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**EXAMINING COMMUNICATION
PRACTICES IN THE PROCESS OF
DIFFUSION OF AGRICULTURAL
INNOVATION IN AMHARA REGION
AGRICULTURAL RESEARCH
INSTITUTE . MA THESIS HABTIE**

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BAHIR DAR UNIVERSITY
FACULTY OF HUMANITIES
DEPARTMENT OF JOURNALISM AND COMMUNICATIONS



**EXAMINING COMMUNICATION PRACTICES IN THE
PROCESS OF DIFFUSION OF AGRICULTURAL
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RESEARCH INSTITUTE**

MA THESIS
HABTIE ADERAJEW
JUNE, 2020

Bahir Dar University
Bahir Dar

**Examining Communication Practices In The Process of Diffusion of
Agricultural Innovation in Amhara Region Agricultural Research
Institute: The Case of Adit and Andasa Research Centers**

**A Thesis Submitted to the Department of Journalism and Communi-
-cation in Partial Fulfillment of the Requirements for the Degree of
Masters of Art in Media and Communication**

By

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June, 2020

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This is to certify that the thesis prepared by Habtie Aderajew entitled: examine the communication practice in the process of diffusion of agricultural innovation in Amhara Region Agricultural Research Institution; The case of Adit and Andasa Research Centers.and submitted in partial fulfillment of the requirement of the degree of Master of Art in Media and Communication complies with the regulation of the university and meets the accepted standards with respect to originality and quality.

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Declaration

I, Habtie Aderajew Zewdie declare that this thesis entitled, “Examining communication practice in the process of diffusion of agricultural innovation in Amhara Region Research Institute: The case of Adit and Andasa Research Centers” is my own original work. I have done it independently with the guidance and suggestions of the research advisor. It has not been presented in any other university, at least to my knowledge. All the source of materials used for the thesis has been duly acknowledged.

Researcher

Signature

Habtie Aderajew

Table of Contents

TABLES OF CONTENTS	PAGE
Declaration	II
Table of Contents	III
Acknowledgements	VI
ACRONYMS	VII
<i>Abstract</i>	VIII
CHAPTER ONE	1
1. Introduction	1
1.1 Background of the study	1
1.2 Back ground of Amhara Regional Agricultural Research Institute	4
1.3 Statement of the problem	4
1.4 Objective of the study	7
1.4.1 General objective of the study	7
1.4.2 The specific objectives are:	7
1.4.3 Specific research questions are:	7
1.5 Significance of the study	8
1.6 Scope of the study	8
1.7 Theoretical frame work of the study	9
1.8 Operational definitions	11
1.9 Organization of the paper	12
CHAPTER TWO	13
2. Related literature review of the study	13
2.1 Introduction	13
2.2 Development Communication	13

2.3	Interface (boundary) of Communication and Development	14
2.4	Diffusion of Innovations Theory	16
2.5	Main Elements in the Diffusion of Innovations.....	17
2.5.1	Innovation.....	17
2.5.2	Communication Channels	19
2.5.3	Time.....	20
2.5.4	A Social System	23
2.6	The participatory model	25
2.6.1	Typologies of Participation:	26
2.6.2	The Main Characteristics of the Participatory Model	27
2.7	Agricultural Knowledge and Information Systems (AKIS).....	28
CHAPTER THREE		30
3.	Research Methodology	30
3.1	Introduction.....	30
3.2	The Research Approach	30
3.3	The Research Design	30
3.4	Research Participants and Sampling.....	31
3.5	Data gathering tools	31
3.6	Data analysis technique and procedure.....	33
3.7	Ethical Consideration.....	34
4.	Presentation and interpretation of results	36
4.1	Introduction	36
4.2	Communication strategies for the diffusion of agricultural innovation in Amhara Region Agricultural Research Institute (ARARI)	36
4.3	The diffusion of agricultural innovation practice in Amhara Agricultural Research Institution by agricultural extension experts, researchers and communication officer.....	41

4.4	Farmers adoptability of by using modern agricultural technologies.....	44
4.5	The main factors to affects the communication practices in the diffusion of agricultural innovation in ARARI?	50
CHAPTER FIVE		53
5.	Conclusion and Recommendations	53
5.1	Conclusion	53
5.2	Recommendation	55
Refererences		57
Research questions -----		60-65

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ACRONYMS

ARARI: Amhara Region Agricultural Research Institute

AKIS: Agricultural Knowledge and Information System

AEE: Agricultural Extension Experts

AR: Agricultural Researchers

EIAR: Ethiopian Institute of Agricultural Research

ILRI: international Livestock Research Institute

FAO: Food and Agriculture Organization of the United Nations

FDRE: Federal Democratic Republic of Ethiopia

FGD: Focus Group Discussion

NGOs: Non-governmental Organizations

PR: Public Relation

Abstract

The research is designed to examine communication practice in the process of diffusion of innovation in Amhara Region Agricultural Research Institute. Hence, the study was examining communication practice in the process of diffusion of agricultural innovation in Amhara Region Agricultural Research Institute that how agricultural extension workers, researchers, and public relation experts created awareness and diffused the new agricultural technologies to benefit the farmers so as to use agricultural products or technologies. Thus, this qualitative case study design which is used in-depth interview, focus group discussion and document analysis. The study was framed based on diffusion model and participatory communication theory, as theoretical framework. The finding of this study clearly shows that there is a limitation communication practice in the diffusion of innovation in the diffusion of agricultural products and services. To guide the diffusion communication work, there is no defined and clear diffusion communication strategy, the approaches are traditional means and personal, and hence the communication intervention is made only for the sake of information dissemination. Additionally the Studies show that mass media is not well communicated or used in the institution for the diffusing of agricultural technologies for the creating of awareness knowledge to the farmers. This gap could make the sustainability of diffusion agricultural technologies under question. The root cause for sustainability problem may be different but regarding to diffusion communication practice, absence of communication strategy, shortage of agricultural extension experts, and access to mass media are the main problems in the institution. To improve such gap a defined diffusion communication strategy should be designed and implemented seriously. Also it recommended that clarifying the role of communication strategies and creating awareness about agricultural technologies is a key factor to strengthen and effectively use them. Although, the farmers, researchers, and extension experts are shared emphasizing the necessity of working together for the successful implementation of these communication strategies.

CHAPTER ONE

1. Introduction

1. Background of the study

Agriculture is an important part of Ethiopia's economy and is one of the pillars of most of the population of Ethiopia. . About 85 percent of the total population is expected to lead their lives in the country side involving with agriculture and agricultural industries. In line with this, different scholars put their views and conduct investigations regarding agriculture in Ethiopia.

Ethiopian agriculture is virtually small-scale, subsistence-oriented and crucially dependent on rainfall. About 90 percent of the country's agricultural output is generated by subsistence farmers who use traditional tools and farming practices (MoFED, 2006;Derconet *al.*, 2009). Low productivity characterizes Ethiopian agriculture. The average grain yield for various crops is only about one metric ton per hectare (Byerlee, Spielman and Alemu, 2007). The livestock sub-sector plays an important role in the Ethiopian economy. The majority of smallholder farms depend on animals for draught power, cultivation and transport of goods. The sub-sector makes also significant contribution to the food supply in terms of meat and dairy products and to export hides and skins which make up the second major export category. However, the productivity of the sub-sector has not been growing as a result of poor management systems, shortage of feed and inadequate health care services and poor communication methods (FDRE, 2010).

Despite the importance of agriculture in the national economy, food insecurity has been an enormous challenge to Ethiopia. In this connection, it is important to note that over the last three decades Ethiopian agriculture has been unable to produce sufficient quantities to feed the country's rapidly growing population. In recent years, commercial food import & food aid have been accounting for a significant proportion of the total food supply in the country (USAID, 2010; Cochrane, 2011; Lefort, 2011). Available evidence shows that yields of major crops under farmers' management are still far lower than what can be obtained under research managed plots (Abate, 2006; EIAR, 2007). In this regard, Ahmed, Kelemework and Abate (2006) noted that under Ethiopian conditions, the potential yields of improved varieties of haricot bean, durum

wheat, bread wheat, finger millet, and sorghum are 2.0, 3.5, 3.6, 2.8 and 2.4 metric tons per hectare, respectively. This is a clear indication of the gap which exists between researchers and farmers. The absence of effective linkage between agricultural research and extension systems has repeatedly been reported as one of the major reasons for the low productivity of Ethiopian agriculture. There had been no forum where this linkage problem had not been raised as a result of which it has become a concern among policy makers, researchers, development workers and funding organizations (Belay, 2003; Agricultural Research Task Force, 1996; Task Force on Agricultural Extension, 1994a, FDRE, 1999, Belay, Kassa and Dawit, Alemayehu, 2017). According to GerbaLeta (2018), smallholder agriculture forms the backbone of the Ethiopian economy, supporting about 85% of the country's population. Since the late 1960s, the state has been actively pursuing agricultural extension as a key means of agricultural and rural development as well as economic transformation. Over the years, the state has introduced several reforms to update and validate its agricultural extension agenda. However, despite reforms, the effectiveness of the extension service in promoting technology transfer and enhancing its adoption has remained low. Top down planning and poor technology transfers have been identified as the main bottlenecks. In 2010, as part of its recent reform process, the Ministry of Agriculture has adopted the participatory extension system, which is characterized by the formation of farmer groups. In this system, development agents and model farmers are assumed to be key actors in the implementation of the participatory extension system in each kebele where the role of the kebele administration is to oversee the implementation at the local level. However, as kebeles were weakly institutionalized and had poor capacity, their duties were often transferred to the development agents. Despite the steadily (many) increasing number of development agents, most of them were insufficiently trained and involved in multiple activities, which diminished (decreased) their effectiveness in providing extension services and in trusting the farmers. Attempts have been made to provide group extension services through public mobilization. However, community involvement was achieved through persuasion and pressure, which could lead to adverse effects on their participation. To abate these challenges and transform the sector to a better state, the ministry of agriculture (MoA); Ethiopian agriculture research system (EARS) which includes Ethiopian Institute of agriculture research (EIAR), regional research institutions, parastatals like the International Livestock Research Institute (ILRI) and local and external nongovernmental organizations (NGOs) working on agriculture,

have been undertaking agricultural research and development activities. But, as MoA (1996:2) emphasizes, the generation of technology by research is not a sufficient condition for its adoption by users. Thus, if a technology generated by research is to result in certain positive changes, the innovation has to be well-communicated (MoA 19996: 2; Ongus, 1997: 5; Atherton, 1977 cited in Tadese. 2006: 2,) in a right way to the right audience through the right media and at the right time.

Concerning this, extension communication takes central position for sharing information about research results that inform users and thereby helping them improving agricultural production and productivity. This is because; the application of communication for development in LDCs has wide- ranging goals. In this regard, Tadese (2006) cited in Waisbord (2001: [internet]) notes that the ultimate goal of development communication is to:

- raise the quality of life of populations, including increase income and well-being,
- promote land reform and freedom of speech and,
- Establish community centers for leisure and entertainment.

But, these goals of development communication can be met when there is effective communication supported by appropriate strategies and approaches. As the Food and Agricultural Organization of the United Nations/German Technical Cooperation (FAO/GTZ) (2004: [Internet]) indicates, effective communication among research, extension and farmers depends on:

- Policies and markets conducive (favorable) for communication,
- Involvement of farmers through participatory methods,
- Communicative capacities and attitude of research/extension services,
- Farmers' organizations as partners in communication,
- Utilization of different media options,
- Monitoring and impact evaluation of communication strategies.

The implication is that absence of these success factors has a detrimental impact on communication practices on diffusion of agricultural innovation.

2. Back ground of Amhara Regional Agricultural Research Institute

ARARI (Amahra Regional Agricultural Research Institute) as a governmental and local agricultural research institution was founded in July 1992 E. C. Combinations of economic, social and political crises that severely affected the region's people were pushing factors for the establishment of this governmental institution. In other words, the establishment of the institution was a response to the socio-economic problems (lack of agricultural technologies) facing ANRS at that time (ARARI, 2008). ARARI has been working in Amhara region almost for two decades. The institution has carried out different agricultural technologies for the development of farming. It was institutionalized as a means for fighting against poverty via the innovation of technologies in the region. It was institutionalized encompassing seven research centers, such as Adet, Andasa, Gonder, Bahir Dar, Seqota, Debrebrehan, and North Wolo. It has also 41 sub districts of research centers where it works on six different areas of issues or affairs, like crops, animals, forest, soil and water, socio economic and agricultural extension mechanizations.

The institution has been operating since the first development transformation goal up to now on different activities, such as innovating 332 new farm technologies before 2003 E.C., providing 13 new technologies in extension services and innovating 692 different technologies at the end of the second transformation development program.

Budgeting 150 million birr annually, the institution has a total of 1150 manpower including 400 researchers and 750 supporters. The institution has three objectives;

- Innovate new technologies
- Improve farmers indigenous knowledge and
- Adapt and implement new technologies.

