

Factors Inhibiting Farmers' Willingness to Participate in Agricultural Research

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Development determinations that use the top-bottom strategy with little input and engagement of farmers have been known as an unsustainable and weak pathway to farmers development and empowerment. Agriculture is the spine of Ethiopian economy. It contributes significantly to the overall economy in the development process. However, different evidences indicate that yields of crops under farmers' condition are far lower than the yield obtained under research plots. Lack of active participation of farmers in agricultural research has been one of the major reasons for the low yield and productivity in Ethiopian agriculture. Therefore, this study examines critical factors that inhibit farmers' willingness to participate in agricultural research in the country. A total sample size of 39 respondents comprising 16 farmers, 14 researchers and 9 development agents were interviewed purposively based on snowball sampling technique. Qualitative research design was used in this research. Data were collected using in-depth interviews, focus group discussions and observations and analysed descriptively. The empirical results reveal that the willingness of farmers in agricultural research is affected by a number of factors. These willingness hindering factors include research types, plans, and objectives; perception of farmers for research and researchers; improper prioritization of farmers problems; problems of selecting potential areas of research; lack of good experiences in the past; absence of proper technology demonstration to farmers during the research process; poor documentation of research process; and weak integration of indigenous and scientific knowledge. As the result of these problems, there was inactive participation of farmers in agricultural research. Lack of farmers' active participation in agricultural research inhibited innovation in agriculture to bring national food security in the country.

Key Words: Agricultural research; farmer's willingness; grounded theory; knowledge; participation


Introduction

Development determinations that use the top-bottom strategy with little input and engagement of farmers have been known as an unsustainable and weak pathway to farmers development and empowerment. Bottom-up methods that view farmers as partners, use local experiences and attempt to empower them have been encouraged. The bottom-up method to development shifts the emphasis from instructing farmers to implement agricultural technologies to coaching and collaborating with them to identify and solve agricultural constraints to bring innovation in agricultural development (Bayissa, 2015; Bayissa and Mansingh, 2015; Prince et al., 2013).

Agriculture is the spine of Ethiopian economy. It contributes significantly to the overall economy in the development process of the country. On a minimal growth domestic product of USD 25.6 billion, 45 % was driven by the agricultural sector. From this 45 %, crop production shares 29%; livestock accounts 12%; followed by forestry with 4%. The sector contributed USD 1.4 billion to exports: forestry and

crops accounts for 60% of the total export value, livestock for 28% and the remaining exports from non-agricultural industry. For the country to become middle-income status by 2015 and make substantial inroads against food insecurity, involvement of all stakeholders especially farmers in the development efforts and strategic investment in agriculture are critical (Bayissa, 2015; Bill and Gates Foundation, 2010). However, different evidences indicate that yields of crops under farmers' condition are far lower than the yield obtained under research plots (Woodhill et al., 2011; Bayissa, 2015; Bill and Gates Foundation, 2011).

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Lack of active participation of farmers in agricultural research has been one of the major reasons for the low yield and productivity in Ethiopian agriculture. The research findings of (3, 4) show that the problems of low adoption of agricultural technologies emerge from lack of active participation of farmers in research process. This inactive participation of farmers in agricultural research process resulted in fragmentation of knowledge system. The knowledge or technologies produced by researchers or farmers are not well exchanged or transferred to the different stakeholders that are working in agricultural innovation in the country. According to (Belay, 2008) that low agricultural production has created national food insecurity in Ethiopia emanating from lack of sufficient knowledge transfer from researchers to farmers and vice-versa that is resulted from poor farmers' participation in agricultural research.

