

UNIVERSITY FOR DEVELOPMENT STUDIES

EFFECT OF SIMLI RADION ON THE ADOPTION OF AGRICULTURE INNOVATIONS IN  
THE KUMBUNGU DISTRICT OF GHANA

BY

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DECLARATION AND APPROVAL

**Student**

I ABDULAI VALENTINE RASHID, hereby declare that with the exception of quotations and references duly cited, this thesis entitled '**Exploring the effect Simli Radio has on the Adoption of Agricultural Innovations in the Kumbungu District**' is the result of my own work and it has not been submitted in part or whole for any degree in the University for Development Studies or elsewhere.

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**Supervisor**

I hereby declare that the preparation and presentation of this thesis was supervised in accordance with the guidelines on supervision of theses laid down by the University for Development Studies

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**DEDICATION**

This thesis is dedicated to God Almighty, My family, my pastor and friends.



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## ABSTRACT

The contribution of Community Radio as a strategy for diffusing agricultural innovations cannot be overemphasized in Kumbungu district. The main objective of the study was to investigate the central importance of local radio network influence on convincing farmers to adopt agricultural innovation. It assessed the Role of Simli Radio in the dissemination of Agricultural Technologies among Farmers in Kumbungu district in Northern Ghana. Purposive sampling technique was used for selecting 140 respondents (80 males and 60 females). Data was analyzed using descriptive statistics. The study showed that the respondents have different degree of accessibility to radio. Radio was found to be more accessible (100%) and also the major source (100%) of agricultural technologies to the farmers. The study further revealed that 95% of the respondents affirmed that rural radio has an effect in the dissemination and adoption of agricultural technologies. The factors militating against the effective utilization of innovations communicated by community radio to the farmers in the study area were also identified to be illiteracy, low income level, lack of credit facilities, and inadequate erratic power supply. To enhance the effectiveness of community radio in the dissemination of agricultural technologies for agricultural development in the study area there is need to strengthen the use of radio in information dissemination to farmers, more competent presenters who are knowledgeable in agriculture to handle agricultural programs.



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## LIST OF ABBREVIATIONS

AMARC .....	World Association of Community Radio Broadcasters
CAMFED .....	Campaign For Female Education
CBO.....	Community Based Organization
CCFC.....	Christian Child Fund Of Canada
CEC.....	Cation Exchange Capacity
CFSC.....	Communication for Social Change
C4D.....	Communication for Development
DA.....	District Assembly
DMS.....	Degrees Minute Seconds
ERP.....	Economic Recovery Programme
EL.....	Executive Instrument
FGD.....	Focussed Group Discussion
GDCP.....	Ghanaian Danish Community Programme
GDP.....	Gross Domestic Product
GMT.....	Greenwich Mean Time
HCR.....	Health Communication Resource
ICT.....	Information Communication Technology
IMF.....	International Monetary Fund
ITT.....	International Telecommunications Technology
JHS.....	Junior High School
MIDA.....	Millennium Development Agency
MOFA.....	Ministry of Food and Agriculture
NGO.....	Non-Governmental Organisation
NHIS.....	National Health Insurance Scheme



- NOGCAF.....Northern Ghana Community Action Fund
- OECD.....Organisation for Economic Cooperation And Development
- PRA .....Participatory Rural Appraisal
- RAINS.....Regional Advisory Information and Network Systems
- RRA..... Rapid Rural Appraisal
- SARI..... Savanna Research Institute
- SNV.....Stichting Nederlandse Vrijwilligers (Netherlands Development Organisation)
- SPSS.....Statistical Package for Social Sciences
- TMA.....Tamale Metropolitan Assembly
- UNDP.....United Nations Development Programme
- UNESCO.....United Nations Educational and Scientific Organisation
- UNICEF.....United Nations International Children Emergency Fund



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## CHAPTER ONE

### INTRODUCTION

#### 1.0 Background of the study

Communication is extremely important to human development. Poor communication or lack of it impacts negatively on societal development. In stressing the critical role of communication Diaz-Bordenave (1979), mentions some of its functions as offering opportunity for informed choices, increasing information access to people and encouraging dialogue among leaders and followers. Hoffmann (2000) considers communication as both an organic part of development and an instrument for furthering development. In the same vein, Freire (1985), explains the power of communication as a liberating tool that allows people to champion their own development agenda. Ayirebesia (2007), observes in his study that in spite of the importance of communication on development, it is usually overlooked as development experts often assign a subordinate role to communication or at best it is given an instrumental role.

Effective communication can be used as a tool for improving standards of living of the poor. Standards of living are low for the majority of people in developing countries (Al-Hassan, 2007), and absolute poverty results in severe human suffering among the population. Such a situation tends to constrain economic growth and is therefore socially, politically and economically unacceptable in the long run. Improvement of living standards of the poor in developing countries through effective communication is therefore one of the most important tasks facing governments of such countries and indeed the whole of humanity (Mac Namara, 1985). Effective communication plays a very important role in poverty reduction. This is because it provides the basis for socio-economic development in the majority of developing countries (Al-Hassan, 2007).



In Ghana and other developing countries, communities have depended on their own modes of communication. However, these are in mutation. In some cases, they face extinction. Western culture has introduced modern modes of communication such as, print, radio, television and the internet into the economy as means of assisting in development processes. The significance of communication for human life cannot be overestimated. This is true because beyond the physical requirements of food and shelter, man needs to communicate with his/her fellow human beings. This urge for communication is a primal one and in our contemporary civilization, a necessity for survival. That is to say without communication no society can exist, much less develop and survive, thus for the existence as well as the organization of every society, communication is a fundamental and vital process (Eyiah, 2004).

In Ghana communication as a tool for information dissemination has helped in the development process. For example, the mass media and other media have been used in Ghana to establish contact with the populace on developmental issues. Creating public awareness about social, economic, political, economic and cultural issues is one major way to achieve development.

With Communication increasingly recognized by many agencies as a development tool with the ever-evolving world of information technologies (i.e. radio, internet, mobile phones etc.) being used to mobilize social change. Whilst information technologies have now reached unprecedented levels, large disparities still exist between richer and poorer nations, (ITU, 2009). In most African and Asian countries, many of the poorest people still live in rural areas (Satterthwaite, 2003). In remote areas, radio is often the only medium available that is pervasive, accessible and affordable (Girard, 2003).



There is much literature on the potential of radio, in particular to bring social change, as its sole focus is the community as opposed to profit (Myers, 2008). There is also research that evaluates the impact of particular radio programmes on society an example is Shree Ram Khanal's role of radio in agriculture development and more closely Seidu Al Hassan et al 'role of community radio in livelihood improvement; the case of Simli Radio'. However, there is the research done is little documented primary research into the overall effectiveness of radio stations in Ghana. The need for documented primary research, and useful indicators to measure effectiveness, was highlighted in a global assessment of radio, conducted by the World Association of Community Radio Broadcasters in 2006 (AMARC 2007).

The use of the radio as a medium of transmitting information is vital for the development of rural areas, especially in their main source of livelihood which is Agriculture. Agriculture remains a major sector in most African countries where it accounts for up to 12.7% of the total GDP and up to 60% to export revenue and remains a major source of income to a significant share of rural households (UNCTAD Handbook of Statistics 2010). Despite this importance, the agricultural sector in Africa has consistently faced a crucial problem of low productivity. As a consequence, increase in agricultural crop production relies mainly on area expansion. This is true for most crops. However, area expansion is getting difficult because of the demographic pressure due to population and urbanization. This threat to agriculture production is worsened by the negative effect of climate change. Thus, raising productivity could be the most sustainable option but challenging. Also, agricultural productivity increase is widely accepted as a strategic approach to contribute to poverty alleviation in developing countries.

To address the low agricultural productivity issue and consequently poverty and food insecurity, national and international agricultural research centers have developed and still are developing a



wide range of technologies. These technologies comprise high-yielding cultivars, best farm management practices, fertilizer, crop protection and harvest technologies as well as agricultural equipment, etc. The adoption of improved varieties along with best crop management practices and mechanization has been identified as one of the major engine of the Green Revolution in Asia. However, the diffusion and the adoption of most of these technologies are incomplete and even low in Africa (Abdulai and Hoffman, 2007). Thus, the greater and wider diffusion of an improved agricultural innovation could constitute undoubtedly, an important strategy for agricultural intensification, productivity increase leading to poverty reduction and food security in Africa.

To achieve the goal of reducing poverty by improving agriculture productivity through innovation communication through radio, it is important to identify constraints to diffusion and adoption of improved technologies in Africa. The first step of adoption of new technologies is the “exposure”. “Exposure” is simply the knowledge of the existence of the technology. Diagne and Demont (2007) argued that if a farmer has not been exposed to the modern variety, it is unlikely that he adopts it. However exposure simply is not a pre requisite for a complete determinant of adoption. Possibly, knowledge of some important characteristics of the technology is critical in farmer decision to adopt (Diagne and Demont, 2007). This knowledge could be just a subjective perception on the performance of the new technology compared to the traditional one (Nowak, 1992; Adesina and Baidu-Forsons, 1995). These perceptions could be formed formally or informally and are likely to increase propensity to adopt a given technology.

The literature usually distinguishes three principal, but overlapping, channels through which learning and knowledge accumulation on agricultural technologies could occur (Lam, 1998). First, a farmer could acquire knowledge or learn through formal agricultural education and training. This is the channel through which research outputs are formally diffused to first adopters. It is also the





channel that delivers the “most perfect” information about the technology. The second channel is social network. Through this channel, the agricultural information is conveyed to the farmer within its community by peers who also probably acquire the information through the first channel or from other peers. The third channel is the individual self-learning. This occurs when the farmer discovers some best features of the technology or updates his/her beliefs about the characteristics (Cameron et al., 1999). This last channel is important to strengthen the ability and the skills of the adopting farmers (Conley and Udry, 2001).

The first two channels use various tools and methods to spread the information to potential adopters. Direct contact between an extension agents or a field researcher constituted the most widely used methods of knowledge transmission in rural area. The method has the advantage that the audience could interact with the trainers and clarify any questions or doubts about the information received. However it presents the inconvenience that only a small audience can be reached at the same time. The relatively low adoption rate of improved varieties questions the effectiveness of such methods. Since the late 1990s and early 2000s, with the development of information and communication technologies such radio, television, CDs, mobile phone and internet, an important avenue was opened for a massive outreach and delivery of agricultural knowledge at an incredibly low marginal cost. In most countries, a high proportion of household owns at least one radio receptor. Among the ICTs, radio is one of the fastest for communicating agricultural information. It has been used as extension tool since several years (Bereh, 2002). Wele (1991) argued that radio has been quite successful in spreading agricultural information in several countries such as Brazil and Cote d’Ivoire. Also in Nigeria, radio listening groups and clubs have been a popular extension strategy (Dimelu and Anyawu, 2004). The radio is very effective in terms of audience reached and cost of production is less than most other ICT tools. In most countries

radio coverage is usually greater than television coverage and there are more radio stations than TV channels. In addition, it is less costly to own a small radio set than owning a television receptor.

It is important to add that because the radio as a communication tool is used to share ideas, knowledge and beliefs in order to develop a common way of living, some Non-Governmental Organization (NGOs), stakeholders, philanthropists and Community Based Organizations (CBOs) establish and use it to empower rural people. When the Ghanaian Danish Community Programme (GDCCP) brought the idea of establishing a community radio in Dalun the people welcomed it without any reservations. Simli radio (95.3 MHz) therefore was born.

Simli Radio is a community radio station located in a small rural community called Dalun which is about 37 km away from Tamale, the capital of the Northern Region; Dalun is in the Kumbungu District of the Northern Region of Ghana. Simli Radio was established in 1996 under the Ghanaian Danish Community Programme (GDCCP), an integrated rural development programme. The overall strategy of GDCCP has been to promote integrated rural development that will create an enabling environment for constructive dialoguing between duty bearers and rights holders; thus giving voice to the vulnerable and excluded to demand for and claim their rights. Simli Radio was established to complement the efforts of the first three sectors namely (Community Projects, Dagbon Ninkesim Karim Zong (DNK), and Simli Pong (SP)) by giving more information on the activities of the GDCCP, recording the gains made, and performing the role of an extension education unit. The radio and communications sector was also funded by Danida till the end of December 2008 when it became totally independent (Simli Radio, 2010). Community radio plays a significant role at the grass roots level for rural development. For instance, issues of poverty, agriculture, gender inequality, education, social problems among others could be the focus for programming. In exploring the importance of sharing information locally and the opening up of wider information



networks for farmers in Northern Ghana with reference to vernacular radio programmes, Chapman et al (2003) found that rural radio is effective in improving the sharing of agricultural information by remote rural farming communities. Radio in this regard provides a set of participatory communication techniques that support agricultural extension efforts. It provides opportunity for feedback from listeners in the form of calling in during radio discussions to ask questions and contribute to programmes, by using local languages to communicate directly with farmers and listeners' groups. Using the most significant change process, Walter et al (2011) assessed the impact of community radio in Indonesia and concluded that effective radio activities can make a significant change in a community's life.

This study was therefore designed to help explore the influence Rural Radio has on the adoption of innovations in rural communities especially Agriculture innovations. This study hopefully fills an important gap by providing an assessment of learning by farmers from radio agricultural broadcasts in Dalun in the northern region of Ghana.


### **1.1 Problem Statement**

Communication is seen as a tool for creating awareness, educating people on ideas and skills for the implementation of projects and programmes (Ansu-Kyeremeh, 1997). In order for communities to participate effectively in developmental processes it is imperative to be interested in the most effective mode of communicating to all stakeholders. The northern part of Ghana provides us with a classic case of poverty, underdevelopment, marginalization and the need for an effective mode of communication.

Saad (2002), observes in his research that the media helps in fighting social evils, illiteracy as well as poverty. With a case in India as a focus, he posited the media playing a pivotal role in spreading

knowledge in traditional societies. He speaks of how regular broadcast of agricultural issues and on various social and moral evils, contributed in bringing about development in the country. Poverty produces its own subculture that erodes the confidence of its victims and hence reduces their participation in the development process.

The issues of poverty and finding remedy presents a problematic situation of how to overcome poverty using the effective communication channels in a way that would not stir social stability and yet be effective enough in bringing an increasing number of people into the center of development processes. Radio as a means of communication is one of the means of the ways in which entertainment, education and information is provided to the public. As a source of information and education, it transmits programs related to agriculture and gives valuable information about new and improved farming methods to farmers in the community they are found. Radio transmission is quick and reaches to a wider population. As the farmers receive useful information from the radio, gradually they bring change in farming method applying new techniques (Ekoja, 2003, p.21).



The extent to which Simli radio contributes to improving the lives or otherwise by providing information to enhancing their livelihoods situations and Agricultural technology transfer of its listeners is not well documented and as to whether Simli community radio as a medium of communication in the Dalun area is meeting the development needs of the people by communicating innovations for the betterment of their agricultural practices thus improving their standards of living, or if it does, how effective is it? What sort of issue does it address effectively? What are the perceptions of the development actors themselves as well as the beneficiaries? It is against this background that the study seeks to explore the effect Simli radio has on the adoption of extension innovations in the Kumbungu district.