1. 3 Statement of the problem

Agriculture is the mainstay (basis) of the Ethiopian economy. It generates over 45 per cent of the GDP and 90 per cent of the total export earnings of the country (MEDaC 2000). It is also estimated that agriculture provides employment for about 85 per cent of the labor force. The striking differences among regions in altitude, topography, soils, and climate and farming systems enable the country to produce a variety of field crops, fruit and vegetables and rear different species of livestock. However, Ethiopian agriculture is characterized by low

productivity and over the last two decades it has been unable to produce sufficient quantities to feed the country's rapidly growing population. In fact, natural calamities (problems) and famine seem to have become the salient feature and permanent problem of the country. For instance, in 1973-1974 and 1984- 1985, the country had experienced the worst droughts that claimed the lives of several thousands of people. One of the reasons for the existing structural food insecurity in the country is the low level of technological development, which acts as the principal barrier to the efficient utilization of the country's natural resources. Even though different extension approaches have been implemented, experiences over the past four decades have not made economists particularly sanguine (hopeful) with respect to bringing major impacts on the productivity of smallholders and the utilization of modern inputs. For instance, the adoption rate of modern agricultural technologies in the country is very low. Regarding this, MEDaC (1999) pointed out that the Ethiopian farmer continued to use low fertilizer rates which were estimated to be an average of 7 Kg of nutrients per hectare of arable land compared with a sub Saharan average of about 9 kg nutrients per hectare of arable land and the world average of at 65 kg per hectare. The physical application rates of fertilizer by most peasant farmers were well below those recommended by the extension program (100 kg DAP [diammoniumphosphate] and 50 kg urea per hectare) and could in some cases be as low as 20-30 kg per hectare.

Daniel et al. (1997) reported that only very few Ethiopian farmers used improved seeds: about 5-10% of total seed used for maize and even less for sorghum, barley and teff(*EragrostisAbyssinica*). Similarly, MOA (1998a) pointed out that of the 3.5 million hectares of the potentially irrigable land, only 161,010 hectares (4.6%) were currently under irrigation. A closer look at the different extension approaches revealed that they have been planned and implemented without the participation of the people for whom they have been designed. Apart from being biased against the livestock subsector; these approaches have captured only farmers located in a few kilometers from both sides of all-weather roads (Belay 1998). With the exception of a few non-governmental organizations engaged in agricultural development activities and other governmental bodies such as the Coffee and Tea Development Authority, the defunct Ministry of Natural Resources and Environmental Protection and the Ministry of State Farms' Development, which had been doing some extension work, the Ministry of Agriculture has been the sole authority responsible for the national agricultural extension system. (kassa Belay, 2003)

Even though different extension approaches have been exercised in the country since the 1950s, these approaches have not contributed to bringing sizable increases in the production and productivity of smallholder agriculture (Belay, 2003:). Technology adoption by farmers has not been promising because as the author pointed out, the different extension approaches have been planned and implemented without the participation of the people they are meant for. Information and messages about new and improved agricultural technologies including inputs and farming practices were not appropriately communicated to users, who mainly were subsistent farmers.

The roles of communication for development were either neglected or overlooked. In this regard, Mundy and Sultan write:

Without communication...progress would be unimaginable [complex or difficult]. Why, then, is it so neglected in development efforts? Huge research organizations, whose sole purpose is to develop new farming technologies (i.e., generate new information) and communicate them to farmers, relegate the communication part to the dustbin. Instead of creating wealth, research findings gather dust. Agricultural extension agencies (never very effective) are being downsized and closed, to be replaced by well, nothing. The potential of media that do reach people in remote rural areas (channels such as radio, market traders, churches and mosques) is ignored. (2001: 1)

FAO/GTZ shared a similar view at a workshop held in May 2005 on Effective communication between agricultural research, extension and farmers in that the inefficiency of many countries in agricultural development has been attributed, among other factors, to inadequate communication along the Research-Extension-Farmers continuum, including poor information packaging and lack of communication systems. The following extract from Black further consolidates this view. Think of all the studies thoroughly investigated, and with demonstrable results of great benefit to the industry [agriculture], that has never reached the farm gate. Millions of pounds have been spent around the world on research that remains buried in libraries and never reach the community on behalf of whom the initial study was undertaken. (2000: 494)

The sentiments expressed above hold true for Ethiopia. Agricultural research institutions have been developing and adopting lots of technologies since late 1940s (Belay, 2003: 24; Getinet *et al.*, 1996: 94). However, these technologies have not been effectively shared with farmers. Most of them have become outdated as they have been put on shelves. A number of agricultural extension projects in the past ended unsuccessful. Many people attribute this mainly to inadequacy and low acceptability of communication approaches employed along the research-extension-farmer continuum. This may be one reason why adoption of agricultural technologies by farmers has been so sluggish, and the resultant agricultural development has been so stagnant. However, research work in this area has been scanty and not investigated or studied. Given this lack of research, this study seeks to examining communication practices in the process of diffusion of agricultural innovation in ARARI.

3. Objective of the study

1.3.1 General objective of the study

The main objective was examining communication practices in the process of Diffusion of Agricultural innovation in Amhara Region Agricultural Research Institute.

1.3.2 The specific objectives are:

1. To identify the communication strategies in the diffusion of agricultural innovation in Amhara Agricultural Research Institute.
2. To point out how the Diffusion of agricultural innovation is practiced in ARARI Extension workers, Researchers and Communication experts.
3. To identify how the farmers adopt agricultural innovations provided by Amhara Agricultural Research Institute.
4. To identify the factors that affects the communication practices in the Diffusion of Agricultural innovation in ARARI.

1.3.3 Specific research questions are:

- What communication strategies are used in the diffusion of agricultural innovation in Amhara Agricultural Research Institute?

- How is diffusion of innovation practiced in ARARI extension workers, researchers and communication experts?
- How do farmers adopt agricultural innovations provided by Amhara agricultural research institute?
- What are the factors that affect the communication practices in the diffusion of agricultural innovation in ARARI?

4. .Significance of the study

The results of this study can be essential in designing and fine-tuning communication approaches and methods in such a way that communication can motivate and be part of agricultural innovation processes. The results of this study would provide a general review of communication practices in the process of diffusion of agricultural innovation in Amhara Agricultural Research Institute focusing on two research centers i.e. Adet and Andasa. Thus, it can be an essential contribution to the field's communication in general and agricultural communication in particular. More specifically, it can provide good insights for media educators and students, policy makers, extension workers, agricultural researchers, and DAs into the need for appropriate and acceptable communication approaches to facilitate agricultural technology adoption by farmers and thereby enhancing agricultural production and productivity. Besides, the work may serve as a springboard for researchers who want to conduct research in areas such as development communication, research extension-farmer linkages, media use and roles in the diffusion of agricultural innovation.

5. .Scope of the study

This research was limited to studying the role of communication practices in the process of diffusion of agricultural innovation in Amhara Agricultural Research Institute in two research centers such as Adet and Andasa. Both are located at western Gojam zone where they are located in the same directions or places. These things were more comfortable for the researcher to do his activities effectively. Additionally, these two centers are working different activities. Adet research center focuses on crops, water and soil management, and socio-economic activities, whereas Andsa research center focuses on animal productions. Therefore, the researcher focuses

only the two research centers to understand how they perform their activities effectively to achieve the institution goals and help the farmers to use modern agricultural new technologies and to change their lives.

6. Theoretical frame work of the study

There are mainly two divergent theoretical models in the area of development communication: the non-participatory pro-mass media theory of diffusion and the participatory pro-interpersonal pro-group methods theory of participation (Melkote and Steeves, 2001: 297–301; Gandelsonas,). Plus to this Servaes, J.(2008, p.20-21) articulated that the American scholar Everett Rogers is said to be the person who introduced this diffusion theory in the context of development. Modernization is here conceived as a process of diffusion where by individuals move from a traditional way of life to a different, more technically developed and more rapidly changing way of life. Building primarily on sociological research in agrarian societies, Rogers stressed the adoption and diffusion processes of cultural innovation. This approach is therefore concerned with the process of diffusion and adoption of innovations in a more systematic and planned way. Mass media is important in spreading awareness of new possibilities and practices, but at the stage where decisions are being made about whether to adopt or not to adopt; personal communication is far more likely to be influential. Therefore, the general conclusion of this line of thought is that mass communication is less likely than personal influence to have a direct effect on social behavior.

Newer perspectives on development communication claim that this is still a limited view of development communication. They argue that this diffusion model is a vertical or one-way perspective on communication, and that active involvement in the process of the communication itself will accelerate development. Research has shown that, while groups of the public can obtain information from impersonal sources like radio and television, this information has relatively little effect on behavioral changes. And development envisions precisely such change. Similar research has led to the conclusion that more is learned from interpersonal contacts and from mass communication techniques that are based on them. On the lowest level, before people can discuss and resolve problems, they must be informed of the facts, information that the media provide nationally as well as regionally and locally. At the same time, the public, if the media are sufficiently accessible, can make its information needs known. Communication theories such as

the ‘diffusion of innovations’, the ‘two-step-flow’, or the ‘extension’ approaches are quite congruent with the modernization theory. The elitist, *vertical or top-down orientation* of the diffusion model is obvious.

The participatory model, on the other hand, incorporates the concepts in the framework of multiplicity. It stresses the importance of cultural identity of local communities and of *democratization and participation at all levels*—international, national, local and individual. It points to a strategy, not merely inclusive of, but largely emanating from, the traditional ‘receivers’. Paulo Freire (1983:76) refers to this as the right of all people to individually and collectively speak their word: ‘This is not the privilege of some few men, but the right of every man. Consequently, no one can say a true word alone—nor can he say it for another, in a prescriptive act which robs others of their words’. In order to share information, knowledge, trust, commitment and a right attitude in development projects, participation is very important in any decision-making process for development. Therefore, the International Commission for the Study of Communication Problems argues that ‘this calls for a new attitude for overcoming stereotyped thinking and to promote more understanding of diversity and plurality, with full respect for the dignity and equality of peoples living in different conditions and acting in different ways’ (MacBride, 1980:254). This model stresses reciprocal collaboration throughout all levels of participation.

Also, these newer approaches argue, the point of departure must be the community. It is at the community level that the problems of living conditions are discussed, and interactions with other communities are elicited. The most developed form of participation is self-management. This principle implies the right to participation in the planning and production of media content. However, not everyone wants to or must be involved in its practical implementation. More important is that participation is made possible in the decision-making regarding the subjects treated in the messages and regarding the selection procedures. One of the fundamental hindrances to the decision to adopt the participation strategy is that it threatens existing hierarchies. Nevertheless, participation does not imply that there is no longer a role for development specialists, planners, and institutional leaders. It only means that the viewpoint of the local groups of the public is considered before the resources for development projects are allocated and distributed, and that suggestions for changes in the policy are taken into consideration. Therefore the researcher used diffusion models and participatory development

communication as a guide to examining communication practices in the process of diffusion of agricultural innovation in Amhara Agricultural Research Institute.

7. Operational definitions

Diffusions the process by which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication in that the messages are concerned with new ideas. Communication is a process in which participants create and share information with one another in order to reach mutual understanding (Rogers, 1983).

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. It matters little so far as human behavior is concerned, whether or not an idea is "objectively" new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation (Rogers, 1983).

Participatory communication is a dualistic approach to communication and development that sets the platform for people to participate not only in program implementation, but also in program formulation (Nwosu 1995b: 345), program evaluation, and in benefit as well (Yoon, 1996: [Internet]). This is because farmer participatory approaches bring researchers and DAs to farmers' field for group discussions-where attention is given on the farmers' problems (WARDA (2000: 16).

Agricultural extension is the service that provides technical advice to farmers, helps farmers acquire required inputs including credit for farming, provides training and evaluates new agricultural technologies on farmers' fields in close collaboration with farmers, helps link farmers to supply chain and markets, forwards farmers' concerns and problems to decision makers, and thus helps in formulation of new and favorable agricultural policies suitable for different regions, and so on. (*www.quora.com*)

Agricultural communications: All kinds of human communication in relation to agriculture, food, natural resources and rural interest. It obviously involves two wide streams of endeavor: communications and agriculture. As a discipline, agricultural communications seeks to connect these two well-established streams effectively somewhat akin to the role of a lubricant, integral and vital to an operating engine. Similar to this perspective, all the diverse array of mass media

(such as newspapers, magazines, television, radio); new information technologies (such as the Internet); information and education systems (such as libraries, extension services and schools); group methods (such as meetings and field events); one-on-one interactions (such as friend-to-friend conversations); and even intra-personal communications that help individuals make decisions.(www.quora.com)

7. Organization of the paper

This thesis was organized into five chapters. The first chapter introduces the research idea, about Amhara regional agricultural research institute, research questions, and research objectives. It also provides the scope and significance of the work, ethical consideration, and clarification of concepts and theoretical frame work. The second chapter contains a comprehensive review of the concept of development communication, interface of development communication and participatory practices in development communication (diffusion innovation) including other related extension communication. Methods used for data collection was presented in chapter three. In chapter four, the qualitative data generated through focus group discussions and in-depth interviews was presented and interpreted. The last chapter contains a summary of major findings of the study and recommendable lines of actions drawn from the results of the study.