Participation, in this study, refers to the engagement of marginalized and poor farmers in development process that aim to develop farmer's abilities to control and access benefits, opportunities and resources headed for self-reliance and better standards of living. Little or lack of active participation in agricultural research in decision making to implement agricultural technologies and policies lead to failure in agricultural innovation and development (Nxumalo and Oladele, 2013). There are different factors why farmers lack willingness to make active participation in agricultural research to bring innovation in agriculture to bring food security. These willingness limiting factors include farmer's lack of capital, knowledge, skills, confidence and ignorance (Aref, 2011). Moreover, most agricultural research projects do fail because of lack of considering local ethics (farmers), socio-economic and cultural characteristics of the target groups that lead the outside experts not being able to improve and recommend the right technologies that are relevant to farmers (Iqbal, 2007). The findings of (Balemi et al., 2013; Douglah and Sicilia, 1997) also show that failure and poor adoption of agricultural technologies are results of lack of active farmer's participation in all stage of the research projects. He added that farmers are not given the right chance to actively participate in decisions that influences their lives directly.

Farmers' active participation in agricultural research process can be affected by a number of factors positively or negatively. These participation hindering factors include nature, plan and objectives of the research; potential beneficiaries and users involved in the research process; institutional context in which the research project is conducted; methods of the research for accessing indigenous or local knowledge; shared vision among the different stakeholders who are involved in agricultural develop-

ment; adequate market for farmers to sell their produce; information flows between farmers and researchers; hierarchal approach between farmers and researchers; lack of well-developed capital; difference between farmers indigenous knowledge and researchers formal scientific knowledge; social status between farmers and researchers; cultural differences that exclude farmers from working with the educated researchers; professional status that affect the relationship between farmers and researchers; and incentives for farmers (Jones et al., 2015; Klerkx, L. and N. Aarts, 2010; Neef and Neubert, 2011).

The potential beneficiaries and users addressed by agricultural research would have an influences on participatory prospective. For the development of both technical and institutional innovation by agricultural research, the main customers would be farmers (Pound et al., 2003). This agricultural research is affected by the institutional context in which the research is conducted. One of the critical factors for the participatory potential of agricultural research is whether it is planned and conducted in an institutional setting that is responsive to the engagement of farmers' viewpoint in research. If the research is planned in a research institution or university that is less receptive to the prevailing problems of farmers, it is questionable that researchers would have the choice to adopt participatory methods and to respond to farmers' priorities and needs when conducting the research. The same theory holds true to participatory research that are conducted in regions or countries with an elongated history of supply driven agricultural research projects and where the flow of technology and information is linear from agricultural researchers through extension people to farmers (Neef, 2005; Hellin, et al., 2008). The results of agricultural research could have its own risk and this can affect the willingness of farmers to participate in the research process. The research project may fail to find the desired results for farmers need. The result of the findings may not give the expected return to the time and resources spent during the research process and affects farmers willingness to participate in agricultural research (Buhler et al., 2002).

Research methodology is also another factor that hinders farmers' willingness to participate in agricultural research. Research methodology could be reductionist which has little room for farmers' participation or it could be system oriented and holistic approach which invites farmers' participation that increases farmers' participation in agricultural research. Research epistemology, the adherence of researchers to scientific paradigm (constructivist vs. positivist), can affect farmer's willingness to participate in agricultural research in different angles. Agricultural researchers could have positivist world view and can

assume that reality exists independently of the observer and farmers' participation has no or little value in research since the research results do not depend on farmers' context and shows general validity. Agricultural researchers can have constructivist world view assuming that reality is constructed by the observer and validity depends in a given context and give room for farmers' perspectives from different perspectives. This world view gives wider room for farmers' participation to increase participation of farmers in research. This opinion affects the willingness of farmers starting from research planning phase. Research plan can affect participation of farmers in research process. Traditional agricultural researchers incline to conduct relatively inflexible research plans that cannot be easily modified throughout the research process. Such inflexible research planning hinders farmers from influencing experiments and approaches and to negotiate on some aspects of the research strategy with agricultural researchers. A flexible and open plan, on the other hand, can be more responsive to farmers' experiences, priorities and views, gives room for negotiation of adaptation, experiments, and approaches to new circumstances (12).