## 1.2 Significance of the Study

Chapman et al (2003) reported that the growth of the rural radio stations reflects both the improvements in information technologies and the shifting of development paradigms towards a more participatory style of information transfer. Kumar (2004) identified radio as an avenue for participatory communication and as a tool relevant in both economic and social development. Community radio can play a significant role at the grass root level for rural development. For instance issues of poverty, agriculture, gender inequality, education, social problems among others could be the focus for programming. In exploring the importance of sharing information locally and the opening up of wider information networks for farmers in northern Ghana with reference to vernacular radio programmes rural radio has been found to be an effective medium in improving the sharing of agricultural information to remote rural farming communities. Radio in this regard provides a set of participatory techniques that support agricultural extension efforts by using local languages to communicate innovations directly with farmers and listener groups. Walter et al (2001) in his assessment of the impact of community radio in Indonesia concluded that effective radio activities can make a significant change in a community. By this process, community members provide feedback in the form of stories describing change in their life as a result of the activities of radio. Hence the study will assess the extent to which Simli radio has either or not improved the adoption process of agricultural technology in the Kumbungu district.

The purpose of this study is to provide firsthand information on the activities of the radio station with regards to agricultural activities, how its programming content has improved the adoption of some agriculture innovation in the past, identify the challenges faced in the process of diffusion of innovations to rural people and how it can be enhanced in the area. The research will also serve as impetus for further research in the area concerning agriculture innovations. The Kumbungu district



is chosen however because of the availability of the community radio station in Dalun, a community in the district.

### **1.3 Objectives of the study**

#### **1.3.1 Main Objective**

The general objective is to investigate the effects of Simli radio on the adoption of Agriculture technologies in the district.

#### **1.3.2 The specific objectives are:**

1. To ascertain the various communication media and use of Simli radio in the district.
2. To examine the innovations communicated to farmers in the District over the years through Simli radio
3. To assess the knowledge, attitude and practice level of the farmers.
4. To identify limitations and constraints that hinders the effectiveness in diffusing agriculture innovations

#### **1.4 Research Questions**

The main research question is stated below;

What is the effect Simli radio has on the adoption of Agriculture innovations in the Kumbungu district?

Specific research questions are:

1. What are the various sources of information to farmers?



2. What are innovations that have been communicated to the farmers through the radio station?
3. What knowledge, attitude and practice of Agriculture innovations exist in the community?
4. What limitations and constraints affect the effectiveness of diffusion of Agriculture innovations to farmers?

### **1.5 Limitations of the Study**

The study had some few limitations and these included the distances between communities, was quite far from each other so data collectors spent lot of time travelling to the communities. Also because of the nature of road, being rough and very dusty forced the data collectors to travel to communities via motorbikes. Aside from these too the issue of finance also had a bit of stern on the researcher, and this was as a result of respondents requesting for something before responding to the questionnaires. In some case some people actually wanted to get the data collector to buy food for them to eat while the questionnaire was being administered.

### **1.6 Organization of the thesis**

The thesis is organized into five chapters. The chapter one describes the background of the study as well as the problem statement, research questions, research objectives and justification. Chapter two consists of literature review. Chapter three describes the methodology employed in collecting and analyzing data. The fourth chapter presents the results and discussions and chapter five summarizes the findings, draws conclusions based on the findings and makes recommendations based on the conclusions.



## CHAPTER TWO

### LITERATURE REVIEW

#### 2.0 Introduction

This chapter is the literature review. In this chapter review of all relevant literature will be done.

This literature review begins by introducing some of theories that have influenced diffusion of innovations and also discusses agriculture and innovations

The second section examines some of the overlaps between development and communication theory that influence practice today and provides a background to the evolvment of communication development.

The final section draws on theoretical understandings to review some of the current state of the art of the specific communication media that is community radio. It places these in the broader context of communication development.

#### 2.1 Development theories and practice

Development is the systematic use of scientific and technical knowledge to meet specific objectives or requirements. It can also be seen as an extension of the theoretical or practical aspects of a concept, design, discovery, or invention and it is the process of economic and social transformation that is based on complex cultural and environmental factors and their interactions, the process of adding improvements to a parcel of land, such as grading, subdivisions, drainage, access, roads, utilities.( Business dictionary 2016).





### 2.1.1 Diffusion of innovations

Innovation is about finding a better way of doing something. Innovation can be viewed as the application of better solutions that meet new requirements, in-articulated needs, or existing market needs. This is accomplished through more effective products, processes, services, technologies, or ideas that are readily available to markets, governments and society. The term innovation can be defined as something original and, as a consequence, new, that "breaks into" the market or society. A definition consistent with these aspects would be the following: An innovation is something original, new, and important in whatever field that breaks in to a market or society. While something novel is often described as an innovation, in economics, management science, and other fields of practice and analysis it is generally considered a process that brings together various novel ideas in a way that they have an impact on society. (Wikipedia, 2016)

It tries to differentiate Innovation and invention, in that innovation refers to the use of a better and, as a result, novel idea or method, whereas invention refers more directly to the creation of the idea or method itself. Innovation differs from improvement in that innovation refers to the notion of doing something different rather than doing the same thing better.

The basic notion is that innovations, novel ideas, autonomously diffuse among members of a relatively homogeneous population after their introduction from outside, either through a change agent, through people who straddle the local and external worlds, or through other media. The diffusion process usually starts slowly and then gathers steam, so that the 'diffusion' curve marking the rate of adoption of the innovation by individuals over time typically has the shape of a growth curve (Rogers, 1995). Diffusion has basic elements which include; the innovation, adopters, communication channels, time and social system. Innovations are a broad category, relative to the





current knowledge of the analyzed unit. Any idea, practice, or object that is perceived as new by an individual or other unit of adoption could be considered an innovation available for study (Rogers 1983). Adopters are the minimal unit of analysis. In most studies, adopters are individuals, but can also be organizations (businesses, schools, hospitals, etc.), clusters within social networks, or countries (Meyer, 2004). Diffusion, by definition, takes place among people or organizations. Communication channels allow the transfer of information from one unit to the other (Rogers, 1983). Communication patterns or capabilities must be established between parties as a minimum for diffusion to occur (Ghosal, and Bartlett 1988). Time is what is necessary for innovations to be adopted; they are rarely adopted instantaneously. In fact, in the Ryan and Gross (1943) study on hybrid corn adoption, adoption occurred over more than ten years, and most farmers only dedicated a fraction on their fields to the new corn in the first years after adoption (Ryan and Gross, 1943). The social system is a catalyst for adoption of innovations because it combines external influences (mass media, organizational or governmental mandates) and internal influences (strong and weak social relationships, distance from opinion leaders) (Strang, et al, 1998). There are many roles in a social system, and their combination represents the total influences on a potential adopter (Rogers, 1983). In this process make it quite easy to distinguish between people who adopt fast and people who are slow to follow. Research on modes of innovation diffusion also shows that ‘progressive’ farmers (i.e. those with large farm sizes, education, access to outside agencies, etc.) are the ones who are early to adopt. Therefore, extension efforts should focus on these farmers to achieve rapid diffusion. These farmers are early to adopt partly because extension agents already pay a lot of attention to them. Diffusion studies often have provided the rationale for what can be called ‘the progressive farmers strategy’.

The popularity of the diffusion of innovations can be explained by the fact that empirical studies of cases where an innovation diffused to a large proportion of the farmers in a population in a very short time have created an expectation that technologies, once introduced to few farmers through extension and research efforts, will diffuse rapidly on their own and multiply the public sector effort. (Rogers, 1995)

At one time, diffusion of innovations research was the most popular form of social science research with literally thousands of surveys of diffusion processes published.

Diffusion research has had a tremendously important imprint in our daily activities since it brings out new ways to achieve tasks. Rogers (1995) in his study has reinforced the following assumptions:

1. Innovations come from outside, usually are developed by scientists and then introduced into rural communities, groups of doctors, consumers or other populations. The possibility that innovations emerge locally is not emphasised;

2. Innovations tend to be looked upon as technical component technologies that diffuse on their own, without paying much attention to the farming system into which they are adopted. They are like silver bullets. In actual practice, farmers usually spend a great deal of time on adapting innovations. What is more, the focus on technical innovations that enhance productivity detracts from a focus on system innovations to improve the sustainability of a farming system. Yet innovation in the area of resource management increasingly is becoming a condition for improving rural livelihoods.

3. All adopters are on the same development path, except that some are ahead and others behind.

The Dutch rural sociologist Van der Ploeg (1994) has shown that this assumption of a single

development path is erroneous. Given the same economic and technological conditions, farmers tend to follow very different development paths. What stands out is diversity and ability to act autonomously.

4. The community in which an innovation diffuses is homogeneous in that all farmers are assumed to benefit from the innovation. In actual practice, innovations tend to be differentially relevant, depending on access to inputs, land, labour, credit, and so on. Adoption of innovations by some might pre-empt others from benefiting.

5. Technical innovation is a good thing. In actual practice, one can imagine situations where innovation is not good at all. For example, the adoption in Europe of hormones to enhance productivity of dairy cows by 10 % would put tremendous pressure on the price of a commodity that is already cheap. It would leave cows with a more miserable life and would mean a sharp drop in the number of farms that are able to survive. Yet, once introduced, a farmer could ill afford not to adopt the technology world. (Rogers, 1995).

Diffusion of Innovation theory sees innovations as being communicated through certain channels over time and within a particular social system (Rogers, 1995). Individuals are seen as possessing different degrees of willingness to adopt innovations and thus it is generally observed that the portion of the population adopting an innovation is approximately normally distributed over time (Rogers, 1995). Breaking this normal distribution into segments leads to the segregation of individuals into the following five categories of individual innovativeness (from earliest to latest adopters): innovators, early adopters, early majority, late majority, laggards (Rogers, 1995). Members of each category typically possess certain distinguishing characteristics as shown below:

Innovators - venturesome, educated, multiple information sources



Early adopters - social leaders, popular, educated

Early majority - deliberate, many informal social contacts

Late majority - skeptical, traditional, lower socio-economic status

Laggards - neighbors and friends are main info sources, fear of debt

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 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 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

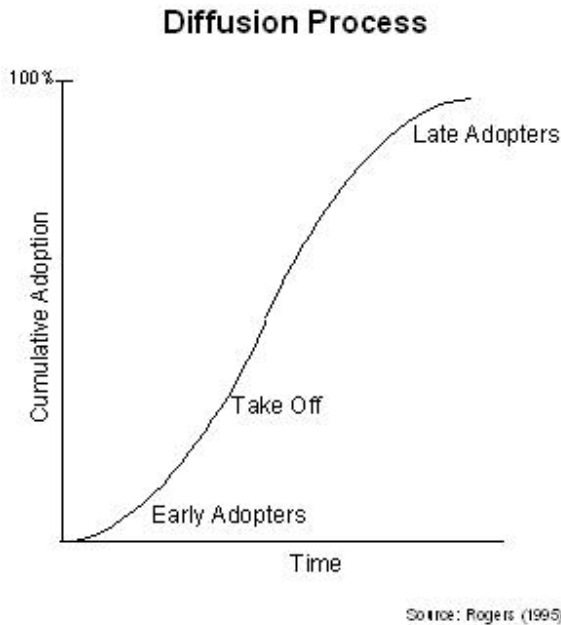


Laggards the last of the category are the last to adopt an innovation. Unlike some of the previous categories, individuals in this category show little to no opinion leadership. These individuals typically have an aversion to change-agents. Laggards typically tend to be focused on "traditions", lowest social status, lowest financial liquidity, oldest among adopters, and in contact with only family and close friends.

The rate of adoption of innovations is impacted by five factors: relative advantage, compatibility, trialability, observability, and complexity (Rogers, 1995). The first four factors are generally positively correlated with rate of adoption while the last factor, complexity, is generally negatively correlated with rate of adoption (Rogers, 1995). The actual rate of adoption is governed by both the rate at which an innovation takes off and the rate of later growth. Low cost innovations may have a rapid take-off while innovations whose value increases with widespread adoption (network effects) may have faster late stage growth. Innovation adoption rates can, however, be impacted by other phenomena. For instance, the adaptation of technology to individual needs can change the nature of the innovation over time.



**Fig 2.2 Diagram/schematic of theory**



Source: Rogers (1995)

In addition, a new innovation can impact the adoption rate of an existing innovation and path dependence may lock potentially inferior technologies in place. Moore and Benbasat (1991), working in an Information system context, expanded upon the five factors impacting the adoption of innovations presented by Rogers, generating eight factors (voluntariness, relative advantage, compatibility, image, ease of use, result demonstrability, visibility, and trialability) that impact the adoption of Information technologies.

Relative Adopters will therefore adopt a technology according to Rogers (1995), Moore and Benbasat (1991) voluntary not forced, the advantage of the innovation should be more in the positive rather than negative, it should compatible with what they already practice in their farms



or soil used to cultivate, the image the innovation portrays to potential adopter, should be easy to use not complex, results of demonstration should be evident and visible so all can see and should be subject to trailability . When these are all certified than they can be adoption.

### **2.1.2 Transfer of Technology**

‘Technology transfer, also called transfer of technology (TOT), is the systematic, knowledge, technologies, for the manufacture of products, for the application of a process of rendering a service, which does not extend to transactions involving mere sale or mere lease of goods’. (UNCTAD, 1985, p1.2.). It is closely related to (and may arguably be considered a subset of) knowledge transfer. Transfer of technology has two types, these are Horizontal transfer of technology and Vertical transfer of technology. Horizontal transfer is the movement of technologies from one area to another. Transfer of technology (TOT) is primarily horizontal. Vertical transfer occurs when technologies are moved from applied research Centre’s to research and development departments (Grosse, Robert 1996) Technology Transfer is closely related to Innovation. Three perspectives on Innovation and Technology Transfer have been unveiled (Dubickis, M. et al 2015)

TOT is the movement of innovations, knowledge, and techniques from one organization or country to another through assistance, investment, licensing, trade, or training. In this case transfer of technology is related to transfer of Agriculture innovations, knowledge and techniques either from one organization or country to another through assisting them in training, investing in them financially, giving seed to the farmers and other agriculture inputs, helping them engage in favorable trading conditions.



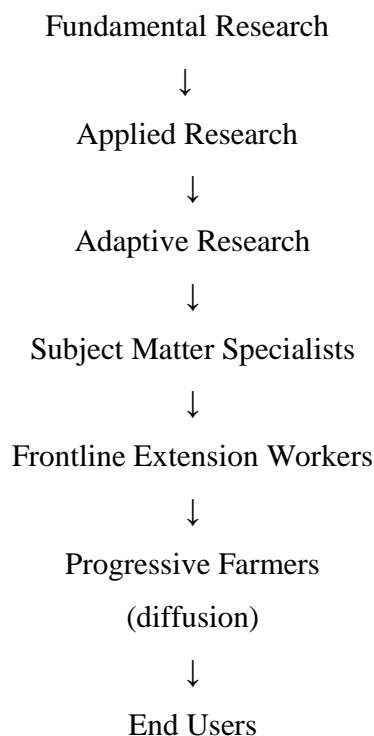




Science is the growth point of human civilisation. It develops the technologies that help us escape from what the Bible calls the ‘vale of tears’. Science ensures progress. Extension delivers these ideas to users. Science is good, but people do not always appreciate it. If farmers do not adopt the scientists’ ideas, chances are that they are backward and don’t know what is good for them. Or the culprit might also be extension. After all, many extension workers have been badly trained. A third possible reason can be a ‘fatal gap’ in the linear flow from science to farmers, for example because subject matter specialists are missing (McDermott, 1987).

Transfer of Technology assumes a one-way and uninterrupted flow of technologies from fundamental scientists, to ultimate users via various intermediaries and delivery mechanisms. It therefore is also called the linear model (Kline and Rosenberg, 1986; Chambers and Jiggins, 1987).

