Original Research Article

INVESTIGATING FACTORS HINDERING FARMERS' PARTICIPATION AND LOOK FOR AGRICULTURAL DEVELOPMENT AND FOOD SECURITY IN ETHIOPIA

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ABSTRACT

Agriculture is one of the key drivers of Ethiopia's long-term development and food security. It supports 85% of the total population, constitutes 43% of GDP and 80% of export value. For the country to reach middle-income prestige by 2025 and make significant inroads against food insecurity, strategic choices and concerted and strategic investments in agricultural sector are vigorous. The government of Ethiopia has put maximum efforts to increase agricultural output. However, increments in agricultural production and productivity, the expected benefits, have not been achieved yet. Low agricultural production and productivity is the major cause of food insecurity in the country emanating from lack of suitable technologies for beneficiaries, low adoption of agricultural innovations, and lack of active participation of farmers in agricultural research. Therefore, this study examines critical factors that hinder farmers' participation in agricultural research in Ethiopia. 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 semi-structured interviews, focus group discussions and observations and analysed descriptively. The empirical results reveal that lack of sufficient time, bad experiences in the past, perception of farmers' for researchers, farmer's attitude for research, the type of research, lack of stakeholder's willingness to learn from one another, loose integration of indigenous and scientific knowledge and insignificant change of new technologies to material wealth critically hindered farmer's participation in agricultural research to bring innovation in agriculture. Innovation in agriculture comes from the interaction of the different actors that are working in agriculture since each actor brings their own knowledge and results in social learning. Insignificant innovation in agricultural research results in food insecurity in the country.

Keywords*: Agricultural Research Agricultural Innovation; Farmer; Food Security; Participation.*

1. INTRODUCTION

Agriculture is one of the key drivers of Ethiopia's long-term development and food security. It supports 85% of the total population, constitutes 43% of GDP and 80% of export value. For the country to reach middle-income prestige by 2025 and make significant inroads against food insecurity, strategic choices and concerted and strategic investments in agricultural sector are vigorous. More than 90% of agricultural production is driven by smallholder farmers in the country. Given forecast of population growth, without expanding cultivated land, the average size of land per farmer in highland areas will be reduced to 0.7hectares by 2020 bringing additional pressure on food security in the rural areas. Livestock and crop productivity, based on county comparisons, although improving, still remains by far below the potential. The agricultural growth domestic product per hectare of the cultivated land is half of Morocco or Kenya. In 2007, the figure was USD 1,150 per hectare for Morocco, USD 1, 190

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per hectare for Kenya, and 587 per hectare for Ethiopia. Modelling the inferences of projection of population growth, if Ethiopia remains on its present productivity path, food insecurity would climb to over 50 million people reducing growth domestic product per farming household by 20% by 2020(1).

In Ethiopia, the agricultural sector has the highest potential for improving the livelihood of the society. A considerable increase in agricultural produce and output is anticipated to be recognized by instigating interventions intended at speeding-up the adoption and assimilation of improved agricultural technologies and management practices. Still the country needs to adopt innovative and modern strategies to agricultural knowledge creation, dissemination and use. These require the engagement of farmers' in agricultural research for agricultural innovation and knowledge creation. Sources of agricultural knowledge include indigenous knowledge and scientific research. After the sourcing, creation or accumulation of knowledge through the engagement of farmers' in the research processes, the knowledge has to be disseminated to other stakeholders to support innovation process in agricultural innovation to bring development and food security in the country(2).

Most agricultural research projects fail for the reason that when research projects are planned, local people or farmers, culture, and socio-economic features are not considered that lead to outside agents not being able to create and recommend suitable technologies that are well-suited with the beneficiaries (3). Failure and poor adoption of agricultural research projects are results of lack of active participation of farmers in all phases of the research projects. Farmers are not given chances to actively engage themselves in all decisions that affect their lives directly (4). Experts and government officials support the idea of farmers' participation in agricultural research in philosophies, however practically there is no common consensus. Involving local knowledge or target group has limitations such as solutions that are based on limited technical knowledge, limited scientific understanding of processes and dissemination of results may be limited to specific socio-economic or gender groups (5). The use of top-down approach is one of the key factors resulting in failure of agricultural research projects. The approach constructs on farmers' experiences instead of building farmers capabilities and promoting empowerment (6).