Methods of research for accessing indigenous or local knowledge are also a critical factor that affects participation of farmers in agricultural research. This anticipates capturing the difference between agricultural research projects in integrating indigenous or local knowledge into the process of knowledge development or generation. Some researchers look indigenous or local knowledge as less pertinent for the research process or even as incompatible to scientific knowledge on the experiences of their accepted epistemological and methodological differences and the conceptuality and social embeddedness of the local knowledge (Ellen and Harris, 2000). Still a growing number of researchers look indigenous knowledge as an important component in the development of scientific knowledge, and methods of getting into indigenous knowledge are part and parcel of their research method (Cleveland and Soleri, 2007).

The government of the country is exerting maximum effort to bring increment in agricultural output under farmers' condition. However, boosting agricultural production and productivity, the anticipated benefits, have not been realized yet. Low agricultural production and productivity is the major cause of food insecurity in Ethiopia emanating from limited of farmers' willingness to participate in agricultural research, lack of suitable technologies for farmers, weak adoption of agricultural technologies, poor agricultural innovation and loose linkage between farmers and researchers in agricultural research (Wigboldus et al., 2011; Abate et al., 2011).

Therefore, the objective of this study was to examine critical factors hindering farmers' willingness to actively participate in agricultural research in Ethiopia. The research findings, hopes to inform recommendations to policy makers and public authorities to contribute to solve the problems which hinder active participation of farmers' in agricultural research with the aim to solve practical problems at grassroots level in agricultural innovation to bring sustainable development for the marginalized and poor farmers.

Research Methodology

Contemporary researchers in social sciences have started to put more attention on the use of qualitative research methods, i.e., methods by means of which one can study non-quantitative characteristics of empirical phenomena (like categories, meanings, assumptions and understanding underlying peoples' languages and practices). Data were generated primarily from knowledge institutes (Wallaga University, Ambo Plant Protection Research Centre), development agents and farmers from Western Oromia region through in-depth interviews. A total sample size of 39 respondents comprising 16 farmers, 14 researchers and 9 development agents were interviewed purposively based on snowball sampling technique. Interviews were conducted and recorded for 67hours.

A qualitative research design was used in this research. Triangulation between different data sources took place to ensure validity (Yin, 2003). Respondents were identified through snowball sampling and in-depth interviews were held. Interviews were fully transcribed, translated and coded applying principles of grounded theory (Glaser and Strauss, 1967) before it was descriptively analysed. Translation followed transcription of data before analysis. Facilitating a qualitative research interview is a hard work and difficult to write down responses while maintaining eye contact, providing encouragement and planning the prompt, probe or link to the next topic of interest, listening and other activities. Therefore, the interview was recorded on memory recorder. Key informants were mostly used as a means of gaining access to the interviewee. Focus group discussions (FGD) were used in this research since it has the advantage over one-to-one interviews of providing access to interaction among the participants and give some insight in how knowledge and innovation was produced. It was also used to augment the individual interview. Moreover, FGD can be a critical way of researching some sensitive matters such as dissatisfaction of farmers with researchers. Also observation was taken place in the role of observer-as-participant (Angrosino, 2007), in which the researcher relates to and was

known to the subjects under study as a researcher. Observation was performed during annual prioritization meeting, research reviews, and field demonstrations. Existing documents were used as sources of data for this research since it can be efficient sources for qualitative questions.

In qualitative research the sample size for the interview depends on the aim of the research. Most qualitative research has the aim of purposive sampling which is explicitly selecting interviewees who it is intended will generate appropriate data. The overall aim of purposive as opposed to probability sampling is to contain information rich cases for in-depth study. To achieve this snowball sampling technique was used. The best methodological answer to sample size in qualitative research is a grounded theory approach. The grounded theory approach is a qualitative research method that uses a systematic set of analytical, interpretative, and coding procedures, to develop an inductively derived grounded theory about a phenomenon. Grounded theory emerged in reaction to the formerly common practice of considering research only as a means of testing hypotheses. That means that the research started with theory that was subsequently tested. Grounded theory was developed as a systematic approach to develop theory on the basis of empirical research. The theory is then the 'finding' of the research. Grounded theory approach advocates theoretical sampling or including interviewees (the incidents and events that interviewees and other sources do provide) in the sample on the bases of both an emerging hypothesis from ongoing data analysis, an understanding of the field and a delicate attempt to test such hypotheses. The objective is to keep sampling and analysing data until nothing new is being generated. This point is called saturation and the techniques are called sampling to saturation. When sufficient data are gathered it reaches theoretical saturation. In qualitative research 'statistical significance' of relations between the empirical phenomena which are being described is not a major criterion (Strauss and Corbin, 1998). A better criterion is what has been called sociological significance. This shows that the researchers' interest is to examine whether the descriptions of these conceived relationships are understandable, meaningful and convincing for the people involved and for the outside world (Elias and Scotson, 1976).