**Transfer of Technology (also called ‘The Linear Model’)**



Source: Chambers and Jiggins, 1987

This is the typical thinking behind technology transfer. By way of example, what is presented is the difference between two situations: (1) the transfer of knowledge, and (2) the co-creation of knowledge. In the first situation, an expert, such as an agricultural extension agent or a medical, seeks acceptance of, or compliance with, his way of looking at the world or of solving a problem. In the second situation, a group of stakeholders with different and often complementary experiences or knowledge's agree on ways forward to improve their shared problem.

**Table: 2.1 Difference between Transfer of knowledge and co-creation of knowledge.**

Key Factor	Transfer of Knowledge	Co-creation of knowledge
Nature of problem	Lack of productivity or Efficiency	Lack of concerted action
Key actors involved	Expert and target audience	Interdependent stakeholders in a contested resource or shared problem
Desirable practices	Target audience uses improved component technologies	Stakeholders agree on concerted action (e.g., integrated catchment management)
Desirable learning	Target audience adopts technologies developed by expert. In best situation: diffusion of innovations	Through interaction, stakeholders learn from and about each other. They try out ways forward in joint



	among members of target audience. Learning of expert is not relevant in this situation	experimental action that allows discovery learning. They become able to reflect on their situation and empowered to deal with it
Facilitation	Expert demonstrates, persuades, explains, promotes	Trained facilitator brings together stakeholders so as to allow interaction. He/she creates spaces for learning and interaction (platforms). He/she manages the process, not the content.

Source: chambers and J Jiggins 1987

## 2.2. Development Communication: Theory and Practice

### 2.2.1 Introduction

There are many parallels between the evolvments in development theory and the communications theory that underpins media practice today. Communications theory has many strands. For the purposes of this thesis, the researcher is primarily interested in the relationship between media and society since this underpins the aims of the thesis (reviewing the effectiveness of radio on the adoption of agriculture innovations).

Communication that is used to bring about social change has different labels: development communication, communication for development etc. For some such names pose problems as their



roots are seen attached to the western thinking behind communication used after the Second World War which was to give developing countries necessary information needed to become developed.

### **2.2.2 Development Communication**

The United Nations refers communication for development as a two way process for sharing ideas and knowledge using a range of communication tools and approaches that empower individuals and communities to take action to improve their lives (UN, 1997).

Development communication refers to the use of communication to facilitate social development (Quebral, et al 1972). Development communication engages stakeholders and policy makers, establishes conducive environments, assesses risks and opportunities and promotes information exchanges to bring about positive social change via sustainable development (Paolo, 2008)

Development communication techniques include information dissemination and education, behaviour change, social marketing, social mobilization, media advocacy, communication for social change and community participation.

Development communication has been labeled the "Fifth Theory of the Press," with "social transformation and development," and "the fulfillment of basic needs" as its primary purposes (Flor et al, 2007) Jamias (1975) articulated the philosophy of development communication which is anchored on three main ideas, namely: purposive, value-laden and pragmatic. Jamias, (1991) expanded the definition, calling it "the art and science of human communication applied to the speedy transformation of a country and the mass of its people from poverty to a dynamic state of economic growth that makes possible greater social equality and the larger fulfillment of the human potential." (Jamias, 1991). Melkote and Steeves (2001) saw it as "emancipation



communication", aimed at combating injustice and oppression. The term "development communication" is sometimes used to refer to a type of marketing and public opinion research.

The history of development communication varies according to different cultural perspectives. Manyozo (2006) acknowledges six independent schools in his historical account. According to him much of the literature written in English conveys the history through Western lenses, heavily influenced by one particular school --- the Bretton Woods institutions (such as the World Bank, and the International Monetary Fund, or IMF).

After World War 11, the Western paradigm of development upheld that the role of mass media was to inform the recipients (in developing countries) of the necessary information needed to instigate behavioral change (to become like developed countries). This one way form of transmitting information that is from information sender to information recipient was based on the more linear models in communication theory such as Shannon and Weaver, (1949). This *persuasive* use of media had its roots in propaganda used during the Second World War, building on early communication theory based on the hypodermic needle model (Severin and Tankard, 1988).

The hypodermic needle model worked on the premise that a passive population could simply be injected with ideas that would instigate behavioral change. Such approaches complimented the top-down approach to development, as the key role of society was neither acknowledged nor understood. Rogers's innovation model (1962) helped theorist understand how, and at what rate, ideas move and spread through a community. It served the modernist paradigm, with the media acting as both channels and indicators of modernization (Waisbord, 2000).



### 2.2.3 Critics of the linear models of communication

Quebral (2006) was one of the early critics of the Western paradigm of development communication, stressing that development is `no transplant` (Quebral 2006). It was Quebral who first coined the phrase `development communication` in 1971 defining it as: ``the art and science of human communication linked to a society planned transformation from the state of poverty to one of dynamic socio-economic growth that makes for greater equity and the larger unfolding of individual potential...”. (Quebral, 2006, p 101)

Although her interpretation is still heavily connected to economic growth it was a radical Interpretation at that time. Quebral is named `the mother of development communications` in non-western literature that acknowledges the participatory forms of development communication happening in other parts of the world and criticizes the appropriateness of the western paradigm for all. (Dagron and Tufte 2006; Manyozo 2006) Dagron and Tufte (2006) translated key text into English for the first time in an attempt to `minimize the imbalance` of a dependence on English texts. Pasquali (1963) was an early critic of the sender/receiver communication model, highlighting its inability to establish dialogue with a `deaf sender` and `mute receiver` (Pasquali Antonio 1963, as cited by Dagron and Tufte 2006).

As development practitioners recognized the failure of top down approaches to bring change in developing nations, communication theorists then began to recognize the limitations of their linear communication strategies to bring change.

The United Nations Educational and Scientific Organizations (UNESCO) `McBride` report in the nineteen eighties, *Many Voices One World* (UNESCO 1980), helped create awareness of communication as a basic human right for everyone, opening up debate and discussion around



participatory development communication. The Bretton Woods School agencies and institutions began to incorporate participatory approaches into their understandings of communication development, using the term defined by the 2005 Communication for Social

Change (CFSC) Consortium it is;

``a process of public and private dialogue through which people themselves define who they are, what they need and how to get what they need in order to improve their own lives`` (2005, p 3)

### **2.3 Development Communication: Current State of the Art**

The need for a two-way participatory communication that gives a voice to the poor is recognized by many agencies (i.e. UNESCO 2007; AMARC 2007; FAO 2007) as being central to communication for social change. Yet how this is implemented and measured is questioned. (Dagron and Tufte 2006; Estrado 2002). Dagron and Tufte (2006) criticize UNDPs debate on *communication for development* for its focus on technology at the expense of society. As Fraser and Estrado (2002 p.69)) argue the main obstacle lie not in a lack of technology but in the `lack of political will, and in policies that fail to recognize the importance of communication as a social process that can help to bring change and development`

In 1994 the FAO project "Communication for Development in Southern Africa" was a pioneer in supporting and enhancing development projects and programs through the use of participatory communication. The FAO project, placed under SADC, developed an innovative methodology known as Participatory Rural Communication Appraisal (PRCA), which combined participatory tools and techniques with a strong communication focus needed to enhance projects results and sustainability.



### 2.3.1 Participatory Approach, Community Radio and Policy Development

The roots of participatory approaches in development communication according to Yoon (1996) can be found in the early years of the 1970s when many people in the development community began to question the top-down approach of development dominant in the 1950s and 60s which targeted the economic growth of countries as its main goal. Development according to Yoon (1996) was "thought to be triggered by the wide-scale diffusion and adoption of modern technologies". Such modernization Yoon (1996) further expounds, was planned in the national capitals under the guidance and direction of experts brought-in from developed countries. Often, the people in the villages who are the "objects" of these plans were the last to know when "strangers from the city turned-up, frequently unannounced, to survey land or look at project sites" However, the demarcation of the First, Second and Third Worlds by late 1960s to early 1980s has broken down and the cross-over center-periphery can be found in every region, a need for a new concept of development which emphasizes cultural identity and multidimensionality is raised (Servaes and Malikhao, 2005). Servaes and Malikhao (2005) posit that the 'global' world, in general as well as in its distinct regional and national entities, is confronted with multifaceted crises. Apart from the obvious economic and financial crisis, they elaborate that one could also refer to social, ideological, moral, political, ethnic, ecological and security crises thus the previously held dependency perspective has become more difficult to support because of the growing interdependency of regions, nations and communities in the globalized world. A new viewpoint on development and social change has come to the forefront according to them which "the common starting point is the examination of the changes from 'bottom-up', from the self-development of the local community".





At first, speech, traditional and folk media, and group activities were considered the most appropriate instruments for supporting participatory communication hence, the practitioners in the mass media responded by innovating their own approach towards participatory communication (Yoon, 1996) which brought the emergence of community radios. The historical philosophy of community radio is to use this medium as the voice of the voiceless, the mouthpiece of the oppressed people and generally as a tool for development. He articulates that in community radios, the people "produced and voiced the programs which were focused on local issues which were the most current and important making way for participatory communication to be practiced at both the community or village level and at the broader regional or sub-regional level". Most of the successes of community broadcasting are to be found in the non-formal education sector (Beltran, 1993 cited in Yoon, 1996). Literacy programs have been effectively conducted via community radio and television stations. Other subjects covered by these stations include gender issues, farming, health, income-generation, workers' safety and occupational health, land tenure, and religious matters (Yoon, 1996).

Mhagama (2015) posits that participatory development projects such as community radio employ a participatory approach to decision making processes and enable marginalized people to "define their own development path through the identification and implementation of projects that are initiated by them". He stresses that "participatory communication gives the local community a right to freely share or exchange information and to reach a consensus on what they want to do or to be done and how to do it". Tamminga (1997) in Mhagama (2015) posits that in community radio the dichotomy between the rich and the marginalized sectors like women, indigenous peoples and the poor is broken by "allowing listeners an opportunity to shape the medium to meet their own specific needs and breakdown the monopolies of knowledge and power that marginalize them

politically, economically and socially". In one project of UNESCO in partnership with the Danish International Development Agency (DANIDA), and the Philippine government a participatory communication project using community radio dubbed as "*Tambuli*" (**Tambuli** is a Filipino term referring to a traditional way of calling villagers to an important meeting)(Jayaweera and Tabing, 1997) was launched in 1999 According to Howley (2005) the project was able to make the community residents come to appreciate radio's potential as a forum to discuss issues of mutual concern allowing the local populations to give immediate and sustained feedback to local, regional and even national political leaders and authorities which afforded them greater opportunity to chart their own destiny.

Howley (2010) cited in Mhagama (2015) stressed that "community radio highlights people's ability to alter and rearrange existing media structures to better suit their needs" This is made possible Servaes (1996) in Mhagama (2015) concludes because community radio allows non-professionals to participate in media production, management, and planning of the communication systems.

The African school of development communication sprang from the continent's post-colonial and communist movements in the late 1960s and early 1970s. Anglophone Africa employed radio and theatre for community education, adult literacy, health and agricultural education (Kamlongera, 1983, Mlama, 1971).

### **2.3.2 Communication for Development (C4D) and e-Agriculture.**

If highly urbanized and wealthy cities or countries are advancing urban agriculture, it cannot be denied that many of the Third World countries are also at par when it comes to improving agricultural processes and policies and in the informatisation of agriculture. In Malawi, one of the

poorest regions in Africa, Agunga (2012) emphasized that the success rate of poverty-reduction programming could be greater if C4D education was provided for development decision-makers and field staff, especially agricultural extension workers. Agunga (2012) further stated that agricultural extension education can impact development by focusing on how C4D can strengthen agricultural extension performance. By this he implied that educating policymakers about C4D will increase donor investments in pilot C4D projects, a strengthening of agricultural extension systems, and success of poverty-reduction programs (Agunga, 2012).

In the Philippines, a book by Flor (2007) entitled *Development Communication Praxis* discussed a rice scandal such that in the last quarter of 1990, the Philippines groaned as the price of rice and other commodities went up. Flor (2007, p.123) wrote:

‘Rice farmers who were expected to gain from the situation were likewise disadvantaged. They were not able to sell their produce at reasonable prices. On one hand, their bumper crop entailed expensive inputs – certified high yielding varieties, irrigation, pesticides and fertilizer. On the other hand, middle men bought their harvest at cutthroat prices leaving them penniless and in debt...’

For all practical purposes, the Philippine rice industry is controlled by a group of obscure Filipino-Chinese businessmen called the Binondo Rice Cartel... Employing a nationwide marketing network composed mainly of fellow Filipino-Chinese traders, the cartel has held a viselike grip over rice trading since the post-World War II years that enable them to virtually dictate the buying price of dried paddy all over the country.

What was done when this happened? Did development communication come into the picture? Was change sought? There were a few discussions on alternatives such as proper use of funds since it was observed that international donations for the agricultural farmers were spent more on the



informatisation of agriculture (increasing need for computers, logistical aids, etc.) instead of investing into more practical and realistic methods to empower the farmers and improve their farming methods. Attention was also given to the rise of white-collar jobs which was cutting down the numbers of agricultural farmers tilling the land (Flor, 2007). The youth became more attracted to the life in the city and to seek for office or desk jobs than remain in the province and till the farm. With this, Flor (2007) suggested policy rationalization:

Rationalization need not mean a reduction of monies awarded to the information sector. It primarily means the rearrangement of priorities and the increase of allotment to actual farming activities in the case of agriculture or to direct social services in the case of rural development. (p. 123).

However, with the seemingly hegemonic influence of the internet and the impact of globalization, the field of agriculture needs to adapt to radical changes in society for it to become sustainable. As policy sciences and development communication suggest, the goal of communication and policies is to empower individuals or groups, and this empowerment necessitates crucial adaptation to an ever changing world. This brought agriculture into another layer: e-agriculture. What is e-agriculture? The Food and Agriculture Organization (FAO, 2013.p 1) defined this as: An emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. More specifically, e-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use information and communication technologies (ICT) in the rural domain, with a primary focus on agriculture.



In a post on e-Agriculture webpage, Walter (2009), indicates that the Philippines has launched a Knowledge Working Towards Enhancing Agricultural Communities Program or K-Agrinet project with the aim to promoting the use of ICT to attain agricultural sustainability and competitiveness for the country's farmers. The project was a collaborative effort amongst the country's diverse agencies to utilize information technology (IT) as a tool to fast-track the dissemination of agriculture and natural resources information and technologies to farmers, upland dwellers, and rural entrepreneurs in the Philippines. The institutional key players in the agricultural and natural resource sectors are: (1) the e-Learning led by the Open Academy for Philippine Agriculture of the Department of Agriculture-Philippine Rice Research Institute (DA-PhilRice) which focuses on e-extension and distance learning for agriculture extension workers; (2) the e-Consortia led by the Department of Science and Technology-Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (DOST-PCARRD) which intensifies technology and knowledge generation and exchange amongst existing partners R&D Institutions through improved ICT tools and applications; (3) the e-Farm also led by DOST-PCARRD that promotes e-commerce by initiating e- based farm to market opportunities through the FITS centers and their respective farmer-scientists; and lastly, (4) the e-Agriculture led by the Department of Agrarian Reform (DAR) and Development Academy of the Philippines (DAP) tasked at mobilizing and generating the participation of agrarian reform communities into the program (Walter, 2009, p. 1).

Indeed, the goal of C4D and e-agriculture is clear: to improve the lives of people especially the poor and the marginalized. This entails educating and empowering them for the impact of change to be sustainable.