Development works which employ the top-bottom strategy with insignificant input and engagement of farmers have long been known as an unsustainable and poor pathway to farmers' development and empowerment (7)**.** Bottom-up strategies that view farmers as partners, use local experiences and make an effort to empower farmers have been encouraged in the past decades. Farmers' participation in agricultural research recognizes the significant role farmers' play in the failure or success of an agricultural research project. It distinguishes farmers' engagement in identifying farming problems as well as solutions for sustainable agricultural development. The bottom-up approach has shifted from instructing beneficiaries to coaching and collaborating farmers to identify and solve local agricultural restraints (8, 9).

Participatory Technology Development (PTD) is one of the key arenas for social learning and helps stakeholders to contribute their share in the innovation system. Participatory technology development has different types of participation hierarchy in research especially in agriculture. These are nominal (farmers' labour and land are used), consultative (farmers' opinions are required), action-oriented (farmers are engaged in implementing portions of the research), decision-making (farmers take part in decision making processes) and collegial participation (research strengthen farmers' own research). In PTD, participation has seven grades of participation. These are positivist theoretical research (the least inclusive type of approaches), passive information sharing (farmers are informed of the processes and outcomes of the research), consultative stage (farmers are consulted and their needs may be included in the research design), on-farm testing (researchers continue to dominate the research processes but farmers' expertise is recognized), evaluation (farmers are involved in assessing the process and results of the research), collaborative planning (scientists join hands with farmers in defining problems and in designing the research process), and partnership (farmers and scientists engage in a long term mutual learning and research process). Both of these typologies are

linear and they have the shortcoming that does not reflect the diversity and dynamics of agricultural research. Stakeholder participation in agricultural research should take into account the dynamic and complexity of agricultural research processes and diversity of stakeholder engagement in various research contexts. Stakeholders' participation in research has to be from the planning phase to the evaluation phase (10).

BENEFITS OF FARMER'S PARTICIPATION IN AGRICULTURAL RESEARCH

Farmer's participation in agricultural research has a number of benefits including the development of agricultural technologies that brings improvement in the lives of farmers. " Success is often not found in the agricultural technology alone, but rather in its grounding in and building of human and social capital- confidence, knowledge, networks, and capacity-which then allow technologies to have full effect on livelihoods" (11). Farmer's participation in agricultural research enables them to acquire the following basic benefits that bring innovation in agriculture.

1. INNOVATIONS AND IMPROVED PRACTICES

The basic attention of development-oriented agricultural research is the development of institutional and technical innovations and improved practices (12). Traditional agricultural research projects may deliver "turnkey" elucidations that can be seen on demonstration farms. In these circumstances farmers merely have the choice to reject or adopt the innovations, without the opportunity to adapting the technology to their explicit farming system. The research would requisite to come up with a "basket of choices" from which the beneficiaries can choice the solution that best suit to their conditions (13).

2. CREATION OF AWARENESS AND KNOWLEDGE

Increased awareness and knowledge among the different stakeholders can be a key result of agricultural research project. They are frequently called to as "disembodied" things as they are not an essential part of institutional or technical innovation (11). These effects can cover a wide range from knowledge on a commodity or specific theme to awareness of underlying relationships in agro systems to knowledge on how value chains or whole systems function. Agricultural research may enhance farmers' awareness about the negative or positive effects some practices have on the ecological amenities of a watershed on downstream residents. Farmers' participation in agricultural research enables them to blend their indigenous knowledge with "expert" scientific knowledge in a synergic or complementary way (14). It is recognized that researchers and farmers have diverse comparative benefits in creating knowledge. For example, Maori farmers from New Zealand, in a research project, were insisting that their own traditional knowledge - obtained through long term experience and passed down through elders would be merged with researchers' technical knowledge rather than being by it (15).

3. DEVELOPMENT OF SKILLS

Farmers' skills can improve significantly through their engagement in agricultural research. These contain technical and diagnostic skills obtained through the application of water saving irrigation scheme. Organizational or managerial skills are often learned through participation. Farmer's participation in agricultural research improves problem solving capacities and experimental skills of farmers in agricultural innovation (16).