In general, a systematic approach to qualitative data analysis is the use of the grounded theory. The procedure in grounded theory lies in a cyclical process of data collecting, analysing it, developing a provisional coding scheme, using this to suggest further sampling, more analysis, checking out emerging theory and so on until a point of saturation is reached, when no new constructs are emerging. At this point

rich, dense theoretical account is achieved (Judith Green and Nicki Thorogood, 2009).

Results and Discussion

In the study areas, most of the people were living in the village. They were illiterate and they were using the traditional way of farming. Most of the farmers depended on subsistence agriculture. In the study areas, males were the head of the household and every decision were made by them. Females did have little room for making decisions in their matters. Farmers were using their indigenous knowledge in their agriculture. In the study areas, farmers did not have good attitude for research and researchers. They thought that researchers were using the scientific knowledge in the research process. Researchers did not consider the use of indigenous knowledge in their research process. Most of the researchers have limited interest to hear farmers' views to make them development partners.

The research findings revealed a number of factors that hindered farmer's willingness to participate in agricultural research in Ethiopia. These participation limiting factors are listed and described below.

Problems of the research type in agricultural research

Most of the researchers in the study areas conducted research that had little room for farmers' participation. The research showed that most of the researchers in the study areas used the conventional research type that was based on problem identification from other researcher's recommendations. The agricultural technologies generated based on other researchers' recommendation had less relevance to the need of farmers. After the generation of the new technologies, farmers were asked or forced to implement the technology that was not in farmers need.

Basic research that had little room for farmer's engagement in the research process critically reduced farmers' willingness to participate in applied type of research that was conducted in the field since farmers were not mostly consulted or involved in the research process during problem identification in the study areas. Most of this basic research was not relevant to the problems of farmers and had little room for farmers' participation in agricultural research. Lack of room for farmers' engagement in the research process reduced farmers' willingness to participate in agricultural research to bring innovation in agriculture to achieve food security in the country. According to (Bayissa, 2015; Bayissa and Mansingh, 2015; Jones et al., 2015; Neef and Neubert, 2011) farmers' partic-

ipation in agricultural research is affected by the types of research conducted. Basic type of research has little room for farmers to engage in agricultural research process. This inhibits farmers from participating in research and farmers do not learn something from the research to use the new agricultural technology. Lack of social learning from the research process reduces the willingness of farmers to participate in agricultural research to bring technical and institutional innovation.

Lack of good experiences in the past

Farmers in the study areas had ruthless experiences in the past in using agricultural technologies generated by research. Most of the farmers were forced or told to use agricultural technologies to increase production and productivity. Farmers were told that the use of these agricultural technologies would double or triple the output. Farmers were given wrong information and promises from the government and extension workers about the success of agricultural technologies. However, the yield of agricultural outputs did not increase because of the implementation of agricultural technologies. Farmers borrowed money to buy the technologies to bring change in their lives with the assumption that the technologies would bring significant increase in their agricultural produce. But farmers did not get the yield they expected from the use of agricultural technologies. Farmers sold their cattle's to pay the money they borrowed. These shed bad experiences on farmers to use agricultural technologies to bring change in their lives. Moreover, this bad experience significantly reduced the willingness of farmers to participate in agricultural research in the country. The research findings confirm that farmers have different experiences with respect to agricultural research projects. Inappropriate technologies to the various agro-ecological conditions results in failure of technologies. Failure of technologies has risk and result in bad experiences on the use of the technologies in the future. Moreover, it reduces farmers' participation in agricultural research. The research result may fail to find the demanded results for the beneficiaries. The technologies may not give the desired result to the time and resources spent during the research operation and significantly affect the willingness of farmers to engage in research (Bayissa, 2015; Prince et al., 2013; Aref, 2011; Neef and Neubert, 2011; Buhler et al., 2002).