Radio as a tool for enhancing e-agriculture maintained a strong presence in research and practice into the 21st century. Radio was especially important in rural areas, as the work of the non-governmental organization Farm Radio International and its members across sub-Saharan Africa demonstrated. Knowledge exchange between development partners such as agricultural scientists and farmers were mediated through rural radio (Odame, 2003).

## **2.4. Radio**

### **2.4.1 Introduction**

There are many different kinds of media that have been used to bring about social change, some of these are theatre, audio, television, videos, internet and radio. However, many agree that radio is the most often `utilized and successful medium for social change` (Dagron 2001). Girard (2003) posited that: *more than ninety years the world's first station was founded, radio is still the most pervasive, accessible, affordable, and flexible mass medium available. In rural areas, it is often the only mass medium available.* (2003, p7)

There are four main sectors into which radio broadcasting loosely falls: state---controlled public service, commercial or privately---owned, community radio, and international radio.

UNESCO (2002), community radio is one that is operated in the community, by the community and for the community (2002, p 11) There are many stations that fit much into this criteria but not all of them in this regard particularly in relation to ownership.

There are officially 412 radio stations in Ghana granted licenses to operate as at the fourth quarter of 2015 and, of this number, 313 are currently on air. The breakdown is as follows; 30 public radio stations, 5 foreign, 68 community radios, 17 campus radios and 292 commercial radio stations

mostly on FM frequencies ( NCA, 2015). The vast majority of these stations have come into operation in the past twenty years since the breaking of the state broadcaster GBC's monopoly in 1996. There are no pirate radio stations in the country. Around 90% of the population has listened to the radio in the past seven days, and about 69% listens at least once a day. FM is the most-used reception platform, with 82% of the population receiving radio via FM (Gadzekpo, 2005; InterMedia, 2005).

The only nationwide radio broadcaster is the state-owned Ghana Broadcasting Corporation (GBC), which has two national channels: the multilingual GBC 1; and, the more commercially oriented, English-only GBC 2. The English-only GBC 2 is restricted to the Accra region; all other stations, including state-run GBC affiliates, broadcast at district, regional or local level.

At the regional level, the state-owned GBC runs subsidiary stations in all ten regional capitals.

These stations carry nationally-networked programming as well as producing their own regional shows.

There is some networking and syndication of Programming among the private stations. The largest audiences in the five most populous parts of the country belong to private commercial stations established since the breaking of the GBC broadcasting monopoly in 1996 (Gadzekpo, 2005). The five stations are as follows:

Peace FM (Accra);

Fox FM (Kumasi);

Sky Power FM (Takoradi);



Space FM (Sunyani); and,

Diamond FM (Northern Region)

The success of these private commercial stations in attracting higher audiences than GBC 1,

GBC 2 or the GBC regional affiliates is a significant illustration of the waning power of state run services in the radio sector. Partly it would seem that people have reacted against the radio monopoly that the GBC held for several decades, but also the new commercial stations have been producing innovative and entertaining programmes, as well as providing large doses of foreign music favored by many youth. As well, there is evidence to suggest that better working conditions have drawn talented radio workers away from the GBC to private stations (Dzeikpor, 2006).

The community radio stations have lower transmission capacity than private commercial or state stations, covering smaller geographical areas that are clearly spelt out in their licenses'. They are also limited in the types of advertisement and sponsorship they can carry. They are run by community boards and some are affiliated to NGOs, who sponsor most of their activities.

#### **2.4.2 Community Radio and Social Change**

According to UNESCO (2002), the community can be `territorial or geographical` or `a group of people with common interest, who are not necessarily living in one defined territory (Tabing 2002, p11). Similarly, the AMARC defines it as a `collective or group of people sharing common characters and interest` (Mtimde 1998, p13). The key factor in the various definitions is that community is an identified `` group`, not simply the mass people that the broadcasting signal happens to cover.







Community-based radio is considered by many (Dagron 2001; UNESCO 2001; AMARC 2007) as one of the best ways to reach and empower marginalized and remote communities for social change.

According to Fraser and Estrada (2002), other cultural identity, significant with the globalization of information and satellite communications and subject to the political and social environment, it can act as a platform for debate, discussion and ideas-giving people a voice`. As German writer According to health media NGO Health Communication Resources (HCR), the role of radio can be categorized under tasks: to inform, to advocate, to educate, to promote social learning and dialogue, and to entertain (HCR 2002). These can be helpful indicators to identify the potential of radio, used alongside limitations and constraints in society. The beginnings of many community stations emerged, uniquely, from a desire for social change. It is not easy to trace the history and involvement of community radio since licensing laws are not and have not always been commonplace. Much literature (O'Connor 1990; Fraser and Estrada 2002; Dagron 2005) cites the miner's radios of Bolivia in the 1940s as one of the earliest examples of radio for social change. Over twenty radio stations (Bresnahan 2007) operated together, forming a kind of trade union to fight for the rights of miners who worked in dangerous conditions, exploited by a rich elite minority.

Other forms of social injustice, and resilience to military dictatorships across different parts of Latin America, also served as drives for radio initiatives that `gave a voice to the people` and provided an alternative to the state run media (Dagron 2005). It was not until much later that the passing of dictatorships in Africa and Asia opened up previously state-controlled airways to private and commercial stations allowing new forms of participatory communication for social change to emerge (Dagron 2005).



Community radio set out its own operational guidelines and mandate even before the existence of formal government laws in support of the sector. The Ghana Community Radio Network (GCRN) was established in 1999 and registered in 2003 as a subsidiary of Ghana Community Broadcasting Services (GCBS). It is an NGO that has drawn from the African Charter on Broadcasting adopted at a United Nations Educational, Scientific and Cultural Organization (UNESCO) workshop in Windhoek in May 2001. The charter states that:

“The programmes of community broadcasting shall reflect the needs and concerns of the community, including language, gender, cultural and demographic needs. Programming shall highlight community issues including but not limited to development issues, health care, basic information, education, local cultures and environment, local, national and international issues.” (UNESCO, 2001)

It is this guideline that the National Media Commission (NMC) later, in its National Media

Policy (2000), expanded upon by stating that “such community media shall have the objective of community empowerment and shall provide access to all members of the community” (NMC, 2000).

Each community radio station is a hybrid, a unique communication process shaped by a few overarching characteristics and by the distinct culture, history, and reality of the community it serves. (World Bank Institution 2007, p. 12)

AMARC and UNESCO include key characteristics of community radio to be `access participation, self-management, community mandate and accountability. (Mtimde et al 1998). Participation is often highlighted as a key characteristic, distinguishing community radio from most kinds of media (Mtimde et al 1998) however participation can operate on many levels and it is worth noting that

the AMARC and UNESCO do not include `ownership` as a key characteristic, but rather `self-management`. In reality, there is often an external NGO or group that at least part-funds the station, and thus exercises influence or even control. More purist interpretations do not include such stations in their definitions of `community radio` which is often, according to Fraser and Estrada (2002) used `rather loosely and ignores the key principles of community ownership and control` (2002, p 70).

Community radio, like all media, can be used to serve both positive and negative causes to promote or to distort truth. However, whilst all media is susceptible to manipulation, the structure of community radio can make it more vulnerable to appropriation by negative political forces (Myers 2008). One of the most documented, and extreme, examples of this is radio Mille-Collines in Rwanda, used to spread propaganda and `hate messages` before and during, the Rwandan genocides (Bratic 2008; Gordon 2004)

## **2.5. Communication Technology for Agriculture**

Rural radio in many developing countries is an important tool for use in many aspects of development, including promoting the process of participatory democracy and rural and community development (Chapman et al., 2003; Menon, 1986).

Agricultural communication and extension, however, take more air time of these rural radio stations. This is understandable and acceptable because radio stations in rural areas in Africa have a predominantly agricultural clientele, and the radio stations are always aware that information on agriculture is most needed by the rural populations where the local radio stations operate (Chapman et al., 2003).



Communication and development experts believe that radio is the most appropriate medium for rural poverty reduction and rural emancipation programmes (Okwu, Kaku and Aba, 2007). Research findings on the use of radio in agricultural communication in developing countries are widespread (Monu, 1983; Partel and Ekpere, 1978). These studies suggest different degrees of knowledge gain and behaviour change among peasant farmers when they are exposed to agricultural extension messages. In these findings, the basic tenets of the diffusion theory are evoked, even though most of these studies did not claim to be testing the diffusion theory.

The strength of rural radio as an extension tool lies in its relative advantage of being able to reach illiterate rural farmers in even the remotest areas. It also provides them with information on all aspects of agriculture in the languages they understand (Chapman, et al., 2003). Rural radio is effective in blending the people's cultures and traditional communication channels with development messages (Panford et al, 2001; Ansu-Kyeremeh, 1992, 1997). One of the early approaches to the use of rural radio for agricultural extension in Ghana was the experiment of the *Wonsuom* Rural Communication Project at Swedru in the Central Region (Boafo,1984; Bonnah-Koomson, 1994). Boafo (1984) reported that the *Wonsuom* Rural Communication Project was important not only for the valuable development messages it provided, but also it offered the people a platform for the exchange of ideas. After a collaborative research project between six African countries and the Overseas Development Institute (ODI), UK, which was funded by the Department for International Development (DFID), and also from Chapman et al (2003) study, it was clear that, the radio has a role in sharing information as their findings helped the local population after they were put on radio.

The study used a radio programme, written in English and translated into six local languages. The programme was designed to combine music and drama with information from the presenter on soil



and water conservation topics discussed by a panel. Farmers' levels of knowledge were measured before and after the radio broadcasts. The general finding of the study was that an understanding of the soil and water conservation practices seemed to have improved after farmers listened to the messages (Chapman et al., 2003).

Myers (1998), in a study conducted in Mali on a radio campaign on afforestation, in which Mali was faced with the problems of deforestation and desertification, due to high illiteracy levels, the country relied very much on radio to reach out to the rural communities (Myers, 1998). Myers reported that in October 1994, a radio programme on national regeneration of trees and vegetation was designed by the collective efforts of radio programme producers, the forestry and extension agents and Near East Foundation (NEF), an NGO. Participatory workshops were organized for all the actors in the project, and the rapid rural appraisal (RRP) technique was used to gather data on the information needs of farmers, and to draw up the project evaluation strategies and methodology. The campaign was tied to coincide with the farming season, which is the time naturally occurring trees must be protected. Myers (1998) reported that at the end of the project, the major findings were that, there was not only a gain in knowledge, but also there was a reasonable impact by way of the adoption of the messages. This translated into physical terms. The people were planting trees and protecting those that grew naturally. The success of the project in terms of the adoption rates of the messages could be due to the strategy of repeat broadcasts (Myers, 1998). Social psychologists suggest that repetition as a communication strategy enhances understanding and memory recall. Simple repetition of a statement makes it appear truer. This enhances its adoption and recall (Hogg and Vaughan, 2005).

In Ghana, Radio Savannah Tamale is located within the region that has the greatest land space in the country Northern Region. It is also the region that produces the bulk of the country's cereal



requirements. Agricultural programmes are therefore next to non-formal adult literacy programmes in terms of allocation of airtime.

The radio station's agricultural programmes are broadcast in English, Gonja and Dagbani. The two local languages are understood and spoken by an overwhelming majority of the people (Chapman, et al., 2003).

During the crop planting season, most of Radio Savannah's programme messages are on control of weeds, application of fertilizers and compost manure, and harvesting and post-harvest handling and management (Chapman et al., 2003). Radio Savannah collaborates with extension agents and the large number of NGOs in the area to produce radio agricultural programmes. The extension agents serve mostly as resource persons, and the NGOs buy airtime to carry out radio campaigns, mostly but not limited to agricultural issues. Some of the staff of the NGOs serves as resource persons for the radio station's agricultural programmes.

Simli Radio, which is in the study area a community radio project funded and run by the Ghana Danish Community Programme broadcasts a wide range of programmes with emphasis on agriculture and rural development (Chapman, et al., 2003; Kafewo, 2007; Zakariah, 2004). The radio station's range covers 60 kilometers, and its broadcasts cover three districts in Northern Ghana - Savelugu-Nantong, Tolon-Kumbungu and Tamale Municipal (Chapman, et al., 2003). Simli's radio programme production uses the narrow casting strategy of rural broadcasting. The listening communities are concentrated within a limited geographical area (Zakariah, 2004).

The audience are homogenous or near homogenous in terms of characteristics such as language, culture, occupation, literacy rates and other socio-economic variables and the messages are on agriculture and adult literacy (Chapman et al., 2003). Simli Radio adopts a participatory approach to its programme production. The radio programme producers visit the rural people in their



communities, where they record discussion messages through discussions with the people and interviews with the local populations. The recorded messages form part of the programmes that the radio station broadcasts to its target communities (Kafewo, 2007). Thus the farmers hear their own voices or the voices of their neighbors or community members on phone. They also listen to the broadcast of the problems, concerns, and development needs as presented to the radio station by them. This makes the radio station very popular with the target rural communities. Audience participation in radio enhances the adoption of the radio messages and also makes the radio station popular. As noted by Kafewo (2007), Simli Radio “demonstrates how community radio deconstructs one’s conception of radio - from the station’s philosophy through to its studio environment and its specialist cast of people who run the equipment and do the programming”(Kafewo, 2007: 63). Radio and other mass media have been used to support agriculture in many places. Axinn and Thorat (1960) called it “the most dynamic channel in the whole field of extension education in the decade of the 1960’s (1972. Hyman, Levine, and Wright (1967) survey experts who have worked on agriculture projects in less developed countries and found that half had been involved in projects that incorporated mass media. Radio is a powerful communication tool. Experience with rural radio has shown the potential for agricultural extension to benefit from both the reach and the relevance that local broadcasting can achieve by using participatory communication approaches. The importance of sharing information locally and opening up wider information networks for farmers is explored with reference to the specific example of vernacular radio programmes based on research on soil and water conservation. Most rural radio stations have been established by international agencies, NGOs or governments expressly for development purposes and it is therefore inherently a supplement where other delivery systems are seen to be failing. This particular experience of agricultural extension systems



in many developing countries has led to a review of the approach and a shift to a more advisory and facilitation-based approaches (Roling, 1995). The corresponding shift towards more participatory development approaches (Chambers, 1994; Brown et al., 2002) has meant that a greater understanding of community perspectives is required to identify the local resources that can be built on to address local priorities. Similarly, efforts to improve agricultural extension have focused on innovations in communication to improve the points of interaction between research, extension and farmer to encourage a greater sharing of information. This is intended to replace the top-down, one-way technology transfer approach widely perceived to have failed to improve the prospects of most farmers and their rural communities.. Experiments with radio as a communication tool have been going on since the 1940s.

According to Mytton (2000), Harry Franklin pioneered broadcasting in indigenous African languages as early as 1941 in Northern Rhodesia to provide news of the war to those whose families were fighting in Somaliland as part of the Northern Rhodesia regiment. The problem he faced was getting receivers into villages because the wireless sets were not portable and required mains electricity. He managed to persuade Ever Ready to manufacture the ‘saucepan special’ battery set that could be used to power a small low-cost radio that required less electric power than conventional sets. This proved very successful prior to the introduction of the transistor radio about a decade later. The use of radios across Africa has grown to over a 100 million by some estimates.

According to Lele Uma, (1975) Rural development is clearly designed to increase production and raise productivity. Rural development recognizes, however that improved food supplies and nutrition together with basic services such as health and education can not only directly improve the physical well-being and quality of life of the rural poor, but also directly enhance their productivity and their ability to contribute to the national economy.