4. SOCIAL CAPITAL DEVELOPMENT AND EMPOWERMENT

Today most specialists in agricultural research give due attention to a functional role of participation (17), even though the question of power relationships in participatory strategies is still of significant relevance, especially when the research emphases on marginalized groups specially the poor. Engaging farmers in agricultural research regularly has an influence on social capital formation. For example, the potential for joint action between partaking stakeholders can be increased in the development of the research process (18).

5. ENHANCEMENT OF LIVELIHOODS

Farmer's participation in agricultural research project increases resilience of the resident livelihoods to outside shocks and improve the capability of local institutions and stakeholders to adapt to altering circumstances (19).

Low performance of agriculture does not only threaten livelihood but it also accelerates environmental degradation, affects production capacity of natural resources bases and fails to address malnutrition and poverty(20). In order to increase the performance of agricultural sector, different programmes are introduced by different countries. This includes rural development, food security and farmers participation in agricultural research. Participation and empowerment are the most critical issues in development programs. Participation is the engagement of marginalized groups in development operations that intend to build peoples abilities to control and access of resources, opportunities and benefits towards self-reliance and to better standard of living. Farmer's participation plays a critical role in poverty alleviation and economic development. Lack of farmers' participation in decision making to use or implement agricultural policies could lead to failure in agricultural development (21). Active participation of farmers in agricultural research is hindered by people's lack of skills, knowledge, capital, knowledge, ignorance, shortage of incentives to those who participate and lack of capable organization (22).The critical relationship between farmer's engagement in agricultural research projects on one hand, and poverty alleviation and economic development on the other hand, cannot be over emphasized. Without participation there is no program and without program there is no development (23). Without farmers' active participation in agricultural research projects, there would be little success to bring food security and development.

The government of Ethiopia has put maximum efforts to increase agricultural output. However, increments in agricultural production and productivity, the expected benefits, have not been achieved yet. Low agricultural production and productivity is the major cause of food insecurity in the country emanating from lack of suitable technologies for beneficiaries, low adoption of agricultural innovations, and lack of active participation of farmers in agricultural research (24, 25).

Therefore, the objective of this study was to investigate critical factors hindering farmers' participation 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 farmer's in agricultural research with the aim to solve practical problems at grassroots levels in agricultural innovation in the country. Agricultural Innovation System (AIS) was used as a theoretical framework to guide this research.

2. 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 underling 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. In qualitative research the sample size for the interview depends on the aim of the research. Most qualitative research uses purposive sampling which is explicitly selecting interviewees who it is intended will generate appropriate data. It is to contain information rich cases for in-depth study. Purposive sample sizes are often determined on the bases of theoretical saturation (the point in data collection when new data no longer bring additional insights to the research questions). Purposive sampling is therefore the most successful when data review and analysis are done in conjunction with data collection. Snowball sampling (known as chain referral sampling) is a type of purposive sampling in which informants with whom contact has already been

made use their social networks to refer the researcher to the people who could potentially participate in or contribute to the study.

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. 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. Interviews were fully transcribed and coded applying principles of grounded theory (26, 27). Also, observation at meetings took place in the role of observer-as-participant (28), in which the researcher relates to and is known to the subjects under study as a researcher. Several documents such as meeting minutes, policy documents and internal evaluations were analysed. Triangulation between different data sources took place to ensure validity (29).

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 on-going 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. A better criterion is what has been called sociological significance (26, 27).

3. RESULTS AND DISCUSSION

Ethiopia is one of the countries that is not yet achieved food security at household levels. Most of the mass of the marginalized and poor farmers are struggling to secure their basic needs for their family on daily bases. For the country, more than any programs, granting food security at household level is one of the most urgent programs to be achieved. To achieve this food security program, a number of urgent actions have to be implemented. The urgent actions needed to let the different programs to run effectively and to get the confidence of farmers in the study areas were many and diverse. Conducting research that is relevant to farmers need by participating them in agricultural research, integrating the use of indigenous knowledge with scientific knowledge in agricultural technology development by engaging farmers in agricultural research process, changing the attitude of researchers from negative to positive for farmers and engaging farmers in decision making that matters in their life are some of the most urgent actions need to let the food security program to run effectively and helps to get the confidence of farmers in agricultural research and development in the country. Having positive attitude for farmers can be achieved by a number of factors. Researchers have to go and work alongside farmers in their farms practically by identifying their problems. By doing these important activities, researchers can win the trust of farmers.