CHAPTER TWO

2. Related literature review of the study

1. Introduction

The main purpose of this research was examining communication practices in the process of diffusion of agricultural innovation in Amhara region agricultural research institute.

This study emanates from the assumption that examining the genuine participation, which is the missing link in the process of diffusion innovation or participatory development for the goal of the Amhara region agricultural research institute, has a tremendous importance in suggesting the relevant practical remedies.

This section particularly, reviews the literature that can assist the researcher address the research questions the communication practices in the process of diffusion innovation in agriculture and frame of the data analysis. The review starts with the concept of development communication, and interface of development and communication. Then, it moves on discussing the meaning of diffusion innovation theory, main element of diffusion innovation, characteristics of innovation, the participatory model, and the main characteristics of participatory model, and finally Agricultural Knowledge and Information Systems (AKIS).

2. Development Communication

Rosario-Braid (1979) concisely expressed development communication as the application of the processes of communication to the development process. In other words, development communication is the use of the principles and practice of exchange of ideas to fulfill development objectives. It is, therefore, an element of the management process in the overall planning and implementation of development programs. In a very broad sense, development communication is the art and science of human communication applied to the speedy transformation of a country and the broad mass of its people through the identification and utilization of appropriate expertise in the development process that will assist in increasing participation of intended beneficiaries at the grassroots level. Because communication is related with a social conscience, development communication is heavily oriented towards the human

aspects of development. Even though it is primarily associated with rural development, it is also concerned with urban, particularly sub-urban problems.

Communication plays two broad roles. The first is a transformation role through which it seeks social change in the direction of higher quality of life and social justice. The second is a socialization role through which it strives to maintain some of the established values of society that are consonant with development. In playing these roles, development communication creates an enhancing atmosphere for exchange of ideas that produces a happy balance in social and economic advancement between physical (material) output and human relationships (ibid).

3. .Interface (boundary) of Communication and Development

A close examination of the basic tenets (doctrine) of the new development paradigm and of the ultimate requirements of the new communication approach to development would reveal very close similarity between them. To begin with, participation is the key variable in the new development paradigm, just as it is for the new communication approach to development. In broad terms, the ultimate objectives of national development (urban and rural) are economic development, equitable distribution of facilities and of benefits, national cohesiveness, and human development. These are also, in broad terms, the ultimate objectives of development communication. However, because of the importance attached to intelligent understanding of development issues, development communication gives more attention to human development. In order to achieve these ultimate objectives, both the new development paradigm and the new communication approach stress the need for the following:

- Equality of the distribution of social and economic benefits, information and education;
- Popular participation in the development planning and execution, accompanied by decentralization of activities to the local level;
- Self-reliance and independence in the development with emphasis on the potential of local resources; and
- Integration of traditions with modern systems so that development is synchronized with the old and new ideas, with the exact mixture somewhat different in each local (Rogers, 1976, p.130).

However, communication goes further to identify specific actions that should be taken in order to smoothen the path to achieving the above goals. At the International Conference on Communication Policies for Rapidly Developing Societies held at Mashhad, Iran, in 1975, a working group identified specific activities that development communication must strive to accomplish if it must contribute effectively to development. These include:

- Determination of the needs of the people and the provision of sufficient citizen access to the communication systems to serve as effective feedback to the government;
- Provision (prerequisite) of horizontal and vertical (interactive) communication linkage at all levels of society and communication channels through which people have the capability to communicate with one another in order to accomplish co-ordination necessary for human and material development;
- Provision of local community support for cultural preservation; provision of local media to serve as effective channels;
- Provision of relevant information;
- Support for specific development projects and social services; and
- Raising people's awareness of development projects and opportunities, and helping to foster attitudes and motivations that contribute to development.

Goals and objectives identification is not the only area in which development and communication are correlated. Research has shown that they also correlatively strongly in goals achievement. The use of communication media has been shown to lead to positive and effective development. At three levels of analysis - individual, community and national levels, there is substantive evidence from many countries in the developing world which indicates that development and communication are strongly correlated. At the individual level, there are many factor analytic studies which show communication variables to be significantly correlated with development variables (Deutschmann and McNelly,1964; Bostian and Oliveira, 1965). Many examples, also abundant the community level.

4. Diffusion of Innovations Theory

Rogers and Kincaid (1981, p.64) defined that diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication in that the messages are concerned with new ideas. Communication is a process in which participants create and share information with one another in order to reach mutual understanding. This definition implies that communication is a process of convergence (or divergence) as two or more individuals exchange information in order to move toward each other (or apart) in the meanings that they ascribe to certain events. We think of communication as a two-way process of convergence rather than as a one-way linear act in which one individual seeks to transfer a message to another. Such a simple conception of human communication may accurately describe certain communication acts or events involved in diffusion, such as when a change agent seeks to persuade a client or to adopt an innovation. So, diffusion is a special type of communication in which the messages are concerned with a new idea. It is the newness of the idea in the message content of communication that gives diffusion its special character. Newness means that some degree of uncertainty is involved. Uncertainty is the degree to which a number of alternatives are perceived with respect to the occurrence of an event and the relative probability of these alternatives. Uncertainty implies a lack of predictability, of structure, of information. In fact, information represents one of the main means of reducing uncertainty.

Information is a difference in matter-energy that affects uncertainty in a situation where a choice exists among a set of alternatives (Rogers and Kincaid, 1981, p. 64). A technological innovation embodies information, and thus reduces uncertainty about cause-effect relationships in problem solving. Diffusion is a kind of social change defined as the process by which alteration (change) occurs in the structure and function of a social system. When new ideas are invented, diffused, and are adopted or rejected leading to certain consequences, social change occurs. Of course, such change can happen in other ways too, for example, through a political revolution or through a natural event like a drought or earthquake. Some authors restrict the term "diffusion" to the spontaneous, unplanned spread of new ideas, and use the concept of "dissemination" for diffusion that is directed and managed. And, the general convention is to use the word "diffusion" to include both the planned and the spontaneous spread of new ideas. However, we

do find it useful to distinguish between centralized and decentralized diffusion systems. In a centralized diffusion system, decisions about such matters as when to begin diffusing an innovation, who should evaluate it, and through what channels it will be diffused are made by a small number of officials and/or technical experts at the head of a change agency. In a decentralized diffusion system, such decisions are more widely shared by the clients and potential adopters; here, horizontal networks among the clients are the main mechanism through which innovations spread. In fact, in extremely decentralized diffusion systems, there may not be a change agency; potential adopters are solely responsible for the self-management of the diffusion of innovations.

New ideas may grow out of the practical experience of certain individuals in the client system rather than coming from formal R & D activities. Originally, it was assumed that relatively centralized diffusion systems like the agricultural extension service were essential ingredients in the diffusion process, but in recent years several relatively decentralized diffusion systems have been investigated and evaluated, and found to represent an appropriate alternative to centralized diffusion under certain conditions (ibid).

5. Main Elements in the Diffusion of Innovations

Rogers (1962) identified four main elements of diffusion of innovation such as innovation, communication channels, time, and the social system.

2.5.1 Innovation

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption. It matters little, so far as human behavior is concerned, whether or not an idea is "objectively" new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it. In other words, if the idea seems new to the individual, it is an innovation. Newness in an innovation does not involve new knowledge. Someone may have known about an innovation for some time, but he/she may not develop a favorable or unfavorable attitude toward it, nor have adopted or rejected it. The "newness" aspect of an innovation may be expressed in terms of knowledge, persuasion, or a decision to adopt. It should not be assumed that the diffusion and adoption of all innovations are necessarily desirable. In fact, some studies showed harmful and uneconomical innovations that

are generally not desirable for either the individual or his or her social system. Further, the same innovation may be desirable for one adopter in one situation but undesirable for another potential adopter in a different situation.

Based on the above ideas, researcher is agreed that: “it should not be assumed that the diffusion and adoption of all innovations are necessarily desirable.” Especially, adapting new agricultural products and services needs diffusion of innovation for farmers to use the agricultural products and services properly depend on individual and social interests? That means, we have to respect or know the community cultural aspects when we need to diffuse and adopt new agricultural technologies. Because individual or social system has the chance to ignore the new agricultural products and services that are not appropriate or harmful and uneconomical innovations.

2.5.1.1 Characteristics of innovations

The characteristics of innovations, as perceived by individuals, help to explain their different rate of adoption. These characteristics of innovation as generalized by Rogers (1962) are:

- **Relative advantage** is the degree to which an innovation is perceived as better than the idea it supersedes (replace). The degree of relative advantage may be measured in economic terms, but social-prestige factors, convenience, and satisfaction are also often important components. It does not matter so much whether an innovation has a great deal of "objective" advantage. What does matter is whether an individual perceives the innovation as advantageous. The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption is going to be.
- **Compatibility** is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters. An idea that is not compatible with the prevalent values and norms of a social system will not be adopted as rapidly as an innovation that is compatible. The adoption of an incompatible innovation often requires the prior adoption of a new value system.
- **Complexity** is the degree to which an innovation is perceived as difficult to understand and use. Some innovations are readily understood by most members of a social system; others are more complicated and will be adopted more slowly. In general, new ideas that

are simpler to understand will be adopted more rapidly than innovations that require the adopter to develop new skills and understandings.

- **Trial ability** is the degree to which an innovation may be experimented with on a limited basis. New ideas that can be tried on the installment plan will generally be adopted more quickly than innovations that are not divisible. Ryan and Gross (1943) found that every one of their Iowa farmer respondents adopted hybrid-seed corn by first trying it on a partial basis. If the new seed could not have been sampled experimentally, its rate of adoption would have been much slower. An innovation that is trial able represents less uncertainty to the individual who is considering it for adoption, as it is possible to learning by doing.
- **Observe ability** is the degree to which the results of an innovation are visible to others. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt. Such visibility stimulates peer discussion of a new idea, as friends and neighbors of an adopter ask him or her for innovation-evaluation information about it.

In general innovations that are perceived by receivers as having greater relative advantage, compatibility, trial ability, observe ability, and less complexity will be adopted more rapidly than other innovations. These are not the only qualities that affect adoption rates but past research indicates that they are the most important characteristics of innovations in explaining rate of adoption.

2.5.2 Communication Channels

According to (Rogers, 1983, P.17-18) a communication channel is the means by which messages get from one individual to another. The nature of the information-exchange relationship between the pair of individuals determines the conditions under which a source will or will not transmit the innovation to the receiver, and the effect of the transfer. For example, mass media channels are often the most rapid and efficient means to inform an audience of potential adopters about the existence of an innovation to create awareness-knowledge. Mass media channels are all those means of transmitting messages that involve a mass medium, such as radio, television, newspapers, and so on, which enable a source of one or a few individuals to reach an audience of many. On the other hand, interpersonal channels are more effective in persuading an individual

to adopt a new idea, especially, if the interpersonal channel links two or more individuals who are near peers. Interpersonal channels involve a face-to-face exchange between two or more individuals.

The results of various diffusion investigations show that most individuals do not evaluate an innovation on the basis of scientific studies of its consequences, although such objective evaluations are not entirely irrelevant, especially to the very first individuals who adopt. Instead, most people depend mainly upon a subjective evaluation of an innovation that is conveyed to them from other individuals like themselves who have previously adopted the innovation. This dependence on the communicated experience of near-peers suggests that the heart of the diffusion process is the modeling and imitation by potential adopters of their network partners who have adopted previously (Rogers, 1983, P. 17-18).

2.5.3 Time

Time is an important element in the diffusion process. In fact, most other behavioral science research is timeless in the sense that the time dimension is simply ignored. Time is an obvious aspect of any communication process, but most communication research does not deal with it explicitly. Perhaps it is a fundamental concept that cannot be explained in terms of something more fundamental (Whitrow, 1980, p. 372). Time does not exist independently of events, but it is an aspect of every activity. The inclusion of time as a variable in diffusion research is one of its strengths, but the measurement of the time dimension (often by means of respondents' recall) can be criticized. The time dimension (measurement) is involved in diffusion:

- In the innovation decision process by which an individual passes from first knowledge of an innovation through its adoption or rejection,
- In the innovativeness of an individual or other unit of adoption that is, the relative earliness/lateness with which an innovation is adopted compared with other members of a system, and
- In an innovation's rate of adoption in a system, usually measured as the number of members of the system that adopt the innovation in a given time period.