Lack of technology demonstration to farmers

Technology dissemination and demonstration was left to extension workers in the country. Demonstra-

tion of the technology was mostly at the end of the research process. Agricultural researchers spent most of their time on technology generation which did not involve either farmers or extension experts. Lack of technology demonstration during the research process inhibited farmers to learn from researchers how to identify their local problems and find their own solutions to bring innovation in agriculture.

Researchers left the work of agricultural technology demonstration to extension workers. Researchers did not have time to spend in the field to demonstrate the technology to farmers. Most of the time researchers spent their time in the office writing proposals or research papers for publications or generation of technologies. Once the technology was generated and packed, the rest of the demonstration and dissemination was left to extension workers for farmers' implementation. Extension agents did not show the technologies to farmers properly since they had other responsibilities from the government that created attention diffusion. Since the technology was not properly demonstrated to the beneficiaries of the technology, farmers did not trust the new technology and even resulted in failure of the technology. This lack of trust and confidence in the technology significantly reduced the willingness of farmers to participate in agricultural research to bring innovation in agriculture. The work of (Bayissa and Mansingh, 2015; Jones et al., 2015; Neef and Neubert, 2011; Cleveland and Soleri, 2007) confirm that demonstration of agricultural technology to farmers have strong impact on the use of technologies to bring change in their lives. Moreover, willingness of farmers to participate in agricultural research is highly affected their relationship with researchers and extension workers.

Weak documentation of agricultural research process

The research revealed that agricultural research institutions and universities did not have the culture of research process documentation. There were problems of getting data about what were done in the past regarding farmers problems that were identified, methods used for the identification of these problems, successful and unsuccessful technologies developed in the country, introduced technologies from abroad, challenges in adopting the different agricultural technologies, farmers need from researchers, farmers best practices in specific areas, farmers attitude for research and researchers. Lack of documenting about the whole research processes resulted in lack of the right information about research in the country. Little or lack of sufficient information about the research process was challenging for junior researchers both in

research institutes and universities. This problem caused repeating research in a given areas that was failed before because of lack of sufficient information about what was done in the past. Repeating failed technologies with pervious farmers significantly reduced the willingness of farmers to participate in agricultural research. This issue inhibited innovation in Ethiopian agriculture. Conferring to the works of (Bayissa and Mansingh, 2015; Bill and Gates Foundation, 2010; Belay, 2008) that lack of proper documentation of research process can result in repeating the research that is done in the past and result in wastage of resources. Moreover, it creates gap between the different stakeholders engaged in the development of agriculture. It also affects farmers' participation in agricultural research reducing their willingness to get involved to bring innovation in agriculture.

Weak integration of scientific and indigenous knowledge

The research findings indicated that the integration of local knowledge with scientific knowledge was weak. Farmers were using indigenous knowledge that they learnt from their grandfathers whereas researchers were using scientific knowledge that they obtained from schools and research. Most of the researchers in the study areas were adhered to the formal scientific knowledge to generate agricultural technologies despite farmers' use of the local knowledge to lead their live. Researchers did not have the perception that local knowledge solves local problems. Farmers greatly depended on their indigenous knowledge since they knew practically the success and failures of their agricultural practices. Farmers trusted their indigenous knowledge because of the fact that they had experiences throughout their lives.

