and effective application of the technology as proved by research. Moreover, the absence of efficient communication about the technologies might result in poor decision making, delay in the planned activities, and failure and deficiencies in the dissemination of research results thereby the technologies remain without use for the desired objectives/impacting the end user (Day *et al.*, 1994). This shows the importance of having strong linkage between the different information/knowledge system partners. This is because having good linkage between stakeholders ensures the transfer of information and knowledge among the different stakeholders properly and helps to achieve the desired objective. According to Aflakpui, (2007) the function of linkage is more than just transfer of information/knowledge; rather it helps to perform diagnosis, planning and review of programs, execution of collaborative works, evaluation and feedback in a cooperated manner. The same study also suggests different mechanisms on how to sustain linkage between farmer and other actors such as survey, meetings, reports, training, demonstrations and field day. This also helps the farmer to select the technology in an informed way thereby enhance adoption rate of the technology. Moreover, weak link between research,

education, and extension and also the contact these organizations have with farmers is among the main bottlenecks in agricultural technology development, transfer and adoption level and thereby reduce the contribution of the technologies to development (Van Crowder and Anderson, 1997). Government policy and organizational structure also affect the linkage between the different parties in the agricultural sector. This is because the different groups/members in the linkage/information transfer system act in accordance to the policy. And if, for instance, the policies centralized, it might inhibit the flexibility that allows the different stakeholders to be responsive to each other as well as to farmers. Furthermore, absence or miss structured linkage may result in repetition of the same task by the different parties of the system, or result in failure to perform certain tasks (Van Crowder and Anderson, 1997). However, in recent years, a pluralistic approach of communication or linkage structure has been used. And this seems better in terms of flexibility, complementarities, and also in terms of range and number of farmers involved in the system and their technological needs (Van Crowder and Anderson, 1997). Van Crowder and Anderson (1997) in their study on linking research and education, indicated the importance of an integrated approach, since this approach links all system members/participants. Moreover, this approach allows having agricultural knowledge and information system that draws on both modern science and indigenous knowledge of the farmers. According to Van Crowder and Anderson (1997), interaction among different actors helps to produce better knowledge different from those produced by one actor alone. This shows the need to look at agricultural knowledge and information at a system-wide base to include all partners (education institutes, research, extension, NGOs and farmers indigenous knowledge) and to benefit from their expertise (Zijp, 1993 as cited in Van Crowder and Anderson, 1997). Following a systematic knowledge chain in the way that it allows interaction with the policy maker is also desirable (Bouma, 2010) since the policy makers are among the important parties that play a role in shaping and strengthening the information and knowledge system. Moreover, Hall *et al.* (2001) suggested the need for collaborative relationship between public and private, and research and non-research organizations to assure successful technology development.

## 5. Conclusions

This review study revealed that the factors constraining the linkage between stakeholders and technological innovation level of agricultural sector are wide ranging from poor linkage between stakeholders, innovation extent of the system, weak involvement of professionals in the system and dependence on traditional technology communication system. Based on the findings of this review study, it can be concluded that as the improvement of the system and the overall impact the developed technology bring about change on the lives of the poor is concerned the linkage between concerned stakeholders and technological innovation level of the sector should be improved.

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