It is clear that development means change, and the first which is changing the attitude of the people who will be directly affected by the development, in this case, the farmers and rural communities. In order to achieve this goal, there must be a fundamental change in the way farmers approach agriculture and the rate at which they adapt new technologies and farming practices.

In order to achieve this change farmers and rural communities need to be informed on the importance of adapting these new practices. Attempts by extension workers through demonstration farms and working with communities alone has not been sufficient to bring about change in attitudes. Radio has often been used to complement the efforts of the extension workers. However the use of radio as a mass media has its limitations such as poor signals, limited reach in certain areas, top-down approach, and limited airtime and in appropriate programming. This calls for a shift in the use of radio from mass media to community centered.

Below are strides already made by community radio to improve the lives of people;

Rural radio encourages villagers to take active part in the development process or even better to take up their own initiative to improve the living conditions in their communities.

Rural radio enables communities to share their experiences and critically examine issues and policies affecting their lives for example a community can use the radio to highlight new agricultural policies. These policies can be debated upon and discussed using the radio and immediate feedback can be given for relevant authorities to take action.

In cases where extension workers are not be able to reach, rural radio takes on that role. Here a community can be given a recording on cassette to substitute the extension workers who were unable to reach that community.



Vital information for agricultural development can be passed on through the use of radio for example information on better farming methods, improved seeds, timely planting, agro-forestry, better harvesting methods, soil conservation, marketing, postharvest handling and diversification.

Since rural radio targets a specific community, geographical area or interest, then the language of choice can be used to ensure that the message is clearly understood. Therefore rural radio gives you the option of using the prevalent language.

Rural radio gives farmers an opportunity to interact with each other and other relevant authorities e.g. extension workers, crop and animal experts through formats like live talk shows, phone-in programmes and on location broadcasts.

Radio makes understandable the scientific jargon. It is able to explain the research in simpler and ordinary language that people understand.

Since rural radio is community based, it can be used to mobilise people towards community development work e.g. construction of valley dams, protected wells and immunisation of animals.

All the above can be arranged at the convenience of the farmer because he is involved in the planning and implementation of the radio programmes.

Because of the participatory nature of rural radio, the community feels part of the programmes and first-hand knowledge can be got from the community because of the proximity of the programs broadcast. The community easily identifies with the people in the programmes and is more likely to listen to them rather than to a distant broadcaster somewhere in the city who is not in close touch with them. This has already been evidenced in different sectors of society and has contributed to the development of these areas. For example in Chad radio was used in a 1991-92 campaign to

stop intentional lighting bushfires. These fires were used by farmers to clear agricultural land. This method led to degraded soils and these fires sometimes spread to forest reserves.

Farmers were encouraged through radio programmes to suggest solutions to the problem and the result after one year was that, the forest fires were reduced by 90%.

There exists a gap between the scientific/agricultural researchers and the farm users. A lot of findings from the research institutions and laboratories are not used by farmers. Research information on improved seed varieties, better farming techniques, post-harvest handling and marketing techniques are not used by farmers either because the information did not reach them, either because the implementation of the received information is not clear. The gap between the researcher and the farmer is even wider in the rural areas; large distances separate researcher from rural farmer. Other barriers like language and diversity of cultures also come into play making it even more difficult for the research information to reach the intended audiences.

Rural radio can be used to disseminate agricultural research in the following ways.

- Research findings can be distributed through radio to the below stated stakeholders through radio discussions and also pre-recorded tapes replayed on air
- Nongovernmental organisations (NGOs) dealing in agriculture
- Extension workers
- Farmers themselves
- Academic Institutions
- Rural radio can make the link between researchers and extension workers by offering information on
- Where research can be obtained and used



- How to pass it on to users
- Communities' feedback regarding research.
- Rural radio can be used to collect feedback from Communities
- Through programmes, farmers give their responses to research
- Farmers share experiences on use of research
- Rural radio airs out farmers' views/recommendations on how to improve the research.
- Communities provide alternatives depending on their experiences.
- Radio can also be used to announce processes of research and extension work that is by:
  - ✓ Giving venues for meetings with extension workers
  - ✓ Advising on where to get inputs/services
  - ✓ Advising on where to get technical support.

## 2.6 Constraints

There are however some constraints to making the above very successful these include the following;

Rural radio is expensive to manage. The community doesn't have enough finances to run this kind of community-based broadcasting because it involves dealing with people who do not have communication skills.

Another issue is the availability of radio sets. The radio sets are not readily available to communities because of affordability.

Translating messages into various languages is not an easy task. The community needs people who are well versed in the language and can translate discussions on radio accurately for rural consumption.

Lack of collaboration between researchers, extension staff and communicators can hinder the smooth operation of rural radios. Because of varied ideas.

The scientific jargon is sometimes very difficult to interpret.

Most of the rural radio work done for example in Uganda is donor funded. So when the donor pulls out, there is a problem of sustaining the programme.

It is time consuming because people who are working on the programme have no training in communication.

A lot of training has to be undertaken especially for the radio listenership clubs and this requires financial facilitation.

In summary one can say rural radio contributes in:

Creating awareness of research findings to all stakeholders, mobilising community - to best practices both in social and economic issues. Radio also helps in simplifying research findings and translating into user language, linking NGO to community, extension to community, research to extension, researcher to community, and government to community on various issues

### **2.7.0 Traditional farming systems used in Ghana and most African countries**

Traditional Farming systems are the systems that have been in use by the rural folks over time.

These systems of farming are still in use but are being modified in order to help improve crop yield

in the community. They include; crop rotation, composting, mulching, mixed cropping and irrigation farming.

### **2.7.1 Crop rotation**

This is the successive cultivation of different crops in a specified order on the same fields. Rodale (2011), defined crop rotation as a systematic approach of deciding which crop to cultivate in an arable land from year to the next year. It is an ecosystem-based farm management practice of high benefit to agriculture lands by balancing soil fertility and preventing pests and disease build-up (Rodale, 2011). In contrast to a one crop system or to the haphazard crop successions where a farmer cultivates only one crop on a piece of land as a time. It is mostly used to control diseases that can become established in the soil over time. The changing of crops in a sequence decreases the population level of pest by Interrupting pest life cycle and Interrupt pest habitat.

### **2.7.2 Composting technology**

This is the process of decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it can be used to support plant growth. Compost bears little physical resemblance to the raw material from which it originated. Compost is an organic matter resource that has the unique ability to improve the chemical, physical, and biological characteristics of soils or growing media. It contains plant nutrients but is typically not characterized as a fertilizer.

Compost is produced through the activity of aerobic (oxygen requiring) microorganisms. These microbes require oxygen, moisture, and food in order to grow and multiply. When these factors are maintained at optimal levels, the natural decomposition process is greatly accelerated. The microbes generate heat, water vapour, and carbon dioxide as they transform raw materials into a





stable soil conditioner. Active composting is typically characterized by a high-temperature phase that sanitizes the product and allows a high rate of decomposition, followed by a lower-temperature phase that allows the product to stabilize while still decomposing at a lower rate. Compost can be produced from many “feedstocks” (the raw organic materials, such as leaves, manures or food scraps). State and federal regulations exist to ensure that only safe and environmentally beneficial composts are marketed. The use of organic matter or manure on farmlands plays an important role in enhancing the nutrients quality of the land via the introduction of nitrogen. It is important to note that even in intensive fertilized grain crops, soil organic matter still provides about 50% of the crop’s nitrogen needs (Swinton et al., 2007)

Composting improves the soil structure, porosity, and density, thus increases infiltration and permeability of heavy soils, and reduces erosion and runoff, it also improves water holding capacity, thus reducing water loss and leaching in sandy soils. Composting supplies a variety of macro and micronutrients. May control or suppress certain soil-borne plant pathogens. Supplies significant quantities of organic matter, improves cation exchange capacity (CEC) of soils and growing media, thus improving their ability to hold nutrients for plant use, supplies beneficial microorganisms to soils and growing media, improves and stabilizes soil ph. Can bind and degrade specific pollutants creating a better plant root environment

### **2.7.3 Mixed cropping**

Mixed cropping is a system of sowing two or more crops together on the same piece of land, one being the main crop and the others the subsidiaries. This type of cropping leads to an improvement in the fertility of the soil and hence, increase in crop yield because when the two crops are properly chosen the products and refuse from one crop plant help in the growth of the other crop and vice-

versa. Mixed cropping is an insurance against crop failure due to abnormal weather conditions. Some successful mixed cropping practices are; soya beans and pigeon pea, maize and udad dal, cotton and groundnut amongst others. The criteria for farmers selection includes the duration of crops that is one of the crops must be a long duration crop while the other a short duration crop, the second is the growth habit that is the two-components crops grow too difficult heights with different canopy, the next is the root system, one crop component is deep rooted while the other is shallow rooted. The next is water need by crops, one crop must need more water more than the other. Finally the nutrient demand must be more for one crop and less for the other. The advantages of this include no risk of crop failure, increase in yield, improvement of soil fertility and minimizing crop pest damage. Also the cultivation of legumes with other crops as mixed cropping will play the important role of enhancing soil fertility, forage and mulching quality within the agro-system (Mooleki and Reckseidler, 2009).

#### **2.7.4 Mulching**

This is one of the simplest and most beneficial practices you can use in the garden. Mulch is simply a protective layer of the material that is spread on top of the soil. Mulches can either be organic- such as grass clippings, straw, bark chips, and similar materials- or inorganic such as stones, brick chips, and plastic. The primary essence of mulching is to create a balance temperature that allows plants to grow fast and to enrich the soil fertility. A mulch can be considered as a layer of materials (most often leaf) applied to the surface of an area of soil to conserve moisture, reduce weeds growth, enhance visual appearance of the area, improve soil fertility and health of the soil (<https://en.wikipedia.org/wiki/mulch>). According to Singh et al. (2014), traditional knowledge-led practices such as bio-mulching is a better and effective way of controlling moisture loss and weeds, reduce disease incidence, regulate temperature, and generally maintain the functioning of the agro-



systems. Both organic and mulches have numerous benefits. Advantages of mulch it protect the soil from erosion, reduces compaction from the impact of heavy rains, conserves moisture, reducing the need for frequent watering, maintain a more even soil temperature and prevents weed growth, keeps fruits and vegetables clean and so on.

### **2.7.5 Irrigation farming**

This is a method in which in water is supplied to plants at regular intervals for agriculture. It is used to assist in the growing of agricultural crops, maintenance of landscapes, and re-vegetation of disturbed soil in dry areas and during periods of inadequate rainfall. It is the controlled application of water for agricultural purposes through manmade systems to supply requirements not satisfied by rainfall. Types of irrigation methods include centre-pivot automated sprinkler irrigation achieved by automatically rotating the sprinkler pipe or boom, supplying water to the sprinkler heads or nozzles, as a radius from the centre of the field to be irrigated. Drip is another irrigation method in which water is applied directly to the root zone of plants by means of applicators operated under low pressure with the applicators being placed either on or below the surface of the ground.

### **2.8.0 Some Innovations of Agriculture over the last decade**

There have been some innovations that have been introduced over the past ten years to help enhance productivity due to fast changing climatic conditions. Limitations in food supply for a growing population, together with the harmful effects of intensive agriculture on the environment, are major challenges to agricultural science. Precision agriculture is one of the unexpected bright spots in a new International Food Policy Research Institute (IFPRI) report that examines 11



agricultural innovations many hold up as the answer to the world's burgeoning food scarcity, water shortage and climate change challenges.

IFPRI reports that these technologies can't be considered to address these concerns on its own, but taken in aggregate they could help improve global crop yields by up to 67 percent by 2050 while reducing food prices by nearly half.

"Advances in technology represent one of the most powerful resources for increasing yields and mitigating the impact of water scarcity and climate change," said Shenggen Fan, director general of IFPRI, during a press conference to discuss the report, "Food Security in a World of Natural Resource Scarcity: The Role of Agricultural Technologies."

The innovations

- 1. Crop protection** — Methods of managing pests, diseases and weeds
- 2. Drip irrigation** — Approaches that involve applying water directly around roots
- 3. Drought tolerance** — Plant varieties that can process available moisture more readily and that are less vulnerable to water deficiency
- 4. Heat tolerance** — Varieties that can withstand or thrive in higher temperatures
- 5. Integrated soil fertility management** — New fertilizer and composting combinations
- 6. Nitrogen use efficiency** — Plants that respond better to fertilizers
- 7. No-till** — Farming that involves little or no soil disturbance and potentially the use of cover crops



**8. Organic agriculture** — Cultivation that excludes manufactured fertilizers, growth enhancers or genetically modified organisms (GMOs)

**9. Precision agriculture** — GPS-assisted, machine to machine solutions that combine information collected by sensors with automated management

**10. Sprinkler irrigation** — Water delivered through overhead nozzles

**11. Water harvesting:** Irrigation that uses earth dams, channels and other ways of directing water toward crops

### **2.8.1 Crop protection**

This is the science and practice of managing, plant diseases, weeds and other pests (both vertebrate and invertebrate) that damage agricultural crops and forestry. Agricultural crops include field crops (maize, wheat, rice, etc.), vegetable crops (potatoes, cabbages, etc.) and fruits. The crops in field are exposed to many factors. The crop plants may be damaged by insects, birds, rodents, bacteria, etc. Crop protection encompasses:

Pesticide-based approaches such as herbicides, insecticides and fungicides, biological pest control approaches such as cover crops, trap crops and beetle banks, barrier-based approaches such as agro textiles and bird netting, animal psychology-based approaches such as bird scarers, biotechnology-based approaches such as plant breeding and genetic modification.

### **2.8.2 Drip irrigation**

The second agricultural innovation that can help improve crop production is drip irrigation this is sometimes called trickle irrigation and it involves dripping water onto the soil at very low rates (2-20 litres/hour) from a system of small diameter plastic pipes fitted with outlets called **emitters** or



drippers. Water is applied close to plants so that only part of the soil in which the roots grow is wetted, unlike surface and sprinkler irrigation, which involves wetting the whole soil profile. With drip irrigation water, applications are more frequent (usually every 1-3 days) than with other methods and this provides a very favourable high moisture level in the soil in which plants can flourish. Drip irrigation is most suitable for row crops (vegetables, soft fruit), tree and vine crops where one or more emitters can be provided for each plant. Generally only high value crops are considered because of the high capital costs of installing a drip system. Drip irrigation is adaptable to any farmable slope. Normally the crop would be planted along contour lines and the water supply pipes (laterals) would be laid along the contour also. This is done to minimize changes in emitter discharge as a result of land elevation changes. Drip irrigation is suitable for most soils. On clay soils water must be applied slowly to avoid surface water ponding and runoff. On sandy soils higher emitter discharge rates will be needed to ensure adequate lateral wetting of the soil.

One of the main problems with drip irrigation is blockage of the emitters. All emitters have very small waterways ranging from 0.2-2.0 mm in diameter and these can become blocked if the water is not clean. Thus it is essential for irrigation water to be free of sediments. If this is not so then filtration of the irrigation water will be needed.

Blockage may also occur if the water contains algae, fertilizer deposits and dissolved chemicals which precipitate such as calcium and iron. Filtration may remove some of the materials but the problem may be complex to solve and requires an experienced engineer or consultation with the equipment dealer.

Drip irrigation is particularly suitable for water of poor quality (saline water). Dripping water to individual plants also means that the method can be very efficient in water use. For this reason it is most suitable when water is scarce.