Farmers in the country are engaged both in rearing of animals and production of plants. Knowledge institutes were involved in the production of skilled manpower besides the production of technologies

that solve problems of farmers to bring food security in the country. Both knowledge institutes and farmers were needed to work together to create and develop knowledge that is relevant to the needs of the different stakeholders that are working in the development of the country. Researchers in the study areas conducted agricultural research that had little room for farmers' participation mostly for publication. The relationship between farmers and researchers were not closer and stronger because of lack of active participation of farmers in agricultural research to bring innovation in Ethiopian agriculture to bring food security for the marginalized and poor farmers. In principle the joint-venture of farmers and researchers is sharing the common vision to bring development in the country by conducting demand-driven and problem solving research by integrating the indigenous and scientific knowledge that both actors have in agriculture to bring innovation in agriculture. However, due to lack of farmers' active participation in agricultural research to bring innovation, food security is not yet achieved in the country. Instead of conducting demand-driven and problem solving research, researchers were conducting research that had no or little practical application in the lives of farmers. Lack of active farmers' participation in agricultural research limited innovation in Ethiopian agriculture and this hammered food security in the country.

The great actions of the government to help farmers are like training development workers to help farmers in technology dissemination, establishing farmers training centres, mobilizing farmers to conserve natural resources, assigning extension workers to village to live and work with farmers, investing money in research to conduct research to alleviate farmers problems, and establishing social services like clinics, clean water, roads, telecommunication facilities, and schools for farmers are among many. However, the desired results in terms of bringing radical change to feed the every rocketing mouth of individuals were not achieved yet.

Hence, the research findings revealed a number of critical factors that hindered farmers' participation in agricultural research to bring innovation in agriculture. Innovation in agriculture is a base for food security. These farmers' engagement inhibiting factors are presented and discussed as follows briefly.

3.1 KIND OF RESEARCH

Some of the researchers in the study area conducted basic research that had no room for farmer's participation. Researchers used the conventional research strategy that was based on identification of problems from others research recommendations and literatures. This type of problem identification for research from literatures resulted in conducting research that had less relevance to farmers need. Once the technology was developed, farmers were asked or forced to use the technologies that were not relevant to their specific agro-ecological condition and their problems. This researcher oriented research topic development hindered farmers engagement in the research process. Researchers did not regularly develop research topics that were applied in type. Researchers mostly focused on basic research that did not have room for farmer's participation in the research process to bring impact on farmers live. Even when the research was of applied type, there was a problem of conducting the research on farmer's farm to participate farmers in the whole research process. Researchers conduct research on-station that excluded farmers from participating in the whole research process. This type of research that was not applied under farmer's condition hindered farmers from participating in the agricultural process and inhibited innovation in agriculture to bring food security. Empirical studies (10, 11, 12, 14) reveal that participatory approaches are basically realistic in adaptive and applied stages of agricultural research. Basic research i.e. theoretical or experimental research intended at obtaining knowledge for comprehending of some phenomena without any specific use of the research in view - seems to have less potential for implementing a participatory method. Hence, it hinders farmer's participation in research to bring innovation in agricultural research to bring food security.

3.2 PERCEPTION OF FARMERS' FOR RESEARCHERS

Farmers in the study areas have had their own agricultural experiences which they inherited from their ancestors. They have their own indigenous knowledge to solve their own agricultural problems.