2.5.3.1 The innovation-decision process

Rogers (1983) stated that the innovation-decision process is the process through which an individual (or other decision making unit) passes from first knowledge of an innovation to forming an attitude toward the innovation to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. Thus, the innovation decision process consists of five stages. These are: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation.

1. **Knowledge** occurs when an individual (or other decision-making unit) is exposed (showing) to the innovation's existence and gains some understanding of how it functions.
2. **Persuasion** occurs when an individual (or other decision-making unit) forms a favorable or unfavorable attitude toward the innovation.
3. **Decision** occurs when an individual (or other decision-making unit) engages in activities that lead to a choice to adopt or reject the innovation.
4. **Implementation** occurs when an individual (or other decision-making unit) puts an innovation into use. Re-invention is especially likely to occur at the implementation stage.
5. **Confirmation** occurs when an individual (or other decision-making unit) seeks reinforcement (strengthening) of an innovation decision that has already been made, but he or she may reverse this previous decision if exposed to conflicting messages about the innovation.

It was previously stated that the innovation-decision process is an information-seeking and information-processing activity in which an individual obtains information in order to decrease uncertainty about the innovation. At the knowledge stage, an individual mainly seeks software information that is embodied in a technological innovation, information that reduces uncertainty about the cause-effect relationships that are involved in the innovation's capacity to solve a problem. At this stage an individual wants to know what the innovation is, and how and why it works. Mass-media channels can effectively transmit such software information. But,

increasingly at the persuasion stage, and especially at the decision stage, an individual seeks innovation-evaluation information in order to reduce uncertainty about an innovation's expected consequences. Here, an individual wants to know the innovation's advantages and disadvantages in his or her own situation. Interpersonal networks with near-peers are particularly able to carry out such evaluative information about an innovation. Such subjective evaluations of a new idea are especially likely to influence an individual at the decision stage, and perhaps at the confirmation stage (Rogers, 1983, p.20-22).

2.5.3.2 Innovativeness and adopter categories

According to Rogers (1983, p.20-22) stated that the innovativeness and adapter categories as follow:

Adopter category	Definition
Innovators	Innovators are willing to take risks, have the highest social status, have financial liquidity, are social and have closest contact to scientific sources and interaction with other innovators. Their risk tolerance allows them to adopt technologies that may ultimately fail. Financial resources help absorb these failures.
Early adopters	These individuals have the highest degree of opinion leadership among the adopter categories. Early adopters have a higher social status, financial liquidity, advanced education and are more socially forward than late adopters. They are more discreet in adoption choices than innovators. They use judicious choice of adoption to help them maintain a central communication position.
Early Majority	They adopt an innovation after a varying degree of time that is significantly longer than the innovators and early adopters. Early Majority have above average social status, contact with early adopters and seldom hold positions of opinion leadership in a system (Rogers 1962, p. 283)
Late Majority	They adopt an innovation after the average participant. These individuals approach an innovation with a high degree of skepticism and after the majority of society has adopted the innovation. Late Majority are typically skeptical about an innovation, have below average social status, little financial liquidity in contact with others in late majority and early majority and little opinion leadership.
Laggards	They are the last to adopt an innovation. Unlike some of the previous categories, individuals in this category show little to no opinion leadership. These individuals typically have an aversion to change agents. Laggards typically tend to be focused on "traditions", lowest social status, lowest financial liquidity, oldest among adopters, and in contact with only family and close friends (Rogers 1962, p. 283).

2.5.4 A Social System

According to Rogers (1983), a social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The members or units of a social system may be individuals, informal groups, organizations, and/or subsystems. Each unit in a social system can be distinguished from other units. All members cooperate at least to the extent of seeking to solve a common problem in order to reach a mutual goal. This sharing of a common objective binds the system together. It is important to remember that diffusion occurs within a social system because the social structure of the system affects the innovation's diffusion in several ways. The social system constitutes a boundary within which an innovation diffuses. Here, we shall deal with the following topics: how the social structure affects diffusion, the roles of opinion leaders and change agents, types of innovation decisions, and the consequences of innovation. All these issues involve relationships between the social system and the diffusion process that occurs within it.

2.5.4.1 Social structure and diffusion

To the extent that the units in a social system are not all identical or the same in their behavior, structure then exists within the system. The structure gives regularity and stability to human behavior in a social system; it allows one to predict behavior with some degree of accuracy. Thus, structure represents one type of information in that it decreases uncertainty. Perhaps we see an illustration of this predictability that is provided by structure in a bureaucratic organization like a government agency. There is a well-developed social structure in such a system consisting of hierarchical positions giving officials in higher ranked positions the right to issue orders to individuals of lower rank. Their orders are expected to be carried out. Such patterned social relationships among the members of a system constitute social structure, one type of structure.

The structure of a social system can facilitate or impede the diffusion of innovations in the system. As Katz (1961) remarked: "It is as unthinkable to study diffusion without some knowledge of the social structures in which potential adopters are located as it is to study blood circulation without adequate knowledge of the structure of veins and arteries." Compared to other aspects of diffusion research, however, there have been relatively few studies of how the

social or communication structure of a system affects the diffusion and adoption of innovations in that system. One explanation may be that methodologically, it is a rather tricky business to untangle the effects of a system's structure on diffusion, independent from the effects of the characteristics of the individuals that make up the system. But let us consider an illustration of system effects, the influences of the structure and/or composition of a system on the behavior of the members of the system. From this example, we can see how a system can have an effect on the diffusion and adoption of innovations over and above the effect of such variables as the individual characteristics of the members of the system. Individual innovativeness is affected both by the individual's characteristics, and by the nature of the social system in which the individual is a member.

2.5.4.2 Opinion leaders and change agents

Opinion leadership is the degree to which an individual is able to influence other individuals' attitudes or overt behavior informally in a desired way with relative frequency. It is a type of informal leadership, rather than a function of the individual's formal position or status in the system. Opinion leadership is earned and maintained by the individual's technical competence, social accessibility, and conformity to the system's norms. Opinion leaders serve as an apt model for the innovation behavior of their followers. Opinion leaders, thus, exemplify and express the system's structure. In any system, naturally, there may be both innovative opinion leaders and also leaders who oppose change. These influential persons can lead in the promotion of new ideas, or they can head an active opposition. In general, when opinion leaders are compared with their followers they:

- are more exposed (showing) to all forms of external communication,
- are more cosmopolite,
- have somewhat higher social status, and
- Are more innovative (although the exact degree of innovativeness depends, in part, on the system's norm.

But one of the most striking characteristics of opinion leaders is their unique and influential position in the communication structure of their system. They are at the center of interpersonal

communication networks. A communication network consists of interconnected individuals who are linked by patterned flows of information. The opinion leader's interpersonal networks allow him or her to serve as a social model whose innovative behavior is imitated by many other members of the system.

A change agent is an individual who influences clients' innovation decisions in a direction deemed desirable by a change agency. He or she usually seeks to obtain the adoption of new ideas, but may also attempt to slow down diffusion and prevent the adoption of what he or she believes are undesirable innovations. Change agents use opinion leaders within a given social system as lieutenants (supporters) in diffusion campaigns. Change agents are often professionals with university degrees in technical fields. This professional training and the social status that goes with it usually indicates that change agents are heterophallus from their typical clients, thus posing problems for effective communication about the innovations that they are promoting. However, because of a manpower shortage of professionally qualified change agents and/or because of a lack of adequate financial resources to employ adequate numbers of them, many change agencies use change agent aides. An aide is a less than fully professional change agent who intensively contacts clients to influence their innovation decisions. Aides are usually more homophile's with their average client, and thus provide one means of bridging the heterophony gap frequently found between the professional change agents and their client audience.

6. The participatory model

The new Paradigm emerged in the 1970s. It is a reaction to all development models in the past and tries to assimilate (incorporate) the various emphases of all the other models. Development theorists and practitioners have incorporated many dimensions in the development model which were never emphasized earlier. Rogers (1976) argued that this model of development is a Meta - model with alternative pathways to development. The unifying dimension of this alternative models participation in development. This approach attempts to integrate strategically a host of ideas related to development that have emerged in the past. It includes popular participation, grass roots development, integrated rural development, use of appropriate technology, fulfillment of basic needs, productive use of local resources, and maintenance of ecological balances. Development problems to be defined by the people themselves and culture as a mediating force in development. There is an explicit emphasis on the idea of self-reliance, self -

development and redistribution of resources between social groups, urban and rural areas, regions and sexes. The role of communication which was essentially to inform and influence people was being revised and proposed as a process of social interaction through the balanced exchange of information which shall lead to change.

The participatory dimension of the model emerged from the failure of the whole development philosophy of the Dominant Paradigm. The communication needs as identified by UNESCO (1978) in the “New Paradigm” are open dialogue which reflects diversified views and experiences. Secondly, multi directional communication flow is necessary. This multi directional flow calls for top down as well as horizontal communication and bottom-up communication. The horizontal communication is across society horizontally – from person to person, village to village and rural to urban. The bottom-top is from people to government and top-down the other way around. UNESCO further contends that for participatory rural communication, media should be made available in rural areas. There should be linkage between development initiatives and communication channels. The communication strategy introduced in this paradigm used mainly interpersonal channels with support from mass media-both cosmopolitan (international) and indigenous media. The functions of communication were not only to disseminate information but also educate them for the development by persuasion through mass media. Interpersonal channels were utilized for communicating feedback on development activities.

Globally the development communication scenario has changed in the last four decades, which has shifted to the availability of new communication channels, the characteristics of the audience, and development demands. The communication strategies are planned according to the focus of development. The new channels of communication technologies have even changed the nature and scope of interpersonal communication (ibid).

2.6.1 Typologies of Participation:

The World Bank (1995) identified four types of participation: (1) Information sharing, (2) consultation, (3) collaboration, and (4) empowerment. Information sharing and consultation are considered low-level forms of participation, while the other two are considered high-level form i.e. pseudo vs. genuine participation. Classification derived by a literature review by Mefalopoulos (2003) includes: (1) passive participation, when stakeholders attend meetings to be informed; (2)

participation by consultation, when stakeholders are consulted but the decision making rests in the hands of the experts; (3) functional participation, when stakeholders are allowed to have some input, although not necessarily from the beginning of the process and not in equal partnership; and (4) empowered participation, when relevant stakeholders take part throughout the whole cycle of the development initiative and have an equal influence on the decision-making process. White (1994) also classifies participation of the local community in the development process as pseudo and genuine.

2.6.2 The Main Characteristics of the Participatory Model

- The participatory model sees people as the controlling actors or participants for development. People will have self-appreciation instead of self-depreciation. Development is meant to liberate and emancipate people. Local culture is respected.
- The participatory model sees people as the nucleus of development. Development means lifting up the spirits of the local community to take pride in its own culture, intellect and environment. Development aims to educate and stimulate people to be active in the self and communal improvements while maintaining a balanced ecology. Authentic participation, though widely espoused in the literature, is not in everyone's interest. Such programs are not easily implemented, highly predictable, or readily controlled.
- The participatory model emphasizes on the local community rather than the nation-state, on monistic universalism rather than nationalism, on spiritualism rather than secular(material) humanism, on dialogue rather than monologue, and on emancipation rather than alienation.
- Participation involves the redistribution of power. Participation aims at redistributing the elites' power so that a community can become a full-fledged democratic one. As such, it directly threatens those whose position and/or very existence depends upon power and its exercise over others. Reactions to such threats are sometimes overt, but most often are manifested as less visible, yet are steady and continuous resistance.

7. Agricultural Knowledge and Information Systems (AKIS)

Rolling (1986) expressed that AKIS combines agricultural research, extension and education in one system (also known as the knowledge triangle) and focuses on how the three activities generate new knowledge and information for farmers. The basic premise of AKIS is that research and extension should not be seen as separate institutions which must somehow be linked; instead, scientists working on different types of research and extension agents at all levels should be seen as participants in a single Agricultural Knowledge and Information System (AKIS). Rolling (1986) defined AKIS as: “a set of agricultural organizations and/or persons, and the links and interactions between them, engaged in such processes as the generation, transformation, transmission, storage, retrieval, integration, diffusion and utilization of knowledge and information, with the purpose of working synergic ally to support decision-making, problem solving and innovation in a given country’s agriculture”.

More recently, the FAO and the World Bank joined forces in promoting the concept of AKIS with the publication of ‘strategic vision and guiding principles’ on the topic in 2000. This document defined AKIS thus: [An AKIS] links people and institutions to promote mutual learning and generate, share and utilize agriculture-related technology, knowledge and information. The system integrates farmers, agricultural educators, researchers and extension personnel to harness knowledge and information from various sources for better farming and improved livelihoods. The transformations taking place within an AKIS are as follows:

- From information on local farming systems to research problems
- From research problems to research findings
- From research findings to tentative solutions to problems (technologies)
- From technologies to prototype (sample) recommendations for testing in farmers’ fields
- From recommendations to observations of farmer behavior (male, female, children)
- From technical recommendations to information affecting service (inputs and marketing) behavior

- From adapted recommendations to information dissemination by extension
- From extension information to farmer knowledge.