There was difference in world views about the position of farmers' local knowledge and researchers' scientific knowledge to solve farmers' problems. This difference in perspectives among the different stakeholders involved in the development of the country negatively affected the use of this knowledge to solve the problems of farmers to bring food security. This indicated that there were no or little efforts to integrate local knowledge with scientific knowledge for productive purposes that could alleviate the problems of marginalized and poor farmers. This problems critically affected farmers' willingness to actively participate in agricultural process to bring change in their lives for the fulfilment of the basic needs they need for their family. Different studies (Ellen and Harris, 2000; Cleveland and Soleri, 2007) indicate that the use of farmers' local knowledge in research critically affects farmers' participation in agricultural

research. Moreover, the perception of researchers for indigenous knowledge affects their decision to either include or exclude farmers in the research process. Some researchers think that farmers' knowledge has no potential to solve farmers' problems and hence it is not as such important to integrate with the scientific knowledge. This view of researcher's affects farmers' willingness to engage in agricultural research.

Top - down designing of research plans and objectives

The research discovered that research objectives and plans were designed in the top-bottom approach. Most of the time farmers were not involved or consulted about the objectives and plans of the research process. The research process came from researchers to farmers for implementation without even having any information about what was going on. Moreover, research objectives and plans came from other countries that were designed under different context. In this type of research, researchers and agricultural offices were asked for implementation of the research process and technologies without knowing under which circumstances these technologies were suitable and successful. Since researchers and farmers were not involved in the generation of the technologies, they showed little interest in the diffusion and implementation of the technologies. This type of bringing technologies from top-down through politicians reduced the efforts of researchers and extension workers to put their maximum potential for the success of the technologies and resulted in failure under farmers' condition. This failure of technologies under farmers' circumstance reduced the willingness of farmers to work in agricultural research to bring innovation for the betterment of their lives. Some of the politicians who were at the top gave order to researchers for implementing the technology for adoption without knowing the specific conditions under farmers' field. In fact these people at the top had great ambition to bring development and change in the country but other stakeholders did not have common vision to bring agricultural growth and development. Research designs that depend on top-down approach are not sustainable to bring development in agriculture. Moreover, top-down research plans does not involve the beneficiaries at the grassroots level to bring innovation and social learning (Bayissa, 2015; Woodhill et al., 2011; Klerkx, L. and N. Aarts, 2010; Jones et al., 2015).

Problem of selecting potential areas for research

The research shown that agricultural researchers in the study areas looked the research areas for conducting research whether it had the potential to give positive responses or not. Agricultural researchers had the mentality to see success from their research and selected the potential areas for their research. This type of perspectives among researchers on selecting potential research areas including rich farmers and fertile soil created differences on the beneficiaries of the technologies and on who were going to participate in the research process.

Poor farmers were not selected since they did not have the resources to use the agricultural technologies to bring innovation in their agriculture. The technologies developed on potential areas by researchers gave good results since the areas had the potential to give good results. However, when the technologies were taken to the areas having poor potential, the technologies showed failure under poor farmers' condition. The philosophy behind selecting potential areas for research was to get maximum yield with minimum efforts and resources to bring dramatic change in the country. Moreover, these great achievements on the potential areas could bring initiation on other researchers and farmers to conduct and use the generated technologies. This also helped politicians for propaganda. This type of potential area selection created wide gap between the majority of poor and marginalized farmers and researchers since agricultural researchers were selected a few rich and educated farmers from the majority of poor farmers. These problems significantly reduced the willingness of poor farmers to participate in agricultural research to bring innovation in agriculture. Empirical evidences (Pound et al., 2003; Neef, 2005; Hellin, et al., 2008) show that selecting potential resources for research including rich and educated farmers, rich regions, and fertile soils have great influences on farmers especially poor and marginalized ones engagement in agricultural research process to bring innovation for the betterment of their lives. If the research is not responsive to the need of poor and marginalized farmers, it critically affects the willingness of farmers to participate in agricultural research.