Farmers have practical skills that helped them to solve the problems that were common in their agriculture. Farmers evaluated technologies that were developed in research in relation to the practical applicability of the technologies under their own field conditions. Farmers valued researcher's knowledge and skills in terms of the real-world applicability in solving their problems. Farmers perceived researchers as white-collars who did not want to make their hands dirty, teachers who talked mostly things in theory, and people who ignore farmer's indigenous knowledge and have less interest to hear farmer's ideas. Farmers looked researchers as bosses and fear to work with them. Researchers were not working with farmers in a friendly and collegial manner. These all perceptions and factors hindered farmer's participation in agricultural research and inhibited innovation in agriculture in the country. The research findings affirmed that farmers observe the behaviour of researchers, label their social status and use this in their engagement in the research process. Farmers may see researchers as teachers who need to instruct them, ignorant outsiders, facilitators of a mutual and continuous learning process and experts who provide them support. These perceptions will always have a strong bearing on the participation of farmers in research process to work with researchers. These perceptions are most critical factors for the failure or success of research and are critically hinder farmer's participation in agricultural research (10, 18, 19).

3.3 FARMERS' OUTLOOK FOR RESEARCH

Farmers in the study areas were adapted to the use of the traditional way of farming and rearing of animals that they learnt from their fathers and grand-fathers. For farmers in the study areas, research activities were the western way of farming that they looked the work as a difficult and complex activity to perform. For them, agricultural research was a special type of agricultural work that was performed by educated people. Farmers thought that their engagement in research had no value because they could not contribute anything in the research process. They thought that they did not know about scientific knowledge and they did not have western mentality. Famers did not believe that research solve their problems in agriculture. These types of perceptions for research critically hindered farmer's participation in agricultural research and limited innovation in Ethiopian agriculture. According to the works of (10, 19) that farmers perceive not all research projects whether conventional, participatory or a combination of both as relevant to their local problems. Farmers participate in agricultural research when they believe an improved profitability of their cropping system. Farmers are willing to participate in research if there is a problem that they want to solve and if they think that they can impact the research process.

3.4 LACK OF GOOD EXPERIENCES IN THE PAST

Most of the farmers in the research areas had bad experiences in the past in relation to the use of technologies produced through research. Farmers were told that the use of new agricultural technologies would double or triple their agricultural outputs. Farmers were given false promise from extension workers and government agents about the success of agricultural technologies. In contrary, the yield of agricultural outputs did not double or triple because of the use of new agricultural technologies. Farmers sold their cattle to purchase the agricultural inputs with the assumption that the yield could double. However, farmers did not get the yield to cover their expense and their field were failed and they suffered from lack of good return from the use of agricultural technologies. Inappropriate technologies were also given to farmers for adoption. These technologies which were not appropriate to the given agro ecological zones failed and farmers concluded that new technologies were not working under their farm condition. This emanated from lack of considering the local problems before the introduction of the new technologies. Failures of technologies had risk on farmers live and they feared risk since there was no insurance for the failure of the technology. Because of the failure of technologies and fear of risk, farmers needed to adhere to the practice that they had used for many years. These factors hindered farmer's to participate in agricultural research to bring innovation in agriculture. The research findings confirm that farmers have numerous experiences with research projects. Farmers experiences show that a situation where farmers have become tried of passionate experts who come with toolkits of participatory approach just as they had

become investigation weary in earlier years. If earlier research projects fail to provide, farmers are likely to approach the new research with a great deal of reserve and scepticism (10).

3.5 INSUFFICIENT TIME

The research revealed that farmers were involved in different activities besides agricultural works in their life. They spent most of their time on social affairs, agricultural routine activities and family matters. Since most of the farmers were poor, they engaged themselves in different routine activities to support their family. Farmer's involvement in different activities to get their basic needs hindered farmer's engagement in agricultural research. According to the works of (10, 15, 18) that participatory agricultural research needs a major commitment on the parts of farmers in terms of time. But farmer's opportunity costs of time are frequently undervalued by researchers engaged in participatory agricultural research method. Agricultural researchers need to be aware of that "time is a precious commodity not only for scientists but also for farmers". Poor farmers are basically concerned with meeting their basic requirements and could not have time to become involved in research works.