When modeling the AKIS, it is important to bear in mind that the system takes its place in a larger context. Agricultural knowledge and information processes must be examined at a national level against (next to) the backdrop of:

- The policy environment, which formulates the laws and incentives that influence agricultural performance;
- Structural conditions, such as markets, inputs, and the resource base, infrastructure and the structure of farming;
- The governance structure through which interest groups influence the system; and
- The external sector, comprising donor agencies, international agricultural research centers (IARCs) and/or commercial firms (Elliott 1987).

The policy environment plays a crucial role so much that in some AKIS models it is considered to be one of the components of the AKIS itself. Once again, policy is considered as a prime mover outside the AKIS. Together with two prime movers inside the system, namely management and user control, policy is considered a force that can overcome the default conditions to which a system reverts unless pressures are applied to prevent it from doing so (Sims and Leonard 1989).

CHAPTER THREE

3. Research Methodology

1. Introduction

The methodological approach of the study explains and justifies the methods and the major data collection tools used in this study. Then the data gathering and analysis procedures as well as techniques are presented. Finally, the ethical consideration of the research is illustrated.

2. The Research Approach

Qualitative research method focuses on exploring issues, understanding phenomena, and answering questions to gain deeper insights about social phenomena or people's reality i.e. how people interpret or understand their reality (Creswell, 2002; Jensen, 2002; Newman, 2007). As defined by Shank (2002: 5) qualitative research is a "form of systematic empirical inquiry into meaning". It is a planned way of inquiry grounded in the social world experience. In such inquiry the main purpose of the researcher is to try to unveil (show) how others see the world and experience it. Thus, this study used qualitative research method to understand how examine communication process in the diffusion of agricultural innovation is practiced in Amhara region agricultural research institute. The method enabled the researcher to establish what types of development (diffusion) were practiced in the research center and to explain why such diffusion practice was undertaken and why other methods such as participatory communication and participatory development have been neglected. It also provided us insights into how to introduce new methods (e.g. participatory and holistic) to development. As a qualitative research, this study is framed by social constructivism paradigm, not positivism.

3. The Research Design

The main objective of this study was examining communication practices in the process of diffusion of agricultural innovation in Amhara agricultural research institute. To attain (achieve) the desired objectives of this research, a case study research design was employed.

Bhattacharjee, (2012) explained that case research is a method of intensively studying a phenomenon over time within its natural setting in one or a few sites. Multiple methods of data

collection, such as interviews, observations, prerecorded documents, and secondary data, may be employed for deriving rich, detailed, and contextualized inferences about the phenomenon of interest. Case research can be employed in a positivist manner for the purpose of theory testing or in an interpretive manner for theory building. It can help derive richer, more contextualized, and more authentic interpretation of the phenomenon of interest by virtue of its ability to capture a rich array (collection) of contextual data than most other research methods. The phenomenon of interest can be studied from the perspectives of multiple actors. It can also examine a problem from multiple levels of analysis (e.g., individual and organizational) by virtue of its ability to record and analyze data at different levels.

4. Research Participants and Sampling

Purposive sampling technique was employed to select the research samples. Purposive or judgmental sampling is a strategy in which particular settings persons or events are selected deliberately in order to provide important information that cannot be obtained from other choices (Maxwell, 1996). It is where the researcher includes cases or participants in the sample because they believe that they warrant inclusion. The sample units were chosen as a result of their particular features that facilitate in-depth exploration and understanding of the central issues of the research. The study samples were categorized into four types. These were researchers working in ARARI, the local people (farmers), the organization's documents and actual research works of ARARI and communication activities. The interviewees ranged from bottom line researchers and extension workers living with the community up to research coordinators and organization's communication directors. To be specific, 20 farmers at two research centers, 6 researchers, 6 extension workers, and one communication director in the institution, and two, researcher coordinator in the research center participated in this study. Totally 35 participants were included as the key respondents of the research.

5. Data gathering tools

To obtain the relevance data from the designed target participants or respondents, this research employed in-depth interview, focus group discussion and secondary documents that are related with the issue of diffusion of innovation from the perspective of agricultural extension or communication.

Interview

Interview is one of the most common kinds of data gathering instrument which helps the researcher to have the most elaborated kind of data that can be narrated descriptively. In most cases, in depth interview is employed for those participants who are expected to be appropriate with the issue of research. Based on these assumptions the researcher tries to implement in-depth interview the respondents to get their idea or opinions in widely. According to Boyce, C. (2006, p.3), in-depth interviewing is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation. For example, we might ask participants, staff, and others associated with a program about their experiences and expectations related to the program, the thoughts or beliefs they have concerning the program operations, processes, and outcomes, and about any changes they perceive in themselves as a result of their involvement in the program. In-depth interviews are useful when a researcher wants detailed information about a person's thoughts and behaviors or want to explore new issues in depth. Interviews are often used to provide context to other data (such as outcome data), offering a more complete picture of what happened in the program and why.

In doing so, agricultural extension experts, researchers and coordinators, agricultural extension team leaders, and communication director were used as interviewees. Therefore, the interviewees were employed purposively, and the data that was obtained from key respondents was analyzed qualitatively.

Focus Group discussion

Focus group discussion is the other most popular kind of data gathering instrument which was used in the research. It makes the researcher to obtain diversified ideas from participants' discussion. Therefore, a focus group discussion involves gathering people from similar backgrounds or experiences together to discuss a specific topic of interest. It is a form of qualitative research where questions are asked about their perceptions attitudes, beliefs, opinion or ideas. In focus group discussion participants are free to talk with other group members; unlike other research methods it encourages discussions with other participants. It generally involves

group interviewing in which a small group of usually 6 to 12 people. It is led by a moderator (interviewer) in a loosely structured discussion of various topics of interest (www.herd.org.np).

To have the necessary data through focus group discussion, the researcher assigned the discussion of participants based on a criterion which could improve frustration of respondents. Accordingly, those who have the same profession were assigned in a group because in order to get the relevance data, homogenous groups are advisable while the researcher employs focus group discussion as data gathering instrument. Therefore, farmers were assigned as a group for a focus group discussion.

The researcher used 10 famers in each woreda, totally 20 farmers used as participant of the discussion. When the discussion was done the researcher used materials such as tape recorder, note book, and pens to record the response of the respondents. The Amharic language was used as medium throughout the discussion.

Documents

The other data gathering instrument that the researcher used included secondary documents that helped the researcher to access information from the previous printed annual magazines used as the sources.

6. Data analysis technique and procedure

The data that was collected by qualitative data gathering techniques i.e. using in-depth interview, focus group discussion and document analysis was first written down since the majority of the data was audio tape recorded. Then, the relevant data was categorized so as to make it convenient for description of thematic relationships and patterns of relevance to the research. Thus, thematic analysis, which is a widely used method of analysis in qualitative research, was employed for this study. Braun and Clarke (2006) state that thematic analysis is a foundational method of analysis that needed to be defined and described to solidify its place in qualitative research. They also define thematic analysis as: “A method for identifying, analyzing and reporting patterns within data.” (p. 79). It is a good approach to research where you’re trying to find out something about people’s views, opinions, knowledge, experiences or values from a set

of qualitative data – for example, interview transcripts, social media profiles, or survey responses.

The study was purely qualitative involving explanation and interpretation of results. For simplicity, the long strings of names and response items were coded as follows:

FGD1: focus group discussion with farmers from Huletuyegoma kebele

FGD2: focus group discussion with farmers from Mossobo kebele

II1: in-depth interview with agricultural extension experts from Huletuyegoma kebele

II2: in-depth interview with agricultural extension expert's from Mossobo kebele

II3: in-depth interview with Agricultural researchers and research coordinator from Andsa livestock research center

II4: in-depth interview with Agricultural researchers and research coordinator from Adit research center

II5: in-depth interview with communication director from Amhara agricultural research institute

7. Ethical Consideration

In this research, due attention and respect was given for the rights of the individuals who participated in this study. Deacon, Murdock, Pickering and Golding (1999), Best and Kahn (1993) and Bhattacharjee (2012) stated that ethical considerations include issues of harm, informed consent, deception, privacy and confidentiality of the data sources. All these ethical issues were carefully considered in the course of this study. For example, consent and access letter from the target organization (ARARI) was granted. Personal as well as group interviews and observations were made confidential, and pseudo name was used during the reporting of the research results. Participants were also informed about the purpose of the study before they participated in this study. Especially the rural community (farmers) who were illiterate, verbal explanation was used in order to get their free consent. Such approach could make this research trustworthy in respecting the local culture instead of simply adopting the Western concept of consent letter usually in written form. Therefore, this research used both written and oral

consents based on the local situation. Research ethics was not taken as the onetime task; it was rather an ongoing process till the end of the research report.

CHAPTER FOUR

4. Presentation and interpretation of results

1. Introduction

This Chapter seeks to answer questions raised by the research i.e. what communication strategies are used in the diffusion of agricultural innovation in Amhara agricultural research institute? How do diffusion of innovation practiced in ARARI extension workers, researchers and communication experts? How do the farmers adopt agricultural innovation provided by ARARI? And what are the factors that affect the communication practices in the diffusion of Agricultural innovation?

Therefore, in order to address the objective of the study, the data collected through qualitative method is presented and discussed thematically. Findings from in-depth interviews, focus group discussion and document analysis are presented and analyzed together in the result part.

4.2 Communication strategies for the diffusion of agricultural innovation in Amhara Region Agricultural Research Institute (ARARI)

According to Colin and Villet, (1994) expressed that the planned use of communication techniques, activities and media gives people powerful tools both to experience change and actually to guide it. An intensified exchange of ideas among all sectors of society can lead to the greater involvement of people in a common cause. This is a fundamental requirement for appropriate and sustainable development. As the Food and Agricultural Organization of the United Nations/German Technical Cooperation (FAO/GTZ) (2004: [Internet]) indicates, effective communication among research, extension and farmers depends on:

- Policies and markets conducive (favorable) for communication,
- Involvement of farmers through participatory methods,
- Communicative capacities and attitude of research/extension services,
- Farmers' organizations as partners in communication,
- Utilization of different media options,

- Monitoring and impact evaluation of communication strategies.

The implication is that absence of these success factors has a detrimental impact on communication practices on diffusion of agricultural innovation.

From above idea the researcher could understand that the planned use of communication techniques, activities and media are the more effective strategies that to bring sustainable development in the institution. Based on this assumption when we saw the Amhara Region Agricultural Research Institute communication strategies are partially planned used of methods communication strategies. To confirm this point the Amhara Region Agricultural Research Institute communication directorate director Ato Mulugeta Asefaw expressed that

We believed that we have used planned communication strategies for the diffusing of agricultural technologies for the farmers like annual planning method of communication. Which means the institution experts and researchers first put annual plan what will be done at the end of a year, then after the agricultural extension experts and communication directors performed their activities based on the annual planning like creating awareness the farmers about the importance of using or adopting agricultural technologies. The annual plan activities may be listed in monthly, bi-month, quarterly or sub quarterly meetings of exchange agricultural information with the farmers and extension workers. By these means we could exchange information. Especially the agricultural extension experts are the main communicator for disseminating agricultural information for the farmers. That means first the agricultural extension experts select the model farmers that thought accept and implement the new agricultural technologies effectively. Then they gave trainings the farmers about the importance of using the new agricultural technologies for the betterment of farmer's life. After training the model farmers implemented the new agricultural technologies practically by the supporting of agricultural extension workers.

Plus to these the agricultural extension experts they formed farmers' development group members, like one to five and 25 up to 35 group members. These group members have a leader that to give or provide agricultural information the farmers from got ideas the agricultural extension experts for exchanging information with the farmers. These approaches are the main methods to exchange agricultural information in the institution. And sometimes we used

interpersonal or face-to-face communication approaches for the exchange of agricultural information during the farm time with the farmers for the creating of awareness knowledge to implement or diffuse the new agricultural technologies properly.

Additionally we also used field days and exhibitions days for the exchange of agricultural information with the farmers together. By this means the farmers got experience from other farmers. And we used print media such as annual magazines, leaflets, brochures, newsletters, flipcharts, etc. But when we saw the accessibility printed materials are very small in the case of lack of budget for publishing. It might reaches only the agricultural extension workers and researchers, but never reach the farmers that could read printed materials. on the other side sometimes we used also electronic media such as radio and television programs and news stories by the invitation of the mass media institutions once or twice times in a year. Because the media institutions are not voluntary to make programs or news stories without payment. They asked great deal of payment for air times and columns. These are the main problems to disseminate agricultural information for the farmers. By this case we could not use electronic media that we could say. However we used social media such as face book and email address for the exchange of agricultural information with agricultural extension experts and researchers.