Perception of farmers' for researchers

The study exhibited that farmers in the study areas have had their own agricultural experiences which they obtained from their fathers and grandfathers over long period of time. Farmers used this indigenous knowledge to solve their own agricultural problems. Farmers in the study areas have had practical skills that helped them to solve the problems that were common in their agriculture and lives. Farmers evaluated agricultural new technologies that were

generated in research in relation to the practical applicability on the technologies under their own field circumstances. Farmers saw researchers' knowledge and skills in terms of the real world practicality in solving agricultural problems. Farmers perceived agricultural researchers as someone who did not like to make their hands dirty, teachers who talked things in theory and people who did not have value for farmers' local knowledge and had less interest to hear farmers' views. Farmers looked agricultural researchers as bosses and fear to work with them. These all perceptions critically affect the willingness of farmers to participate in agricultural research and hindered innovation in agriculture to bring food security. The research result affirmed that farmers see the behaviour of researchers, label their social rank and use these statuses to participate in agricultural research. Farmers perceive agricultural researchers as ignorant outsiders, teachers who need to instruct them, and facilitators for a continuous and mutual learning. These attitudes have a strong bearing on the engagement of farmers in research process to bring innovation in agriculture. These perceptions are most powerful for the success or failure of agricultural research and fundamentally affect the willingness of farmers to participate in agricultural research (Bayissa, 2015; Abate et al., 2011; Nxumalo and Oladele, 2013; Klerkx, L. and N. Aarts, 2010; Neef and Neubert, 2011).

Improper prioritization of farmers' problem

Many different research findings indicated that Ethiopia has various agro-ecological zones that are suitable for various types of animals and plants. The existence of different zones demanded the need to prioritize farmers' problems for different recommendations. Researchers tried to apply the same recommendations to different agro-ecological zones and this created failures of agricultural technologies under farmers' condition. This failure of agricultural technologies emanated from lack of proper prioritization of farmers need to solve their problems besides lack of considering the different agro ecological zones that are suitable to the needs of farmers problems. Agricultural researchers did not engage farmers in problem identification before they start the research problems and prioritization of the identified problems. Since researchers did not involve the beneficiaries of the technologies in problem identification, it created problems in prioritizing the problems to conduct demand driven research in the country. What researchers rank as a first priority for research was not the actual problems to be first solved by the research for farmers from farmers' point of view. This improper prioritization of farmers' problem crit-

ically affected the willingness of farmers to engage themselves in agricultural research to bring development in agriculture. The study revealed that both the government and researchers gave due attention and much time to identifying problems that was not relevant to poor farmers need than working on finding practical solutions to uproot the main cause of the problems to the prevailing problems in the country. This was because of lack of identifying the root causes of the problems by participating farmers during problem identification and prioritization in the research process.

Most of the time researchers gave recommendations than practical solutions for farmers. At the end of the research, the new technology was shelved since the technology was not prioritized from farmers' perspectives and demand driven. Problems of lack of prioritizing farmers' problems and conducting research to solve farmers' problems significantly reduced the willingness of farmers to participate in agricultural research to bring innovation. Most of the topics identified for research were not farmers' priority areas. Improper prioritization of research problems led to generation of technologies that was irrelevant to farmers need under their circumstances. This greatly affected farmers' engagement in agricultural research to bring agricultural development. According to the works of (Bayissa, 2015; Iqbal, 2007; Douglass and Sicilima, 1997; Neef and Neubert, 2011) that top-down research approach excludes farmers' participation from mutually identifying research problems and prioritization of the farmers' problems to develop relevant technologies that solve farmers' problems. Improper prioritization of research problems hinders farmers' willingness to participate in agricultural research process since the research is not demand driven.