3.6 WEAK INTEGRATION OF INDIGENOUS AND SCIENTIFIC KNOWLEDGE

Lack of indigenous and scientific knowledge integration was one of the problems revealed by the research. Most of the researcher's did not have the interest to hear to farmers ideas. These type of mentality inhibited researchers to effectively use knowledge of farmers in their research. Most of the time researchers' needed farmers to use their labour, land and time but not their indigenous knowledge. Most of agricultural researchers were adhered to the scientific knowledge to develop new agricultural technologies to bring food security. However, farmers have used the local knowledge to lead their life and highly dependent on their indigenous knowledge. Researchers were not in a position to integrate the local knowledge with the scientific knowledge to bring innovation in agriculture in the county. Researchers thought that indigenous knowledge has no capacity to solve the problems of farmers in agriculture. Farmers had great suspect on the scientific knowledge and believed that it did not bring significant solution to their existing problems in their lives. The research also showed that researchers did not have the experiences of integrating scientific knowledge with the indigenous knowledge. Problem of weakness in integrating these important types of knowledge created gap between farmers and researchers and hindered farmer's participation in agricultural research to bring innovation in agriculture. Empirical studies (3, 4, 6) show that most agricultural technologies fail due to lack of indigenous knowledge integration with scientific knowledge in agricultural research process. Moreover, the research does not consider the role of local knowledge in alleviating food security. Researchers try to recommend technologies that seem suitable to a different context without considering farmers, their culture and the socio-economic features of the environment. Lack of integrating farmer's knowledge with scientific knowledge is a common problem across most developing countries and resulted in food insecurity.

3.7 UNWILLINGNESS TO LEARN FROM ONE ANOTHER

The study exposed that the different stakeholders engaged in agricultural development were not ready and willing to learn from one another. Due to their low academic status, farmers were not ready to learn from researchers as well as other farmers. Even there was a problem of knowledge and experience sharing among researchers. Junior researchers did not have the willingness and interest to learn from experienced agricultural researchers. Moreover, senior researchers did not have the interest to share their experiences to junior researchers. Lack of readiness and willingness among farmers, researchers and other stakeholders in agricultural sector inhibited skill development, empowerment and social capital formation that are the key to bring innovation and development in agriculture. This problems hindered farmer's engagement in agricultural research. Most agricultural researchers give due attention to the functional role of participation ignoring skills development, social capital formation and empowerment which can be obtained from social learning (16, 17, 18).

3.8 INSIGNIFICANT CHANGE OF NEW TECHNOLOGIES TO MATERIALS WEALTH

Farmers in the study area told that the new agricultural technologies were not capable of bringing material wealth in their life. Users of the new technology needed the material benefits in terms of money or other materials that would bring change in their life but it was not bring change in the life of farmers. These were due to the use of technologies that was irrelevant to farmer's condition. Researchers mostly spent their time on conducting research that was not demand driven and problem solving. These type of technologies that were not problem solving did not bring material wealth for farmers. Since farmers were not getting material wealth from the technologies, they did not have the interest to participate in agricultural research. According to (19) farmers engagement in agricultural research increases if the technologies produced can bring material wealth and increases resilience of the farmers livelihoods to external shocks and improve the capability of farmers and their local institutions to adapt to changing conditions.

4. CONCLUSION

Based on the above empirical results, farmers' participation in agricultural research is critically hindered by lack of sufficient time from the farmers' side. For farmers' time is critically a limiting factor since they engage themselves in different activities to secure their basic needs. Even though, farmers have participated in agricultural research to a little degree, they do not have good experiences in the past. Some of the technologies were failed and this influenced farmers' participation in research. These bad experiences created in the mind of farmers' bad attitude both for research and researchers. Most of the researchers in the country conduct basic research that inhibited farmers' participation in research. This type of research does not have room for farmers' participation and hindered the readiness and willingness of both farmers and researchers to learn from one another. This unwillingness and lack of readiness to learn from one another created in poor integration of indigenous and scientific knowledge in research to bring innovation in agriculture. Lack of farmers' participation in agricultural research occasioned researchers' to conduct research that is irrelevant to farmers' need. These technologies that are not demand driven and irrelevant to the context of farmers brings insignificant change of the new technologies to material wealth. These all factors critically affect farmers' participation in research and inhibit innovation in agriculture. Innovation in agriculture comes from the interaction of the different actors that are working in agriculture since each actor brings their own knowledge and results in social learning. Insignificant innovation in agricultural research results in food insecurity in the country.

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