The other method of communication approaches are experience sharing of the farmers with other model farmers. These also are very effective communication methods for the farmers to implement agricultural technologies properly. Because the farmers believed or trust the model farmers instead of implement the agricultural extension experts told theoretically. They could see the crops on the farming place practically instead of theoretically. We also used operational calendars for creating awareness the farmers by providing monthly trainings about the importance of using agricultural technologies. But when we saw the effectiveness of implementation of agricultural technologies were not effective. Because most of the farmers are not used the agricultural technologies effectively by lack of awareness about agricultural technologies. It needs a big effort for the future that the farmers to implement agricultural technologies effectively by themselves independently instead of supporting agricultural extension experts.

Generally when we saw the linkage of activities extension experts, researchers and farmers are not effective, because it lacks coordination. Therefore the farmers, extension

experts and researchers work together cooperatively for the future that to diffuse or adopt agricultural technologies. And also implements planned used of communication strategies or approaches by the supporting of mass media channels.

From the above idea the researcher could understand that the institution partially implemented or used print and electronic media and participatory communication approaches for the diffusion of agricultural technologies for the farmers. However, the institution more gives attention the electronic media (radio and television), opinion leaders and change agents. And it implemented fully planned of communication strategy method.

On the other side, According to Rolling (1986) expressed that Agricultural Knowledge and Information Systems (AKIS) combines agricultural research, extension and education in one system (also known as the knowledge triangle) and focuses on how the three activities generate new knowledge and information for farmers. The basic premise of AKIS is that research and extension should not be seen as separate institutions which must somehow be linked; instead, scientists working on different types of research and extension agents at all levels should be seen as participants in a single Agricultural Knowledge and Information System (AKIS). Rolling (1986) defined AKIS as: “a set of agricultural organizations and/or persons, and the links and interactions between them, engaged in such processes as the generation, transformation, transmission, storage, retrieval, integration, diffusion and utilization of knowledge and information, with the purpose of working synergic ally to support decision-making, problem solving and innovation in a given country’s agriculture”.

More recently, the FAO and the World Bank joined forces in promoting the concept of AKIS with the publication of ‘strategic vision and guiding principles’ on the topic in 2000. This document defined AKIS thus: [An AKIS] links people and institutions to promote mutual learning and generate, share and utilize agriculture-related technology, knowledge and information. The system integrates farmers, agricultural educators, researchers and extension personnel to harness knowledge and information from various sources for better farming and improved livelihoods. The transformations taking place within an AKIS are as follows:

- From information on local farming systems to research problems
- From research problems to research findings

- From research findings to tentative solutions to problems (technologies)
- From technologies to prototype (sample) recommendations for testing in farmers' fields
- From recommendations to observations of farmer behavior (male, female, children)
- From technical recommendations to information affecting service (inputs and marketing) behavior
- From adapted recommendations to information dissemination by extension
- From extension information to farmer knowledge

Plus to this, according to Gerbaleta (2018), smallholder agriculture forms the backbone of the Ethiopian economy, supporting about 85% of the country's population. Since the late 1960s, the state has been actively pursuing agricultural extension as a key means of agricultural and rural development as well as economic transformation. Over the years, the state has introduced several reforms to update and validate its agricultural extension agenda. However, despite reforms, the effectiveness of the extension service in promoting technology transfer and enhancing its adoption has remained low. Top down planning and poor technology transfers have been identified as the main bottlenecks. In 2010, as part of its recent reform process, the Ministry of Agriculture has adopted the participatory extension system, which is characterized by the formation of farmer groups. In this system, development agents and model farmers are assumed to be key actors in the implementation of the participatory extension system in each kebele where the role of the kebele administration is to oversee the implementation at the local level. However, as kebeles were weakly institutionalized and had poor capacity, their duties were often transferred to the development agents. Despite the steadily (many) increasing number of development agents, most of them were insufficiently trained and involved in multiple activities, which diminished their effectiveness in providing extension services and in trusting the farmers. Attempts have been made to provide group extension services through public mobilization. However, community involvement was achieved through persuasion and pressure, which could lead to adverse effects on their participation.

4.3 The diffusion of agricultural innovation practice in Amhara Agricultural Research Institution by agricultural extension experts, researchers and communication officer

Concerning this research question, respondents II1 and II2 revealed that “we tried to announce the modern agricultural technologies for the farmers by different communication methods.” First, we selected the model farmers that we thought capable of implementing the modern agricultural technologies. Then, we gave them trainings about the importance of modern agricultural technologies and how to use that to improve their lives. After the training, we showed them the demonstrations that were piloted at the agricultural research centers in our farming places. Based on their observation, the farmers selected the best agricultural technologies based on their interests. When they came up with their agreement, we showed them how to use the agricultural technologies for the implementation.

We have used also one to five development farmer group members to diffuse agricultural technologies for the farmers. These group members were selected by the community members that believed to persuade the farmers by giving advice as trainees. And we also used 25 up to 30 farmer group members as announcer for the new or modern agricultural technologies or products by themselves. These group members had a leader. A leader gave agricultural information for the group members that got information from agricultural extension experts. They discussed together about agricultural products and services.

However, the exchange of agricultural information was based on the group member leaders' capacity or knowledge. If a leader was more active; the group members would also be very active to implement or use the new agricultural technologies or products. If a leader was passive; the group members would also be more passive to implement the new agricultural technologies or products. More of the groups were very passive to implement the new agricultural technologies or products. However, we could not use mass media to announce the agricultural technologies for farmers. This was the main problem that hindered to perform our activities said the respondents. But, we believe that mass media is the best instrument to announce the new agricultural technologies for the farmers.

Based on the above respondents' views, respondents II4 andII5 also revealed or supported that the level of using agricultural technologies were based on the ability of the leader activities. Some of the leaders were very active to give information about agricultural technologies for the farmer. They helped the research center by announcing the new agricultural technologies that the farmer used or implemented. However, some of the farmers were not implementing the new agricultural technologies due to the lack of agricultural information from the agricultural extension experts and the farmer group member leaders.

From the above ideas the researcher realized that agricultural extension experts were trying to announce the new agricultural technologies for the farmers by the collaboration of the model farmers, through one to five development group members and 25 up to 30 farmer group members. This is consistent with different scholars who asserted that "to learn by peers are very interesting to diffuse agricultural technologies."

Rogers (1983) stated that a social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The members or units of a social system may be individuals, informal groups, organizations, and/or subsystems. Each unit in a social system can be distinguished from other units. All members cooperate at least to the extent of seeking to solve a common problem in order to reach a mutual goal. This sharing of a common objective binds the system together. It is important to remember that diffusion occurs within a social system, because the social structure of the system affects the innovation's diffusion in several ways. The social system constitutes a boundary within which an innovation diffuses.

Furthermore, Katz (1961) remarked, "It is as unthinkable to study diffusion without some knowledge of the social structures in which potential adopters are located as it is to study blood circulation without adequate knowledge of the structure of veins and arteries." Compared to other aspects of diffusion research, however, there have been relatively few studies of how the social or communication structure of a system affects the diffusion and adoption of innovations in that system. One explanation may be that, methodologically, it is a rather tricky business to untangle the effects of a system's structure on diffusion, independent from the effects of the characteristics of the individuals that make up the system. Contrary to this view, the agricultural extension experts could not use mass media to announce agricultural technologies.

Based on these ideas Rogers (1983, P. 17-18) said that mass media channels are all those means of transmitting messages that involve a mass medium, such as radio, television, newspapers, and so on, which enable a source of one or a few individuals to reach an audience of many. Because mass media channels are often the most rapid and efficient means to inform an audience of potential adopters about the existence of an innovation, that is, to create awareness-knowledge. But the agricultural extension could not provide mass media as sources of information to announce agricultural products and services. By this case most of the time the innovations of diffusion agricultural technologies are not reach the farmers and not implement properly.

On the other hand, response from the respondents II5 revealed that “most of the time we have used print medium to announce the agricultural technologies for the farmers like by leaflets, brochures, annual magazines, and newsletters and also social media.” But their printed materials were not sufficiently published on the basis of our customers because of shortage of budgets. They sometimes also used electronics medium like radio and television. However, these media were not adequately used because great deal of money to be paid for the media was required to announce the agricultural technologies or products.

On the other hand, the institution did not have enough budgets to pay money for air times that announcing the new agricultural technologies or products by mass media (radio and television) although it is believed that electronics mediums are more powerful to announce the modern agricultural technologies or products. On the other hand, we used face- to -face communication methods to announce the new agricultural technologies or products using agricultural extension experts and the model farmer groups. We also used the farmers’ development groups like one to five group members and 25 to 35 group members. By these means we could create awareness knowledge to the farmers about the new agricultural technologies or products. However, it needs more efforts to announce the modern agricultural technologies or products for the future.

Evert Roger’s (1962) articulated that ‘diffusion of innovations’ theory views development communication largely as a product of mass media. But the ARRI research centers or institution did not give attentions on using the mass media to announce the agricultural products for the farmers. Whereas, the participatory model from Paulo Freire (1970) holds the belief that development communication is rather a horizontal process of

information exchange and interaction (Morris, 2000: [Internet]; Servares, 1999: 84–85; Gandelsonas, 2002: 3).

Based on this idea, researcher could understand that the agricultural research center performed horizontal communication partially. But the institution needs more attention on the horizontal communication or interactive communication. Again, there are two major approaches to participatory communication: the Freirian approach which is based on group dialogue and stresses the form or intentions of communication act and the UNESCO (1977) approach which emphasizes access to media, participation and self -management (Servares, 1996a: 17; Servares, 1999: 84–85; Morris, 2000: [Internet]).

4.4 Farmers adoptability of by using modern agricultural technologies

In response to this question, most of the respondents FGD1 and FGD2 revealed we could communicate with agricultural extension experts and communication directors about agricultural products, such as special seeds, fertilizers, pesticides, hybrid animals and plowing by lines the means of group communication and sometimes using face-to-face or interpersonal communication methods.

We could get some information about such agricultural products. Based on this knowledge, we could implement special seeds, fertilizers, pesticides, hybrid animals and plowing by lines. Though; our productivities (yields) are enhancing more than two times when we compare them with the previous times. We could get 60 quintals of maize in one hectare. But, previously we have got only 20quintals of maize. So, our yields were increasing from time to time. Additionally; we were benefitted from animal products such as milk and meat. We have got 15 liters of milk per daily and we could sell each litter of milk by 14 birr. Totally, our income from milkwas210 birr and we have got 6300 birr per month. And we could sell one hybrid animals up to 50 - 60 thousand birr's. And we could earn 120 thousand birr from the sale of two animals. By these means, our lives have been changing when we compare it with the previous times.

These the respondents III and II2 also expressed that we could communicate with the farmers by group communication and partially interpersonal communication. By these methods we shared agricultural information with farmers' about how to implement the

new agricultural products such as special seeds, fertilizers, pesticides, and hybrid animals.

On the other side, one of respondents from FGD1 revealed that we cannot implement modern agricultural products such as special seeds and hybrid animals because the prices of each agricultural product were very expensive while it is compared with the local agricultural products. That means the price of special seeds increases more than two times. For example, if the price of the local seeds was seven hundred, the price of special seeds is 1400birr, which was very expensive to buy it and use it. Especially, the prices of hybrid animals were very expensive when compared with the prices of the local animals. We couldn't buy it and use it. For example; if we wanted to buy one hybrid animals like a cow or an ox, it would require up to 50 up to 60 thousand birr, which was more expensive than the price of the local animal-15 thousand birr.

On the other side; some of the respondents (farmers) said that the exchanges of ideas were not compatible or effective when we discussed in group communication methods because of shortage of time as it was usually dominated by the other farmers so that we couldn't reflect our feelings or questions to the agricultural extension experts. As a result, our attempts to get advice and information on how to use or implement the modern agricultural technologies from the agricultural extension experts were usually hampered, indicating the necessity of establishing better relationship with experts.

On the other side, compared to group communication methods, inter- personal communication approaches are very important. It provides open communication opportunities for us to reflect our feelings or questions with the agricultural extension expert's directly. Despite shortage of time, we could ask different questions for the agricultural extension experts and we can get responses from them. Almost we could meet together every two or three months in a year. This also would affect our communication systems if we wanted to discuss or meet together with agricultural extension experts. Based on this assumptions Rogers (1983, P. 17-18) articulated that interpersonal channels are more effective in persuading an individual to adopt a new idea, especially if the interpersonal channel links two or more individuals who are near peers. Interpersonal channels involve a face-to-face exchange between two or more individuals.

With regard to this, agricultural extension communication also takes central position for sharing information about research results to help users improve agricultural production and productivity. This is because the application of communication for development in LDCs has wide- ranging goals. In this regard, Tadese (2006) cited in Waisbord (2001: [internet]) notes that the ultimate goal of development communication is to:

- raise the quality of life of populations, including increase income and well-being,
- promote land reform and freedom of speech and,
- Establish community centers for leisure and entertainment.