Farmers' outlook for research

Farmers in the study areas were using the traditional way of rearing of animals and farming that they learnt throughout their lives from their experiences. From farmer's perspectives, research process was the work of educated people. Farmers perceived research as a complex, difficult and the work was left to people who had western mentalities. Farmers perceived that their involvement in research process had little value since they thought that they could not contribute anything in the research process for the development of agricultural technologies. Even most of the farmers did not know the language of the research. Researchers used foreign languages in the research. Moreover, farmers perceived that they did not have the formal scientific knowledge to work in agricultural research. These problems hinder farmers' will-

ingness to participate in agricultural research to bring innovation in agriculture. Different research findings (Bayissa and Mansingh, 2015; Klerkx, L. and N. Aarts, 2010; Neef, 2005; Hellin, et al., 2008; Ellen and Harris, 2000; Wigboldus et al., 2011) confirm that farmers' perception for research critically affects their engagement in agricultural research to bring innovation. Most of the research is not perceived as relevant to their local problems. Farmers have the willingness to participate in agricultural research when they believe that the research process bring an improved profitability in agriculture. Farmers engage themselves in research if there is a problem that they want to solve to bring solutions to their prevailing problems under their conditions.

Conclusion and Recommendations

The research findings revealed that the willingness of farmers was affected by a number of factors. These willingness hindering factors included research types, plans, and objectives; perception of farmers for research and researchers; improper prioritization of farmers problems; poor documentation of research process; problems of selecting potential areas of research; lack of good experiences in the past; absence of proper technology demonstration to farmers during the research process; and weak integration of indigenous and scientific knowledge in agricultural research in the country.

From the research findings it was concluded that most of the research that was being conducted in the areas of agriculture was not actively participating farmers in the research process. As a result, most of the technologies generated were irrelevant to farmers need. Farmers were not involved in the research design. Research objectives and plans were designed using the top-bottom approach. This type of research design forced farmers to have negative attitude for the research and researchers in the country. Since researchers did not engage farmers in research problems identification, there were problems of prioritizing the problems identified to develop technologies that were relevant to farmers need. The research has also shown that researchers used potential resources (rich and educated farmers, fertile soil, villages near towns having access to road and electricity, etc.) to conduct their research to get positive responses. However, when the technologies were released to the areas having poor resources like infertile soil; poor and marginalized farmers it showed failure because of the attempt to recommend a given technologies to different circumstances that was different in every aspects. This failure of technologies made farmers

not to have trust to use the technologies to bring innovation.

Moreover, farmers had little opportunity to see what was actually done in the research during the research process. Researchers' did not demonstrate agricultural technologies while they were developing it. Demonstration of technologies was left to extension workers after developing it which was even happen in a rare cases. Even the knowledge institutes had no experiences of documenting the whole research process that help other researchers not to repeat at least the failed research topics in the same manner in the same environment. In the country there was weak integration of local knowledge with the scientific knowledge to bring innovation in Ethiopian agriculture. This showed that researchers had little value for indigenous knowledge to use as a tool to solve farmers' problems through the generation of technologies' that was relevant to farmer's needs. These all hindered the willingness of farmers to actively participate in agricultural research to bring innovation in agriculture which is the base for achieving food security for the whole society in general and for the poor and marginalized farmers in particular.

As the conclusion is not enough for the country rural and agricultural development, the following recommendations are given to help policy makers, public authorities and researchers to make use of the results in agricultural development. The government has to take some remedial actions that can help the poor and marginalized farmers through effective and practical based training of development agents to help farmers in establishing demonstrative sites and farmers training centres, technology dissemination, organizing and mobilizing farmers to wisely use and conserve natural resources and giving incentives to extension workers. Moreover, researchers should actively engage farmers in agricultural research process starting from research planning to empowerment to enable them to identify their problems and find solutions for the problems. Researchers are expected to know why farmers are not actively engaging themselves in the research. Furthermore, farmers should get the benefit for their sweat from agricultural works. The result of this research gives the following implications in Ethiopian agriculture. Farmers' participation in agriculture is critically important to bring innovation in agriculture. Since the linkage of researchers with farmers is weak, innovation in agriculture was, is and will be weak unless farmers are encouraged to actively participate in agriculture. Farmers have to be seen as development partners in agricultural development. This will enhance integration of researchers' knowledge with farmers' knowledge for the development and use of agricultural technologies that is relevant to farmers need.

This will help the country to bring national food security for the poor and marginalized farmers.

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