### 2.8.3 Drought/heat tolerance

The third is drought/ heat tolerant; this refers to the degree to which a plant is adapted to arid or drought conditions. *Desiccation tolerance* is an extreme degree of drought tolerance. Plants that naturally adapt to dry conditions are called *xerophytes*. Drought tolerant plants typically make use of either C4 carbon fixation or crassulacean acid metabolism (CAM) to fix carbon during photosynthesis. Both are improvements over the more common but more basal C3 pathway in that they are more energy efficient. CAM is particularly good for arid conditions because carbon dioxide can be taken up at night, allowing the stomata to stay closed during the heat of day and thus reducing water loss. Many adaptations for dry conditions are structural, including the following:

Adaptations of the stomata to reduce water loss, such as reduced numbers or waxy surfaces.

Water storage in succulent above-ground parts or water-filled tubers.

Adaptations in the root system to increase water absorption.

Trichomes (small hairs) on the leaves to absorb atmospheric water.

Arid conditions can reduce the yield of many crops. Plant breeding programs for improved yield during drought conditions have great economic importance, and these programs may be broad in scope. For example, one study on soybeans currently being conducted by the United States Department of Agriculture is scheduled to span several years, with research taking place across



that country, and has among its goals the identification of specific mechanism by which soybeans resist wilting and of the specific genes for drought tolerance.

In landscapes in arid or drought-prone regions, drought tolerance is an important consideration in plant selection.

#### **2.8.4 Integrated soil fertility management (ISFM)**

This is a set of agricultural practices adapted to local conditions to maximize the efficiency of nutrient and water use and improve agricultural productivity. ISFM strategies center on the combined use of mineral fertilizers and locally available soil amendments (such as lime and phosphate rock) and organic matter (crop residues, compost and green manure) to replenish lost soil nutrients. This improves both soil quality and the efficiency of fertilizers and other agro-inputs. In addition, ISFM promotes improved germplasm, agro forestry and the use of crop rotation and/or intercropping with legumes (a crop which also improves soil fertility).

Farmers who have adopted ISFM technologies have more than doubled their agricultural productivity and increased their farm-level incomes by 20 to 50 percent. The value-cost ratios of adopted ISFM options are well above two.

Soils are naturally poor in sub-Saharan Africa, and poor management has further reduced their productive capacity. There should be more fertilizer use required to reverse further nutrient mining and productivity decline and that this agro-input is best used in combination with other measures to ensure that most of its nutrients are taken up by the crop.

The need for sustainable intensification of agriculture in sub-Saharan Africa (SSA) has gained support, in part because of the growing recognition that farm productivity is a major entry point to





break the vicious cycle underlying rural poverty. Fertilizer use is extremely low in much of the sub-Saharan Africa region (8 kg/ha on average), and this is one of the main factors explaining lagging agricultural productivity growth. Most of the soils in Africa are inherently infertile, and poor agricultural management practices during the past decades have led to a severe decline in their productive capacity. Given the low levels of fertilizer use and poor soils in SSA, fertilizer use must increase if the region is to reverse the current trends of low crop productivity and land degradation. There are renewed efforts to raise fertilizer use in SSA from the current 8 kg to 50 kg nutrients per ha by improving the marketing, policy and socio-economic environment to increase fertilizer availability at prices affordable to smallholder farmers. Since fertilizer is very expensive for most smallholder farmers in SSA, the Alliance for a Green Revolution in Africa (AGRA) has adapted Integrated Soil Fertility Management (ISFM) as a framework for boosting crop productivity through combining fertilizer use with other soil fertility management technologies, based on site conditions. Application of phosphor fertilizer to a dual purpose soybean variety that produces substantial amounts of leafy biomass and leaves a net amount of fixed N in the soil and rotation of this soybean with an N-efficient and disease-resistant maize variety that receives a minimal amount of N fertilizer is a good example of an ISFM strategy. Adapting fertilizer rates to prevailing soil fertility conditions would qualify such intervention as ‘complete ISFM’. Principles embedded within the definition of ISFM need to be applied within existing farming systems. Two examples clearly illustrate the integration of ISFM principles in existing cropping systems: (i) dual purpose grain legume – maize rotations with P fertilizer targeted at the legume phase and N fertilizer at rates below those recommended that are targeted at the cereal phase in the moist savanna agro-ecozone (Sanginga et al., 2003) micro-dose fertilizer applications in legume-sorghum or legume-millet rotations with retention of crop residues and combined with water



harvesting techniques in the semi-arid agro-ecozone (Bationo et al., 1998). As for the grain legume-maize rotations, application of appropriate amounts of mainly P to the legume phase ensures good grain and biomass production, with the latter in turn benefiting a subsequent maize crop and thus reducing the need for external N fertilizer (Sanginga et al., 2003). As for the micro-dose technology, spot application of appropriate amounts of fertilizer to widely spaced crops such as sorghum or millet substantially enhances its use efficiency, with further enhancements obtained when combined with physical soil management practices aiming at water harvesting. The gradual increase in complexity of knowledge as one move towards complete Integrated Soil Fertility Management has implications on the strategies to adapt for widespread dissemination of ISFM. Furthermore, a set of enabling conditions can favor the uptake of ISFM. The operations of every farm are strongly influenced by the larger rural community, policies, supporting institutions and markets. Not only are farms closely linked to the off-farm economy through commodity and labor markets, but the rural and urban economies are also strongly interdependent. Farming households are also linked to rural communities and social and information networks, and these factors provide feedback that influences farmer decision-making. Because ISFM is a set of principles and practices to intensify land use in a sustainable way, uptake of ISFM is facilitated in areas with greater pressure on land resources. The first step towards ISFM acknowledges the need for fertilizer and improved varieties. An essential condition for its early adoption is access to farm inputs, produce markets and financial resources. To a large extent, adoption is market-driven as commodity sales provide incentives and cash to invest in soil fertility management technologies, offering opportunities for community-based savings and credit schemes. Policies towards sustainable land use intensification and the necessary institutions and mechanisms to implement and evaluate these are also a factor that





facilitates the uptake of ISFM. Policies favoring the importation of fertilizer, its blending and packaging, or smart subsidies are needed to stimulate the supply of fertilizer as well. Specific policies addressing the rehabilitation of degraded, non-responsive soils may also be required since investments to achieve this may be too large to be supported by farm families alone. While dissemination and adoption of complete ISFM is the ultimate goal, substantial improvements in production can be made by promoting the greater use of farm inputs and germplasm within market-oriented farm enterprises. Such dissemination strategies should include ways to facilitate access to the required inputs, simple information fliers, spread through extension networks and knowledge on how to avoid less-responsive soils. A good example where the ‘seeds and fertilizer’ strategy has made substantial impact is the Malawi fertilizer subsidy programme. Malawi became a net food exporter through the widespread deployment of seeds and fertilizer, although the aggregated agronomic efficiency was only 14 kg grain per kg nutrient applied (Chinsinga, 2008). Such AE is low, and ISFM could increase this to at least double its value with all consequent economic benefits to farmers. As efforts to promote the ‘seed and fertilizer’ strategy are under way, activities such as farmer field schools or development of site-specific decision guides that enable the tackling of more complex issues can be initiated to guide farming communities towards complete ISFM, including aspects of appropriate organic matter management or local adaptation of technologies. The latter will obviously require more intense interactions between farmers and extension services and will take a longer time to achieve its goals.

### **2.8.5 Nitrogen use efficiency**

Limitations in food supply for a growing population, together with the harmful effects of intensive agriculture on the environment, are major challenges to agricultural science. Nitrogen is an essential element for plant growth and animal nutrition and is the nutrient taken up in the largest



amount by plants. The development of crop plants with improved nitrogen assimilation and management would reduce the need for intensive nitrogen fertilization and positively influence the environment. The new high-throughput technologies in biology, along with systems biology approaches, may provide new integrated information about the processes determinants of nitrogen use efficiency (NUE) in plants, and the discovery of new genes involved in the underlying molecular mechanisms. This knowledge could enable the development of new agricultural and biotechnological approaches to improve nitrogen management by crop plants, and contribute to develop models of sustainable agriculture with lower environmental impact.

Amiour et al (2012), describe how integrating information from multiple ‘omics’ approaches can lead to new insights into how nitrogen metabolism is regulated in crop plants, focusing on maize and its responses to N-deficiency at the transcriptomics, proteomic and metabolomic levels. The long-term goal is to provide breeders with markers and other tools that can be used to aid the development of crop varieties with improved NUE.

Moschou *et al*(2012), review the complex and often poorly understood roles of polyamines in plants, in particular in relation to N cycling, the regulation of developmental processes such as senescence and mediating plant-environment interactions.

### **2.8.6 No till farming technology**

Tilling is the process of removing plants or plant debris, usually for the purposes of planting more desirable species. This tilling can result in a flat seed bed or one that has formed areas, such as rows or raised beds, to enhance the growth of desired plants. It is an ancient technique with clear evidence of its use since at least 3000 B.C.

The effects of tillage can include soil compaction; loss of organic matter; degradation of soil aggregates; death or disruption of soil microbes and other organisms including mycorrhiza, arthropods, and earthworms (Preston, 2004) and soil erosion where topsoil is washed or blown away.

**2.8.7 No-till farming** (also called **zero tillage** or **direct drilling**) is a way of growing crops or pasture from year to year without disturbing the soil through tillage. No-till is an agricultural technique which increases the amount of water that infiltrates into the soil and increases organic matter retention and cycling of nutrients in the soil. In many agricultural regions it can reduce or eliminate soil erosion. It increases the amount and variety of life in and on the soil, including disease-causing organisms and disease suppression organisms. The most powerful benefit of no-tillage is improvement in soil biological fertility, making soils more resilient. Farm operations are made much more efficient, particularly improved time of sowing and better trafficability of farm operations. Studies have found that no-till farming can be more profitable (Derpsch, 2010) if performed correctly.

Less tillage of the soil reduces labour, fuel, irrigation and machinery costs. (Derpsch, 2010) No-till can increase yield because of higher water infiltration and storage capacity, and less erosion. Another benefit of no-till is that because of the higher water content, instead of leaving the field's fallows it can make economic sense to plant another crop instead.

As sustainable agriculture becomes more popular, monetary grants and awards are becoming readily available to farmers who practice conservation tillage. Some large energy corporations which are among the greatest generators of fossil-fuel-related pollution may purchase carbon credits, which can encourage farmers to engage in conservation tillage. Under such schemes, the

farmers' land is legally redefined as a carbon sink for the power generators' emissions. This helps the farmer in several ways and it helps the energy companies meet regulatory demands for reduction of pollution, specifically carbon emissions.

No-till farming can increase organic (carbon based) matter in the soil, which is a form of carbon sequestration. However, there is debate over whether this increased sequestration detected in scientific studies of no-till agriculture is actually occurring, or is due to flawed testing methods or other factors (Baker et al, 2007). Regardless of this debate, there are still many other good reasons to use no-till, e.g. reduction in fossil fuel use, no erosion, and soil quality.

No-till farming improves soil quality (soil function), carbon, organic matter, aggregates, protecting the soil from erosion, evaporation of water and structural breakdown. A reduction in tillage passes helps prevent the compaction of soil.

Crop residues left intact help both natural precipitation and irrigation water infiltrate the soil where it can be used. The crop residue left on the soil surface also reduces evaporation, conserving water for plant growth. Soil compaction and no tillage-pan, soil absorbs more water and plants are able to grow their roots deeper into the soil and suck up more water.

Tilling a field reduces the amount of water, via evaporation, around 1/3 to 3/4 inches (0.85 to 1.9 cm) per pass. By no-tilling, this water stays in the soil, available to the plants. No-till farming requires specialized seeding equipment designed to plant seeds into undisturbed crop residues and soil. If a soil has poor drainage, it may need drainage tiles or other devices in order to help with the removal of excess water under no-till. Farmers should remember that water infiltration will improve after several years of a field being in no-till farming, so they may want to wait until 5–8



years have passed to see if the problems persist before deciding to invest in such an expensive system

### **2.8.8 Organic farming**

This is an alternative agricultural system which originated early in the 20th Century in reaction to rapidly changing farming practices. Organic agriculture continues to be developed by various Organic Agriculture organizations today. It relies on fertilizers of organic origin such as compost, manure, green manure, and bone meal and places emphasis on techniques such as crop rotation, companion planting, Biological pest control, mixed cropping and the fostering of insect predators are encouraged. Generally, although there are exceptions, organic standards are designed to allow the use of naturally occurring substances while prohibiting or strictly limiting synthetic substances.(USDA, 2016) For instance, naturally occurring pesticides such as pyrethrin and rotenone are permitted, while synthetic fertilizers and pesticides are generally prohibited. Synthetic substances that are allowed include, for example, copper sulfate, elemental sulfur and Ivermectin. Genetically modified organisms, nanomaterials, human sewage sludge, plant growth regulators, hormones, and antibiotic use in livestock husbandry are prohibited.(USDA blog,2016) (Paul, 2011)Reasons for advocating the use of organic farming include real or perceived advantages in sustainability, openness, independence, health, food security, and food safety, although the match between perception and reality is continually challenged.

Organic agricultural methods are internationally regulated and legally enforced by many nations, based in large part on the standards set by the International Federation of Organic Agriculture Movements (IFOAM), an international umbrella organization for organic farming organizations established in 1972.(Paul, 2011) Organic agriculture can be defined as



An integrated farming system that strives for sustainability, the enhancement of soil fertility and biological diversity whilst, with rare exceptions, prohibiting synthetic pesticides, antibiotics, synthetic fertilizers, genetically modified organisms, and growth hormones.

Since 1990 the market for organic food and other products has grown rapidly, reaching \$63 billion worldwide in 2012. (Helga .W et al, 2013) This demand has driven a similar increase in organically managed farmland that grew from 2001 to 2011 at a compounding rate of 8.9% per annum.(Paull, john 2011) As of 2011, approximately 37,000,000 hectares (91,000,000 acres) worldwide were farmed organically, representing approximately 0.9 percent of total world farmland (Helga .W et al, 2013).

### **2.8.9 Precision agriculture (PA) or satellite farming or site specific crop management (SSCM)**

is a farming management concept based on observing, measuring and responding to inter and intra-field variability in crops. Precision agriculture, as the name implies, means application of precise and correct amount of inputs like water, fertilizer, pesticides etc. at the correct time to the crop for increasing its productivity and maximizing its yields. Precision agriculture management practices can significantly reduce the amount of nutrient and other crop inputs used while boosting yields. Farmers thus obtain a return on their investment by saving on phytosanitary and fertilizer costs. The second, larger-scale benefit of targeting inputs—in spatial, temporal and quantitative terms—concerns environmental impacts. Applying the right amount of inputs in the right place and at the right time benefits crops, soils and groundwater, and thus the entire crop cycle. Consequently, precision agriculture has become a cornerstone of sustainable agriculture, since it respects crops, soils and farmers. Sustainable agriculture seeks to assure a continued supply of food within the ecological, economic and social limits required to sustain production in the long term. Precision agriculture therefore seeks to use high-tech systems in pursuit of this goal.



A recent article has tried to show that precision agriculture can help farmers in developing countries like India.

The goal of **precision agriculture** research is to define a **decision support system** (DSS) for whole farm management with the goal of optimizing returns on inputs while preserving resources.