But, these goals of development communication can be met when there is effective communication supported by appropriate strategies and approaches. As the Food and Agricultural Organization of the United Nations/German Technical Cooperation (FAO/GTZ) (2004: [Internet]) indicates, effective communication among research, extension and farmers depends on:

- Policies and markets conducive (favorable) for communication,
- Involvement of farmers through participatory methods,
- Communicative capacities and attitude of research/extension services,
- Farmers' organizations as partners in communication,
- Utilization of different media options,
- Monitoring and impact evaluation of communication strategies.

The implication is that absence of these problems has a detrimental impact on communication practices on diffusion of agricultural innovation in ARARI.

Based on these ideas the researcher could understand that the agricultural extension experts did mostly use interpersonal communication when they attempted to create awareness for the farmers. And they also used focus group communication, which was accepted by the farmers. Because all the farmers have got a chance to reflect their idea, effectively without limitation independently and also they have got a chance at experience sharing each others. The respondents FGD1 and FGD2 revealed that we cannot listen to radio and watch television and read newspapers because we didn't have a chance accesses to listen to radio or watch television and read newspapers. However, if we can get a chance, we need to listen to radio and watch television and read newspapers if it is related to agricultural information.

Rogers (1983, P. 17-18) expressed that Mass media channels are all those means of transmitting messages that involve a mass medium, such as radio, television, newspapers, and so on, which enable a source of one or a few individuals to reach an audience of many that to create awareness the farmers about agricultural technologies effectively. Contrary to this fact, however, the agricultural extension experts did not use mass media to diffuse agricultural products.

On the other side, individual, group, and mass media approaches to agricultural extension and advisory services have been used currently as international level. The continuing increase in number of farming families has led to growing emphasis on approaches to reach at a time. Realizing the importance of mass media in extension, the use of radio has evolved in terms of the policies, laws, approaches and players involved. Additionally radio is an excellent, cost-effective means of sharing knowledge, building awareness, facilitating informed decision making and supporting the adoption of new practices by small- scale farmers (farm radio international, 2007).

Furthermore, technology adoption by farmers has not been promising because as it has been pointed out earlier, the different extension approaches have been planned and implemented without the participation of the people they were meant for. Information and messages about new and improved agricultural technologies including inputs and farming practices were not appropriately communicated to users who mainly were subsistent farmers.

The roles of communication for development were either neglected or overlooked. In this regard, Mundy and Sultan write:

Without communication...progress would be unimaginable [complex or difficult]. Why, then, is it so neglected in development efforts? Huge research organizations, whose sole purpose is to develop new farming technologies (i.e., generate new information) and communicate them to farmers, relegate the communication part to the dustbin. Instead of creating wealth, research findings gather dust. Agricultural extension agencies (never very effective) are being downsized and closed, to be replaced by well, nothing. The potential of media that do reach people in remote rural areas (channels such as radio, market traders, churches and mosques) is ignored. (2001: 1)

From the above points, the researcher could understand that the farmers had interest to get agricultural information from the mass media. However, they did not get chances to use it. The mass media is a very essential means of providing different agricultural information on how to use and implement modern agricultural information for the farmers as it reaches the mass of the populations within times at once. The lack of access of this platform in the study area means that the farmers were disadvantaged regarding the use of the mass media.

On the other side, respondents III and II2 also underscored (focused on) the vitality of using modern agricultural technologies to improve the farmers' lives although they did not use modern agricultural technologies, such as special (new) seeds, fertilizers, pesticides and plowing by lines instead of throwing by hand. Previously they could not lead their lives properly. Their lives have gone from bad to worse when the farmers that did not use the modern agricultural technologies. They couldn't lead their family properly compared to those farmers who used modern agricultural technologies. Their income was still low because they did not implement our advices to use modern agricultural technologies; they followed only their traditional methods. From the above response, one could conclude that agricultural extension experts were committed to providing advices for farmers if they wish to apply modern agricultural technologies, which are believed to be very essential to improve the farmer's life (on September 5/2012E.C).

On the other side, some of the respondents said that they did not apply the modern agricultural technologies because, the prices of the modern agricultural technologies are very expensive; we cannot buy the new agricultural products. Respondents III and II2 also supported the farmer's ideas. The price of the modern agricultural technologies was very expensive. For this reason, the farmer did not implement the new agricultural technologies although we advised them to apply or implement it. This is the big problem for our day to day activities; if it is possible the modern agricultural technologies should be provided pertaining to the level of the farmers economic or living standards. Otherwise, the poor farmers do not have a chance to use the modern agricultural technologies.

Based on this idea Rogers (1983, p.20-22) expressed that Innovativeness and adopter categories are categorized: the innovators, early adopters, early majority, late majority, and laggards. When we see the innovators are willing to take risks, have the highest social status, have financial liquidity, are social and have closest contact to scientific sources and interaction with other innovators. Their risk tolerance allows them to adopt technologies that may ultimately fail. Financial resources help absorb these failures.

On the other side when we see the laggards, they are the last to adopt an innovation. Unlike some of the previous categories, individuals in this category show little to no opinion leadership. These individuals typically have an aversion to change agents. Laggards typically tend to be focused on "traditions", lowest social status, lowest financial liquidity, oldest among adopters, and in contact with only family and close friends (Rogers 1962, p. 283). By this perception they are not implemented agricultural technologies. They need more awareness about the technologies to adapt or use.

On the other side, respondents III1 and III2 expressed that the farmers acceptability of using modern agricultural technologies were based on the level of knowledge or economic level. Some of the farmers were interested in using or applying the modern agricultural technologies or products. However, most of them did not to use the modern agricultural technologies. We tried to diffuse or inform the farmers to use agricultural technologies or products that are very importance to change their lives. But, they did not accept or implement it. Their responses include, “We need to implement the new agricultural technologies, but we don’t have enough money to buy the new agricultural technologies. Moreover, the complexity the technologies also are the main problem to use modern agricultural technologies for the farmers.

Concerning this, scholars expressed their viewpoints about the diffusion of agricultural innovation depending on the farmers’ levels of awareness and economic levels. These characteristics of innovations, as perceived by individuals, help to explain their different rate of adoption. These characteristics of innovation as generalized by Rogers (1962) are:

- ***Relative advantage*** is the degree to which an innovation is perceived as better than the idea it supersedes (replaced). The degree of relative advantage may be measured in economic terms, but social-prestige factors, convenience, and satisfaction are also often

*important components. It does not matter so much whether an innovation has a great deal of "objective" advantage. What does matter is whether an individual perceives the innovation as advantageous. The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption is going to be. And **Complexity** is the degree to which an innovation is perceived as difficult to understand and use. Some innovations are readily understood by most members of a social system; others are more complicated and will be adopted more slowly. In general, new ideas that are simpler to understand will be adopted more rapidly than innovations that require the adopter to develop new skills and understandings.*

Respondent II4 and II5 also shared the above ideas that the acceptance rate of farmers on using agricultural technologies depends on the farmer's economic level and awareness's. It expects more information from the agricultural extension experts to create farmers' awareness. In other words, if the farmers had enough awareness about agricultural technologies, they would implement step by step and use it properly.

4.5 The main factors communication practices in the diffusion of agricultural innovation in ARARI?

The results of this study showed that lack of accessibility of special seeds, fertilizers, pesticides, and mixed cow or ox (hybrid animals) were the major challenges that affected the research center to distribute agricultural technologies. Due to these main problems, the farmers raised complaints to the center. This also created mistrust between the research center and the farmers. They tended to perceive or believe that the center had untruthful experts. Because we could not provide agricultural products and services when the farmers wanted to use or apply them. We told them during the discussion time that we had enough special seeds, fertilizers, pesticides and mixed or hybrid cow and ox. But, the government could not provide such products and services. However, our relationship was seriously affected because the farmers believed that the problems occurred because of our weaknesses.

Based on the above points, MEDaC (1999) points out that the Ethiopian farmer continues to use low fertilizer rates which are estimated to be an average of 7 Kg of nutrients per hectare of arable land compared with a sub Saharan average of about 9 kg nutrients per hectare of arable land. The world average stood at 65 kg per hectare.

Daniel et al. (1997) also reported that only very few Ethiopian farmers use improved seeds: about 5-10% of total seed used for maize and even less for sorghum, barley and teff (*EragrostisAbyssinica*). Similarly, MOA (1998a) points out that, of the 3.5 million hectares of the potentially irrigable land only 161,010 hectares (4.6%) are currently under irrigation.

The second problem was the acceptability and adoptability of the new agricultural technologies or products for the farmers. Most of the farmers were not interested in applying the new agricultural products and services properly. They took a lot of time to apply or implement it. For this reason, we could not perform our day to day activities. Moreover, the price of special seeds, fertilizers and hybrid animals (cow and ox) were so expensive that the farmers could not implement such products.

The third problem was lack of human resources (agricultural extension experts) to achieve our goals. There were only three or four agricultural extension experts in one kebele. These were not enough to serve the whole kebele communities (farmers) properly. The agricultural extension experts did not reach out the whole farmers when we wanted to create awareness's about agricultural technologies or products for the farmers. This was because the number of agricultural extension experts was not proportionate to the large number of communities in each kebele. The fourth problem was lack of coordination or good communication or relationships between agricultural researchers and agricultural extension experts (ours). We were not working together. This also created huge knowledge gap between us. We needed their supports or advices from the agricultural researchers especially when there were new agricultural technologies or products. Sometimes we didn't know the functions how it operated or it was implemented. Thus, we could not give effective services for the farmers when we wanted to create awareness's about the agricultural technologies or products.

In support of the above views, the absence of effective linkage between agricultural research and extension systems has repeatedly been reported as one of the major reasons for the low productivity of Ethiopian agriculture. There had been no forum where this linkage problem had not been raised as a result of which it has become a concern among policy makers, researchers, development workers and funding organizations (Belay, 2003; Agricultural Research Task Force, 1996; Task Force on Agricultural Extension, 1994a, FDRE, 1999, Belay, Kassa and Dawit, Aalemayehu, 2017).

The other problem was unorganized structural system or lack of proper linkage system to exchanging information among kebel, woreda, Zone, and region levels experts, and researchers. We didn't have good coordination and communication relationships so that we couldn't exchange real information with farmers.

Most of the respondents revealed that "shortages of budget were the main obstacle that hindered to perform agricultural technologies or products in the research center where we couldn't buy or provide modern agricultural technologies for the research purpose." The other main obstacle was that we attempted to perform our activities based on traditional way (conventional) instead of using modern agricultural technologies. And the other problem was the knowledge gap of farmers and agricultural extension experts to apply the modern agricultural technologies. They only followed in traditional ways or experiences instead of being supported by science.

Further, the lacks of human resources in employments even the displacement of researchers for several reasons like small amount of salaries and other benefits etc. were the obstacles in our day to day activities or to perform our research activities. In addition, non-governmental organizations also affected our day to day activities, for they freely provided agricultural technologies for the farmers. As a result, we couldn't perform our activities to achieve the goals of the research center because the farmers always expected the center to give every agricultural technology for free. However, our research center also couldn't provide agricultural technologies for free because of shortage of budget. The other problem was lack of infrastructures such as; we have only small shades, small laboratory rooms (lack of laboratory chemicals), and lack of offices, scarcity of vehicles (cars), not fulfills as we wanted. . Even we couldn't supply the modern seeds as we were expected from research center for the farmers. Lack of cooperation between agricultural extension experts and researchers was also another obstacle.

CHAPTER FIVE

5 Conclusion and Recommendations

5.1 Conclusion

This research was designed to examine communication practices in the process of diffusion of agricultural innovation in Amhara region agricultural research institute: in case of Adit and Andasa research center by identifying how diffusion of innovation was practiced by agricultural extension experts, agricultural researchers, and farmers. This qualitative case study used in-depth interview, focus group discussion and document analysis.

The results of this research indicated that the communication process of diffusion innovation in the agricultural research center was practiced by group discussion and partially through interpersonal communication methods. As a result, there was no opportunity of using other forms of communication. Diffusion of innovation was not treated as one agenda for the farmers so as to perform the modern agricultural technologies or products efficiently. However, if we want to encourage the farmers about diffusing of agricultural technologies or products using only group discussion and partially interpersonal communication approach is not sensible or advisable.

For such community based practices, involving opinion leaders, religious leaders and other influential figures helps to persuade the farmers to be responsible in using the new agricultural technologies or products and services. Also, the communication system of agricultural extension experts should be supported by other means of communication mechanisms like brochures, pictures, bill boards, leaflets and mass media channels like radio and television to introduce the farmers with the modern agricultural technologies or products and services.