Among these many approaches is a **phytogeomorphological** approach which ties multi-year crop growth stability/characteristics to topological terrain attributes. The interest in the phytogeomorphological approach stems from the fact that the geomorphology component typically dictates the hydrology of the farm field. (Kaspar, T. C et al 2003)

The practice of precision agriculture has been enabled by the advent of GPS and GNSS. The farmer's and/or researcher's ability to locate their precise position in a field allows for the creation of maps of the spatial variability of as many variables as can be measured (e.g. crop yield, terrain features/topography, organic matter content, moisture levels, nitrogen levels, pH, EC, Mg, K, etc.).

Precision agriculture has also been enabled by technologies including crop yield monitors mounted on GPS equipped combines, the development of variable rate technology (VRT) like seeders, sprayers, etc., the development of an array of real-time vehicle mountable sensors that measure everything from chlorophyll levels to plant water status, multi- and hyper-spectral aerial and satellite imagery, from which products like NDVI maps can be made

Precision agriculture aims to optimize field-level management with regard to:

Crop science: by matching farming practices more closely to crop needs (e.g. fertilizer inputs);

Environmental protection: by reducing environmental risks and footprint of farming (e.g. limiting leaching of nitrogen);



Economics: by boosting competitiveness through more efficient practices (e.g. improved management of fertilizer usage and other inputs).

Precision agriculture also provides farmers with a wealth of information to:

Build up a record of their farm;

Improve decision-making;

Foster greater traceability

Enhance marketing of farm products

Improve lease arrangements and relationship with landlords

Enhance the inherent quality of farm products (e.g. protein level in bread-flour wheat)

Precision agriculture is usually done as a four-stage process to observe spatial variability: data collection, variables, strategies and implementation practices.

### **2.8.9.1 Strategies**

NDVI image taken with small aerial system Stardust II in one flight (299 images mosaic)

Using soil maps, farmers can pursue two strategies to adjust field inputs:

Predictive approach: based on analysis of static indicators (soil, resistivity, field history, etc.) during the crop cycle.

Control approach: information from static indicators is regularly updated during the crop cycle by:

Sampling: weighing biomass, measuring leaf chlorophyll content, weighing fruit, etc. Remote





sensing: measuring parameters like temperature (air/soil), humidity (air/soil/leaf), wind or stem diameter is possible thanks to Wireless Sensor Networks.

Proxy-detection: in-vehicle sensors measure leaf status; this requires the farmer to drive around the entire field.

Aerial or satellite remote sensing: multispectral imagery is acquired and processed to derive maps of crop biophysical parameters. Airborne instruments are able to measure the amount of plant cover and to distinguish between crops and weeds.

Decisions may be based on decision-support models (crop simulation models and recommendation models), but in the final analysis it is up to the farmer to decide in terms of business value and impacts on the environment.

### **2.8.9.2 Implementing practices**

New information and communication technologies (NICT) make field-level crop management more operational and easier to achieve for farmers. Application of crop management decisions calls for agricultural equipment that supports variable-rate technology (VRT), for example varying seed density along with variable-rate application (VRA) of nitrogen and phytosanitary products.

Precision agriculture uses technology on agricultural equipment (e.g. tractors, sprayers, harvesters, etc.):

Positioning system (e.g. GPS receivers that use satellite signals to precisely determine a position on the globe);

Geographic information systems (GIS), i.e., software that makes sense of all the available data;



Variable-rate farming equipment (seeder, spreader).

"The reality is that no single agricultural technology or farming practice will provide sufficient food for the world in 2050," Rosegrant said. "Instead, we must advocate for and utilize a range of these technologies in order to maximize yields."

For example, under best case scenarios, no-till farming could help improve yields for maize by 20 percent by 2050, but layering better irrigation methods into those same fields could boost that improvement to 67 percent.

The impact of precision agriculture varies dramatically, depending on the crop. When it comes to improving production, it is the fourth most effective innovation for improving maize yields. But for rice and wheat, precision agriculture ranks behind nitrogen-use efficiency and no-till techniques. All in all, the report suggests that by applying technologies like precision agriculture to global rain fed, wheat yields could be improved by 25 percent by 2050. But the results vary dramatically depending on the crop and the region.

"Globally, the largest production increases compared to the baseline in 2050 are achieved through no-till and heat tolerance for maize, [nitrogen-use efficiency] and [precision agriculture] for rice, and non-till and [precision agriculture] for wheat,"

The literature reviewed on the use of radio for agricultural broadcast news revealed that radio is an important source of message delivery to farmers in Africa. There is high radio ownership, and radio listenership among rural people. Also it was found that attitudes and perceptions of source credibility, and socio-economic and demographic factors do have an influence on farmer's listenership to radio.



### **2.8.10 Sprinkler Irrigation**

This is the type of irrigation method of applying irrigation water which is similar to natural rainfall. Water is distributed through a system of pipes usually by pumping. It is then sprayed into the air through sprinklers so that it breaks up into small water drops which fall to the ground. The pump supply system, sprinkler and operating conditions must be designed to enable a uniform application of water. (FAO 1988)

### **2.8.11 Water Harvesting**

Water harvesting is the collection of runoff for productive purposes, instead of runoff being left to cause erosion, it is harvested and utilized. In the semi-arid drought prone areas where it is already practiced, water harvesting is a directly productive form of soil and water conservation. (FAO, 1982).



## CHAPTER THREE

### METHODOLOGY

#### 3.0 Introduction

This chapter discusses the methodology employed to achieve the research objectives. The discussion is centered on the research design, the population, the sample, sampling technique, research instruments to be used including the validity and reliability of these instruments. The data collection process and the process of data analysis would also be described. All these are to ensure that the objectives of the research are achieved.

#### 3.1 Profile of the Community

The present study is survey in nature. Kumbungu District is the area where the research is conducted. Kumbungu District with its capital **Kumbungu** was carved from Tolon-Kumbungu district and forms part of the new districts and municipalities created in the year 2012. It is located at an elevation of 150 meters above sea level. They were inaugurated at their various locations simultaneously on 28th June, 2012. Its coordinates are 9°33'32" N and 0°56'55" W in DMS (Degrees Minutes Seconds) or 9.55889 and -0.948611 (in decimal degrees). It shares boundaries with the West Mamprusi District to the North, the Savelugu District to the East, Tolon District to the West and Tamale Metropolitan Assembly to the South. It covers a total landmass of 1,599km<sup>2</sup> forming about 3.9% of the entire area of the Northern Region. Kumbungu district, which is located in the central part of the Northern Region, it has the characteristics of all the other districts in the Northern Region. Kumbungu District occupies an area of 99000 km<sup>2</sup>, and a greater part of it is under arable crop cultivation. The total population, according to the 2012 Population and Housing Census stood at 39341 with an equal ratio of females to males (GSS, 2012). About 45% of the





population is within the ages of 18 and 30 which indicates that the population is largely youthful. The district is made up of over 150 settlements, most of which are farming communities with a population below 500. Using a population of 5000 as the threshold for Urban-Rural dichotomy, the district has one (1) Urban Center. This is Kumbungu. It therefore, implies that a greater percentage of the population lives in the rural areas. The district is predominantly agricultural in economy, about 97% of its economically active population (15 to 70 years old) involved in farming and mainly at subsistence level. The major food crops cultivated include maize, sorghum, millet rice, and yam, groundnut, cowpea & soya beans though due to climatic conditions, and other conditions have made productivity low but have the potential to increase output if modernized agriculture is effectively practiced. The agricultural sector however encounters problems of food crop production such as, high cost of farm inputs, post-harvest losses, over reliance on rain fed agriculture and unstable food prices.

Although food price fluctuations could emanate from the rain fed agriculture, inadequate storage facilities and post-harvest losses due to pest infestation pose a serious threat to farmers. The problem of storage forces farmers to sell at low prices immediately after harvest due to glut. Food prices are therefore low in the harvest period but high during the lean season. Secondly, farming is mainly rainfall dependent, which is highly erratic thus causing seasonal unemployment, food insecurity and poverty. To boost food production therefore, farmers have adopted small scale irrigation projects using the Bontanga irrigation project.

Kumbungu district as part of Northern Region is much drier than southern areas of Ghana, due to its proximity to the Sahel, and the Sahara. The vegetation consists predominantly of grassland, especially savanna with clusters of drought-resistant trees such as baobabs or acacias. The district has a unimodal rainfall pattern which normally begins in May and ends in October, with an average

annual rainfall of 750 to 1050 mm (30 to 40 inches). The dry season is between about November and April. The highest temperatures are reached at the end of the dry season, the lowest in December and January. However, the hot Harmattan winds from the Sahara blows frequently between December and the beginning of February. The temperatures can vary between 14 °C (59 °F) at night and 40 °C (104 °F) during the day. The district experiences a unimodal annual rainfall of 1034 mm distributed fairly from April to late November with a uniform mean monthly temperature of 22°C during the rainy season and maximum of 34°C during the dry season. The relative humidity in the study area is at its maximum during the rainy season with mean monthly value of 80% and a sharp decrease to a minimum monthly value of 53% during the dry season (SARI, 2004)

Staple crop farming is highly restricted by the short rainfall duration, hence the need to develop and finance sustainable alternative livelihood activities like shea butter processing to supplement household income of the people. Shea fruits are most treasured in the District because it is harvested between April/May when the dry season and its accompanying hunger sets in.

The Dagombas constitute about 80% of the total population since the area is a Dagomba settlement how however there are a few other tribes that have settled there for various reason example for work purposes, marriage amongst others. Most of the inhabitants (80%) in the district are Muslims. The major festivals of the people are Fire, Damba and Yam festivals celebrated to showcase the rich tradition of the people annually (TMA Profile, 2009).

The economy of the district is dominated by agribusiness including services and small-scale industries. The main occupation of the people is farming, with maize, groundnut, vegetables, and cowpea as the common crops. Yam and rice are also grown, but on a smaller scale (MOFA, 1998). Currently, it is estimated that 80% of the people are engaged in agriculture. (TMA Profile, 2009).



Electricity, kerosene lamp and solar energy are main sources of energy for the people. According to the district Profile of 2006-2009, 59% of households in the district use electricity as their main source of lighting, 40% rely on kerosene lamp for lighting while 1% uses gas lamp and solar energy. There is therefore the potential to expand the use of solar energy because of the high duration of sunshine in the area annually (TMA Profile, 2009).

Pipe borne, boreholes, wells and dugouts are the main sources of water for the populace. Other livelihood activities are rearing livestock such as cattle, sheep, guinea fowls, fowls and goats. The main industrial activities in the district include agro-processing such as rice milling, shea butter processing, vegetable oil extraction, cotton ginning and textile or smock making. Others include: vehicle repairs and the manufacturing of farm implements. The rest are cloth and leather works, pottery and carpentry. (TMA Profile, 2009)

The land is generally undulating with a number of scattered depressions. There are no marked high elevations throughout the district. The district is drained by a number of rivers and streams, most prominent being the White Volta which almost divides the district into two equal halves. Among the major tributaries of the White Volta are Kulabong, Koraba, Salo, and Bawa Winibo. The major rivers and their tributaries exhibit dendrite drainage patterns.

Most of these tributaries dry up during the dry season. There exist 48 smaller dams and dug-out (26 dams- 14 dugouts) in the District.

### **3.2 Study Design**

This research aims to obtain insights into the current radio listening habits of the people of the people from the study area, their preferred radio message contents and preferred radio programmes. The effects of radio programming variables and formats were investigated and ascertained. To be able to meet the study aims and objectives and to adequately answer the research

questions, the qualitative approach to ascertaining data was used to gather and analyze the data that is using survey questionnaires.

Survey is an empirical study that employs the use of questionnaires or interviews to investigate and describe an occurrence, an issue or a phenomenon (Bums, 2000; Reinard, 1994) or to both describe and explain situations and phenomenon ( Wimmer and Dominic, 2006).

According to Shoemaker and Mc Combs (1991:154), in survey research, “the information collected or the data is generally numerical and suitable for statistical analysis”. Gunter distinguished between the descriptive and analytical functions of survey research. Descriptive surveys, Gunter indicated,” are useful for documenting a particular state of affairs regarding public opinion or behavior or population characteristics at one point in time” (Gunter, 2000: 24)., Bums (2000) noted, that the descriptive aspect of research allows large quantities of data to be summarized. This is useful in making the data easy to understand and interpret. Analytical surveys, on the other hand, help in explaining variables, and drawing possible relationships between them (Bums, 2000).

This thesis employed the techniques and methods of both the analytical and descriptive techniques of survey research.

Survey research, Singletary (1994) stated, has been found to be easy to employ, and it rates high on reliability. Survey research has largely remained a useful methodological tool for researchers and scholars in audience research and in studies relating to diffusion of innovations among farmers (Emenyeonu, 1987) and technology transfer to farmers in developing countries (Chizari, Karbasioun, and Lindner, 1998). Singletary Jnr., Bruce and Straits (1999) described the typical features of survey research as follows:



1. “Quite a good number of respondents are chosen through probability sampling procedures to represent the position of interest. Meaning through this method all people in the community are given equal chances of being selected for the study.
2. Systematic questionnaires or interview procedures are used to ask prescribed questions of respondents and to record their answers.
3. Answers are numerically coded and analyzed with the aid of statistical software” (Singletary Jnr., Bruce and Straights, 1999:239)

Similarly, Gunter (2000) also noted the importance of sampling procedure and questionnaire design in survey research. He observed that the growth of survey research has contributed to the development in methodological practice. Some of the major developments in this regard relates principally to techniques of sampling and questionnaires design (Gunter, 2002).

This research used the survey approach because of its strengths and suitability for the study. Reinhardt (1994) noted that, survey offers the researcher the opportunity to have a broader outlook of an issue or phenomenon, while employing the scientific means. Jensen (2002) noted that survey is very useful in diffusion studies. He stated that:

“The most common approach to diffusion studies has been survey methodologies which make it possible to measure credibility or accessibility of either media or information in different social groups and contexts” (Jensen, 2002:141)

In this study, the data collected on farmers, using the survey design, enabled the researcher to describe the characteristics of the farmers, their radio listening habits, media exposure, attitudes and perceptions, as well as establishing relationships between farmer characteristics and communication behavior. The survey was useful also in analyzing the relationships between the main variables of the study, and thereby providing explanations. An aspect of this study draws





heavily on the methodologies of diffusion research, therefore making the survey methodology very appropriate. Schroder et al. (2003) noted that the use of survey research in audience survey can offer data that is useful for description and analyses of variables. There are copious studies in Africa (Emenyeonu, 1987; Osuntogun, Deyama and Anyawu, 1986), which employed the use of the survey method to conduct investigations that were either wholly or partially drawn on the diffusion of innovations model.

### **3.3 Rationale for Using Survey for the Study**

This research used the survey approach because of its strengths and suitability for the study. Reinhardt (1994) noted that, survey offers the researcher the opportunity to have a broader outlook of an issue or phenomenon, while employing the scientific means. Jensen (2002) noted that survey is very useful in diffusion studies. He stated that:

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the survey method to conduct investigations that were either wholly or partially drawn on the diffusion of innovations model.

### **3.4. Sampling and Sample Size**

In this study, a multi-stage sampling technique was used to select respondents for the survey. A combination of purposive, quota and random sampling methods were employed. To arrive at the sample size, Kumbungu district was purposively selected, because of the presence of the community radio station. Firstly quota sampling was employed to divide the communities into four zones, north, east, south and central, purposive sampling was then used to select communities which had access to the station from the four zones. After which simple random sampling was used to select four communities who have uninterrupted access to the station all day and night. The study area has a total population of 39341 (GSS, 2012) out this 35406 representing 90% of the total population are engaged in farming. 7081.2 representing 20% have access to simli radio while from the areas zoned and communities selected 1062.18 have uninterrupted access to the radio station. From a sample frame of 1062.18 a sample size was 140 respondents were chosen representing 13% of the total frame. The selection of 13% is consistent with the view of Agyedu et al. (2013) that a sample of 10% to 20% of any population is always enough to generate confidence in the data collected and for subsequent generalizations.