Based on the above findings, the following conclusions were drawn. For the overall achievements of diffusion of innovation in agricultural products or technologies, improving the attitude and behavioural change, practice of effective diffusion of innovation communication among those who are concerned is vital. As diffusion of agricultural products is community (farmer) based innovation, enormous attention should be given how to change the behaviour of the farmer by designing specific, clear and well organized communication strategy guideline for diffusion of agricultural products and services. In addition, inappropriate communication

methods such as group communication and partially interpersonal communication methods were used to diffuse agricultural products for the farmers. . However, these methods alone are not enough to diffuse agricultural products for the farmers effectively. Different communication methods, such as radio and television and leaflets, brochures, pictures, billboards etc. should be properly used. Opinion leaders, religious leaders, and famous persons as communication supporters and persuaders need to be included to diffuse agricultural technologies for the farmers. Unorganized structure system and communication systems were used for farmer's development group members for the diffusion of agricultural products. This also affected the exchange of real information among agricultural extension experts, and the farmers. On the other hand, the data revealed that there was poor communication interaction among the agricultural extension experts, researches and the farmers that greatly affected the diffusion of agricultural products.

Insufficient use of mass media programs (news stories or documentaries) also affected the institution to create awareness about the new agricultural products for the farmers. For this reason, most of the farmers didn't use agricultural products effectively. Communication was also hampered by the shortage of human powers especially agricultural extension experts who were not enough to communicate the large number of farmers about agricultural products. Consequentially, the farmers didn't have enough information or awareness about agricultural products and how to implement and use properly in the right way. This was the main problem that created lack of communication among the farmers and agricultural extension experts. Lack of give attentions for interpersonal communication and mass media methods also affected the diffusion of agricultural technologies for the farmers. Moreover, agricultural technologies were not used by the farmers due to lack of knowledge of both the agricultural extension experts and farmers about the new agricultural products on how to implement agricultural technologies properly. Generally, agricultural technologies were not diffused and implemented effectively for the farmers indicating the necessity of designing a good communication approach among the agricultural extension experts, researchers, and farmers.

5.3 Recommendation

The results of this study indicated that in order to diffuse agricultural technologies for the farmers it needs more cooperation and good communication relationship among farmers, agricultural extension experts and researchers. To attain that goal, the following points needs to be implemented:

- Using appropriate communication approaches such as group communication, interpersonal communication and mass media methods (radio, television, newspapers, leaflets, and magazines etc).
- Work together with the opinion leaders, religious leaders and famous persons as the communication supporters or persuaders for the diffusing of agricultural technologies to the farmers. And also build positive relationship among farmers, agricultural extension experts and agricultural researcher by creating a good communication system for the common activities.
- Create awareness thefarmers and agricultural extension experts about the new agricultural products by using mass media or group and interpersonal communication methods and by giving short and long term trainings.
- Fulfil enough human powers especially agricultural extension experts in kebele level and PR experts in the institution that to achieve the institution goal effectively.
- Giving more attention the farmer's development group members as the communication supporters for the diffusing of agricultural products and more focus interpersonal communication methods and mass media methods especially radio is the most appropriate medium for the farmers. And also using one to five farmers' group members as the communication supporters effectively.
- Use development communication properly for the diffusing of agricultural technologies. Agricultural extension experts, researchers and farmers might be work together with a good communication relationship for the diffusing of agricultural technologies.
- Extension communication takes central position for sharing information about research results to end users and thereby helping them improving agricultural production and productivity. Improving inadequacy and low acceptability of communication approaches employed along the research-extension-farmer Continuum.

- Ensuring or providing enough budgets for the research institute, expanding veterinary clinics each kebele level and providing enough animals medicine, fertilizers, special seeds, hybrid animals, and providing or expanding good marketing systems for the farmers in their surroundings and providing cheapest credit financing system for the farmers.
- Generally to solve the above problems, group communication, and interpersonal communication and mass media methods, opinion leaders and change agents need to be used to announce the agricultural technologies or products effectively etc.

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The main objective of this interview is to gather data for the research aiming for the fulfillment of MA (master of degree). Thus, this is academic research. The main purpose of the research is examining communication practice in the process of diffusion of agricultural innovation in Amhara Agricultural Research Institute (ARARI). Accordingly it firmly follows the ethics of the research as indicated in the consent form. Thank you for giving out your time and your experiences as well. Now let us begin our discussion from your bio-data.

Demographic information:-

Sex

Age

Marital status

Occupation

Educational background

kebele

➤ **Guide questions for the focus group Discussion with peasant farmers**

1. Do think modern agricultural technologies improve your life style?
2. Do you employee agricultural technology products and services?
3. What are the agricultural products and services that you employ now?
4. Why you employ agricultural technologies?
5. Or what do benefit from the use of agricultural products and services?
6. Who communicates you to use agricultural products and services?
7. How do you communicate with the agricultural extension workers and researcher?

8. What kind of media do you employ to access information about agricultural products and services?
9. When do agricultural extension workers communicate you toward agricultural products and services?
10. What are the factors that affect you to use agricultural technologies?
11. What recommendations do you have for the future for better performance?

➤ **Guide questions for the in depth interview with Agricultural Extension Workers**

1. How do you communicate to introduce the agricultural products?
2. What are the means of communication to communicate the farmers?
3. What are the communication process to aware the farmers towards new technology?
4. When do you communicate the farmers to use modern farming system?
5. How do you see the acceptability or adoptability of farmers to use agricultural products and services?
6. What is the contribution of researchers to identify the drawbacks of farmers to use agricultural products and services?
7. Do you have cooperation between agricultural researchers?
8. What are the factors that affect to practice the agricultural products?
9. What recommendations do you have for the institution for better performance?

➤ **Guide questions for in depth interview with Researchers**

1. What is the role of research center to improve farmers farming style?
2. What are the pre conditions to conduct research?
3. When do you conduct research? Before or after the introduction of agricultural products?
4. How do you communicate the finding of researches?
5. How do you examine the communication between farmers and agricultural extension workers towards agricultural technology products?

6. Who are your key respondents while the research is conducted a case of agricultural products?
7. What are the factor that affects to use agricultural products in line with farmers and extension workers?
8. What are the factors that affect your day to day activities?
9. What recommendations do you have for the institution for better performance?

➤ **Guide questions for the in depth interview with Communication Director and PR Practitioners**

1. What is the role of PR practitioners to communicate the agricultural products and services?
2. What are the main communication tools to public relation used to employee agricultural products and services?
3. How the researchers and agricultural extension workers communicate the agricultural products and services together?
4. How do get the feedback from the farmers is agricultural technologies employees properly?
5. Do you make the research?
6. What are the day to day difficulties in your work?
7. What recommendations do you have for the institution for better performance?

➤ ከአርሶ አደሮች ጋር የሚደረግ ውይይትና ቃለ መጠይቅ

1. ዘመናዊ የግብርና ቴክኖሎጂዎችን ወይም ግብአቶችን መጠቀም የተሸለ ህይወት እንዲኖር ያደርጋል ብለው ያስባሉ?
2. አዳዲስ የግብርና ግብዓቶችንና አገልግሎቶችን ይተገብራሉ?
3. የትኞችን የግብርና ግብዓቶችን ነው አሁን እየተገበሩ ያሉት?
4. የግብርና ቴክኖሎጂዎችን በመጠቀም ያገኙት ነገር ምንድን ነው?
5. የግብርና ግብዓቶችንና አገልግሎቶችን እንድትጠቀሙ የሚያግዛችሁ ማን ነው?
6. ከግብርና ኤክስቴንዥን ሰራተኞችና አጥኝዎች ጋር በምን ዘዴ ነው የምትግባቡት ወይም የምትወያዩት?
7. ስለ ግብርና ግብዓቶችና አገልግሎቶች መረጃ ለማግኘት ምን አይነት የመገናኛ ብዙሀን ዘዴ ነው የምትጠቀሙት ?
8. የግብርና ግብዓቶችንና እንድትጠቀሙ የግብርና ኤክስቴንዥን ሰራተኞች በየስንት ጊዜው ያወያዩአችኋል?
9. ከተመራማሪዎች ጋር በጋራ ሁኔታዎች የምትሰሩት ስራዎች ምንድን ናቸው?
10. የግብርና ቴክኖሎጂዎችን እንዳትጠቀሙ እንቅፋት የሆኑባችሁ ችግሮች ምንድን ናቸው?
11. በአጠቃላይ ለወደፊቱ የተሸለ የግብርና ግብአቶችና አገልግሎቶች እንዲኖሩ ምን ቢደረግ የተሻለ ነው ይላሉ?

➤ ከግብርና ኤክስቴንዥን ሰራተኞች ጋር የሚደረግ ውይይትና ቃለ መጠይቅ

1. የግብርና ግብአቶችን ለማስተዋወቅ በምን መልኩ እየሰራችሁ ትገኛላችሁ?
2. ከአርሶ
3. አደሮች ጋር በምን መልኩ ነው የምትግባቡት/ የምትወያዩት ?

4. አዳዲስ የግብርና ቴክኖሎጂዎችን አርሶ አደሮች እንዲጠቀሙ ግንዛቤ የምትሰጡት በምን መልኩ ነው ወይም ዘዴ ነው?
5. አርሶ አደሩን የግብርና ቴክኖሎጂ እንዲጠቀም በምን ወቅት ነው የምታወያዩት ?
6. አርሶ አደሩ የግብርና ግብአቶችና አገልግሎቶችን ከመጠቀም አንፃር ያለውን ተቀባይነት እንዴት ያዩታል ?
7. አርሶ አደሩን ከችግር ለማላቀቅና ተጠቃሚ ከማድረግ አንፃር የተመራማሪዎች ሚና ምን ያክል ነው?
8. የግብርና ግብዓቶችን ለመተግበር እንቅፋት የሆኑ ነገሮች ምንድን ናቸው?
9. በአጠቃላይ ለወደፊቱ የተሻለ የግብርና ግብአቶችንና አገልግሎቶችን ተጠቃሚና ተደራሽ ለማድረግ ምን መደረግ አለበት ይላል?

➤ ከተመራማሪዎች ወይም አጥኝዎች ጋር የሚደረግ ውይይትና ቃለ መጠይቅ

1. የምርምር ተቋሙ ለአርሶ አደሩ የተሻለ የግብርና ስርዐት እንዲኖር ከማድረግ አንፃር ያለው ሚና ምንድን ነው?
2. ጥናት ከማካሄዳችሁ በፊት መረጃ የምታገኙት እንዴት ነው?
3. ጥናትና ምርምር የምታካሂዱት መቼ ነው? የግብርና ግብዓቶች ከመተዋወቃችሁ በፊት ወይስ በኋላ?
4. የተገኙ የምርምር ውጤቶችን በምን መንገድ ነው ውጤታማነታቸውን የምትገመግሟቸው?
5. የግብርና ግብዓቶችን በተመለከተ ጥናትና ምርምር ስታከናውኑ በዋናነት የምትጠቀሟቸው የመረጃ ምንጭ ወይም ተወካይ ምንድን ናቸው?
6. በአርሶ አደሮችና በግብርና ኤክስቴሽን ሰራተኞች መካከል ያለውን ተግባራት በምን መልኩ ትገመግማላችሁ?
7. የግብርና ግብዓቶችንና አገልግሎቶችን ተግባራዊ ለማድረግ ለአርሶ አደሮችና ለግብርና ኤክስቴሽን ሰራተኞች እንቅፋት የሆኑባቸው ችግሮች ምንድን ናቸው?
8. ጥናትና ምርምሮችን ስታካሂዱ የሚገጥሟችሁ ችግሮች ምንድን ናቸው?
9. በመጨረሻ የተሻለ ጥናትና ምርምር ለማከናወን ምን ቢደረግ የተሻለ ነው ይላል?

➤ ለኮሚኒቴሽን ዳይሬክተርና ለህዝብ ግንኙነት ባለሙያዎች የሚደረግ ቃለ መጠይቅ

1. የግብርና ግብዓቶችና አገልግሎቶችን ለማሳወቅ በምን መልኩ እየሰራችሁ ነው?
2. የግብርና ግብዓቶችና አገልግሎቶችን ለአርሶ አደሩ ለማዳረስ በዋናነት ምን አይነት የተግባቦት አይነቶችን ተጠቀማላችሁ?
3. የግብርና ኤክስፔሽን ሰራተኞችና አጥኝዎች/ ተመራማሪዎች የግብርና ግብዓቶችን ለማሳወቅ በምን መልኩ እንዲሰሩ ታግዟችኋላችሁ ?
4. የግብርና ግብዓቶች በትክክለኛው መንገድ እየተተገበሩ እንደሆነ መረጃዎችን ከአርሶ አደሩ በምን መልኩ ታገኛላችሁ ?
5. ስራዎችን በየጊዜው ለማከናወን የሚገጥሟችሁ ችግሮች ምንድን ናቸው ?
6. በመጨረሻ የተሻለ ስራ እንዲከናወን ምን ቢደረግ የተሻለ ነው ይላሉ ?