In each of the sampled households, the first adult the interviewers met was invited to respond to the interviews, provided he/she owned a farm, and was between the ages of 15 and 70 years. The interviews were conducted mostly in the homes. However, there were some instances where some of the respondents insisted that the interviews with them be conducted outside their compounds, mostly under shady trees. The information of the respondents includes their community, age group, educational status, marital status, and major and minor occupations.



### 3.5. Survey Instrument

The survey instrument contained both close-ended and open-ended questions. The survey instrument was developed based on the objectives of the study, and the literature review. Essentially, the survey instrument was divided into six sections as follows:

Section 1: Farmers' socio-economic and demographic characteristics: Under this section, seven questions were used to measure the farmers' personal characteristics. The variables that were investigated were: age, education, sex, marital status, income from agriculture, other sources of income, and income from the other economic activities. These variables provided useful information on the respondents, and a correlation between these variables and other independent variables were investigated as part of the study.

Section 2: Farmers' Communication Behavior: In this section the importance of radio, television and newspapers as sources of information to the farmers was investigated. The questions contained in this section sought to investigate whether farmers listened to radio, watched television or read newspapers, and the number of days they relied on these sources of news within a week. The information gathered under this section helped in measuring farmers' sources of news and information, their radio ownership, access to radio and radio listening periods within a day.

Section 3: Radio Agricultural Programmes: Data gathered from this section was useful in measuring the farmers' level of reliance on radio for agricultural news. In particular, the farmers' frequency of listening to radio agricultural broadcasts, their radio programme preferences, and their level of comprehension of the radio messages were investigated. Also the questions in this section sought to investigate which farmers have been involved in radio agricultural production, and their level of involvement.





**Section 4: Message Relevancy, Message Comprehension, Message Recall, and Broadcast Timing:**

The questions in this section sought to investigate the perceived levels of farmers' comprehension and recall of the broadcast news on agriculture. The section also sought to investigate farmers' level of adoption of the radio messages on their farms. The views of respondents on the importance of the messages to their agricultural information needs were measured, and their views on the duration of the radio messages and suitability of the broadcast periods were investigated.

**Section 5: Attitudes and Perceptions:** Attitudes and perceptions of the credibility of radio were measured by using a five-item five-point Likert scale for each of them. The questions contained negative and positive statements. Crespo (2001) observed that attitudes surveys have been used for several decades in measuring such things as public moods and beliefs concerning a wide range of areas including political events and public information campaigns. In Kellerman's (1995) view, attitudes are assessed by means of questionnaires. The use of indirect questions and interrelated questions in a questionnaire is one effective way of measuring attitudes. Priest (1996) noted the importance of Likert scales in media research, and stated that though they often measure attitudes, they are useful also for measuring variables such as credibility, believability, preferences, needs and satisfaction. The items in the Likert scales that were used for this study were adopted from studies by Salleh (1989), El-gindi (1986), as cited by Salleh (1989), Salleh and Zakariah (1993); and Zakariah (1993), and modified to suit the scope and objectives of this study.

**Section Six: How Local Radio Can Be Made More Beneficial to Farmers:** This section contained one question - an open-ended question that sought to elicit farmers' views on how local radio can be made more beneficial to them. Multiple responses to this question were permitted.

### 3.6 Data Collection

The data was gathered through face-to-face interviews with the help of six trained interviewers. The interviewers all had reasonably high levels of education: each of them held a Higher National Diploma Certificate or a Bachelors certificate. They were also provided with the requisite training on how to administer the questionnaires. This was useful so as to minimize errors that could affect the quality of the data from the survey research (Singletary, 1994). The researcher personally trained the interviewers and provided supervision during the interviews. The training sessions took two days. The first day of the training involved: explaining the purpose of the research to the interviewers; going through the questionnaires with them to ensure they understood the questions; and teaching them basic techniques of face-to-face interviews and finding appropriate local accepted terminologies for comprehension to use during the interviews since it was going to be done in the local dialect. The second day normally involved a practical administration of the questionnaires by the interviewers to a few farmers (two or three farmers) outside the selected communities for the study. The problems encountered and the lessons learnt by the enumerators and research assistants were then discussed.

The survey instrument was pre-tested in November 2016, using 12 farmers outside the communities that were sampled for the study. In survey research it is always desirable to conduct a pre-test of the research instrument (Bryman, 2003). Pre-testing of an interview schedule is important to ascertain whether the questions are well framed and understandable to the respondents (Bryman, 2003). Apart from reaping these two advantages of pre-testing, the average time that was needed to complete an interview using the survey instrument was known. Some corrections were made to the questionnaires after the pre-testing to enhance comprehension. The direct interview method was used to collect the data, and this ensured that the respondents were persuaded to





answer all the questions (Babbie, 1986), and it provided a 100 per cent response rate. Face-to-face interviews were used because of their inherent merits. Babbie (1995) stated that the interview method provides a guard against questions that will be confusing to the respondents. The interviewer can note the respondents' reactions to the questions; and through the interview method respondents are persuaded to answer all questions, and to do so as accurately as possible.

Singleton Jnr. and Straits (1999) also observed that because of the high response rate when using the face-face interviews, less bias is introduced into the data as a result of manipulation of sampled persons. Face-to-face interviewing additionally permitted important and relevant observations that may be of interest to the researcher to be noticed and recorded (Singleton Jnr. and Straits, 1999).

The face-to-face interview is most beneficial when the research question is of the technical type. More time is needed to explain the questions and to probe, and this makes the face-to-face interviews more effective than other methods of gathering survey data (Singleton, 1994). Also the face-to-face interview is appropriate when the research topic is sensitive - one that is of highly personal nature or likely to evoke avoidance. For instance questions on personal intimacies may be avoided by interviewees when the interview is done on telephone but for face to face the interviewer got the information sorted after by probing further sometimes using jokes in the local dialect and this helps them give out the information they wouldn't easily have given out, Singleton et al also observes that when conducted using the face-to-face interviews, the interviewee might more readily provide personal information to the interviewer (Singleton Jnr. and Straits, 1994).

The research used the face-to-face interviews to administer the questionnaires largely because the respondents were predominantly illiterate and the interviewer were also vexed in the local dialect allowing them to manipulate the language in a probing way and making the respondent feel safe since he feels he is talking to a fellow tribes man. Even for those who could read and write, their

literacy skills were less than adequate to enable them have a thorough understanding of the questions and to accurately express their responses in writing. It was therefore safer, useful and necessary to administer the instrument through the face-to face interviews. It allowed for a more accurate data to be gathered.

Another reason for using the face-to-face interviews to gather the data was that certain questions were probed further to elicit the accurate responses for instance when it gets to finances it is often very difficult to get a person to actually give you information but when the enumerators are interviewing they use cunning yet truthful ways to get them release that information without knowing example in a question like How much do you earn each year from your farm? The enumerator will have to persuade the farmer to give the information, and they do that by seeking the number of produce cultivated, how many bags harvested, how much per bag, any other jobs done within the year to earn income, and then afterwards total it. The training given to the enumerators was useful in getting the farmers to respond to all the questions in as accurate and candid manner as possible.

### **3.7 Data Analysis**

Each day the researcher was on the field with the interviewers to ensure that the right methods and procedures were being used to gather the data. Also, at the end of each day, the research assistants checked the completed questionnaires to ensure that all the questions were and portions of the questionnaire were completed. The main goal was to identify any slippages and to remedy them immediately. At home, the researcher himself further went through the completed questionnaires to check for questions that were left unanswered, and for any inaccuracies and discrepancies in the responses. The data gathered was analyzed using Scientific Package for Social Scientist (SPSS, 2012), and the results was presented in the form of tables, charts and diagrams.



## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### 4.0 Introduction

This chapter presents the findings of the study. It presents discussions of farmers' demographic and socioeconomic characteristics, farmers' sources of information and media exposure, radio listening behaviors, and listenership to radio agricultural programmes other areas include health, economic education etc. Farmers' self-reported levels of message adoption, and message comprehension are discussed. The chapter also presents a discussion on the respondents' attitudes and perceptions of the credibility of local radio and its messages.

#### 4.1 Socio-Demographic Characteristics of Respondents

The demographic information of the respondents includes the communities selected, age group, educational status, marital status and major and minor occupations

**Table: 4.1 Communities and Respective Respondents in the Study Area**

Name of community	Number of male respondents	Number of female respondents	Percentage of respondents
Dalung	20	15	25
Saakuba	20	15	25
Bontanga	20	15	25
Kukuo	20	15	25
Total	80	60	100

Source: field survey December 2015



140 questionnaires were administered to the four communities to both male and female with the male being the majority respondents. Each community had thirty-five questionnaires with twenty administered to the male category of sex and fifteen administered to women. The total percentage being 25% for each community respectively. All respondents are farmers of various age groups and active listeners to the Simli radio both as a source of information and entertainment. The questionnaires were equally distributed to the four communities to ensure that all the four communities were equally represented in the study. The women were however fewer than men because more women were into different livelihood strategies instead of farming just a few women were into active farming.

#### 4.2. Ages of Respondents

The table 4.2 shows the age distribution of the respondents interviewed across the four communities

**Table: 4.2 Age Groups of Respondents**

Age groups	Number of male respondents	percentage	Number of female respondents	Percentage	Total male and female
15-45	43	30.71	40	28.6	83
46-64	28	20	20	14.28	48
65+	9	6	0	0	9
total	80	57	60	42.9	140

Source: field survey December 2015





From table 4.2, farmers in the communities constituted varied age groups of 16 – 45years, 46 – 64years to 65+ years representing 30.71%, 28.57%, 20% 14.28% and 6.428%, 0% respectively from the total 140 respondents. All the age groups of 16 – 45 years, 46 – 64 years and 65+ years, in the communities are involved in active farming practices, showing that farming activity is not restricted to only the active working group (i.e. 18-64 years) but to all age groupings. The involvement of those who are 65+ years in farming activities showed that the aged are productively engaged and hence less dependency on the active group.

Regarding the understanding of what is broadcasted on the radio the farmers shared that they understood most of the agricultural messages that were broadcast to them through local radio. The younger farmers particularly said that they understood the radio messages than did the older farmers. In relation to gender, it was found that the proportion of males who said they understood the messages often was higher than females.

Gunter (1987) argues that news awareness varies with age and sex. He explains that even though not much research has been done to examine the difference in age and sex in relation to news awareness and knowledge of public affairs, there is evidence to show that the ability to understand and retain news has a relationship with age and sex.

After an experiment conducted among college students, out of school adults, 10th grade students and illiterate adults in Kenya by Stauffer, Frost and Rybolt (1980), found that recall of broadcast news was significantly related to education. The college students performed better than the other three categories of respondents in a multiple choice test that was designed to test comprehension of all the 392 people in the sample.

In relation to the findings the high proportions of farmers who reported in the survey data that they understood the messages often, did not reflect in farmers' performance on unaided recall and message comprehension.

### 4.3 Educational Status Of Respondents

This section show the educational background of the people who responded to the questionnaire

**Table:4.3 Educational Status Of Respondents**

Education al status	Number of male farmers	percentage	Number of female farmers	percentage	Total male and female
Non-formal	17	12.14	12	8.6	29
Primary	17	12.14	6	4.29	23
Middle/J. H.S	10	7.14	2	1.43	12
S.H.S	6	4.29	3	2.14	9
Tertiary	5	3.6	0	0	5
None	25	17.9	37	26.43	62
Total	80	57.14	60	42.86	140





The data indicates that twenty-nine (29) (17males, 12females) of the respondents interviewed have attained Non-formal education representing a percentage of 20.74%, twenty-three (23) (17males, 6females) of the respondents' attained non-formal education representing a percentage of 16.43%. A further twelve (12) (10males, 2females) respondent respectively have the Middle/BECE certificate, representing 8.57% nine (9)(6males, 3females) of the respondents obtained secondary education representing a percentage of 6.43% whilst 3.6% respondents representing 5 respondents of male respondents attained tertiary or higher level qualification with none of the female actually attaining higher education in the study area. About 44.33% representing 62(25males, 37females) respondents in the study area had any formal or informal education. The role of education in agricultural training and has been established. Research has shown that there are positive relationships between education and farm productivity and management. Jamison and Lau (1980) produced strong evidence for the positive effects of education on productivity and farmers income. Education has been found to lead to better allocation of resources. The educated farmers tend to make better choice of inputs, combine them more effectively and judge the appropriate quantity better. (Drivel 1981). In addition, educated farmers are more active than their uneducated counterparts in seeking information as they could obtain from agricultural extension and training institutions. The premises of the study is that if the country is to meet its national food demands it must pay attention to farmers whose labour account for the current food availability. This means that farmers must be adequately equipped to execute this role. The provision and accessibility of education and management is the first step towards food self-sufficiency.

#### **4.4 Marital Statuses of Respondents**

This sections presents a table on the distribution of various marital statuses in the study area and a table of representation

**Table 4.4 Marital Statuses of Respondents**

Marital status	Number of male farmers	percentage	Number of female farmers	percentage	Total male and female
Married	63	45	43	30.71	106
Unmarried	13	9.29	15	10.71	28
Widowed	4	2.86	2	1.43	6
Divorced	0	0	0	0	0
Separated	0	0	0	0	0
Total	80	57.15	60	42.85	

Source: field survey December 2015

Table 4.4, indicates that 45% (63 males) and 30.71% (43 females) of the farmers are married, whilst 9.29 % ( 13 males) and 10.71% (15 females) of farmers are unmarried males and females widowed percentage was 2.86% (4 males) and 1.43% (2 females) of the respondents interviewed. However none of the respondents interviewed were divorced or separated. From table 4.4 it can be seen that, the married were more than the other categories, the respondents female suggested that it was due to their being married was the reason they got access to land for farming, the unmarried however said they had to beg for land from their fathers or brothers in order to engage in farming.

#### **4.5 Occupation of Respondents**

There are variations in occupations in the district. More employed persons (of the totals for both male and female percentage of workers, 100% and 100% representing 80 male and 60 female farmers respectively) in rural areas are engaged in agricultural occupations as the main occupation,





with some few salaried workers in the community. In contrast most farmers also engage in minor occupations in all communities like trading which has a percentage of 69.29% farmers from the total study population engaging in trading totaling 97 of the total population (for 49 male farmers, for 48 female farmers), for farmers engaging in fishing and fish trading along farming totaled 25 of the total respondents making a percentage of 17.86% (15 male farmers and 10 female farmers respectively). Respondent percentage of 8.58% for 12 farmers from the total responding population for male are engaged in activities like masonry aside farming and 4 of the male population and 2 of the female farmers are involved in only farming representing a percentage of 2.86% and 1.43 respectively.

Most farmers who engaged in one of any of the minor occupations said that, their major occupation which is farming might not be enough for the family up-keep all year round due to unfavorable weather conditions leading to poor yield and so have to engage in minor income activities in order to supplement their incomes. Farmer who engaged in fishing activities said that, they need not buy meat for cooking but use some of their catch to balance their diet. Balanced diet means healthy life for the next farming season. This act of these farmers engaging in other income activities undoubtedly will increase the food basket in the district ensuring a regular and sustainable supply of food throughout the year. Most farmers also engaged in other forms of economic activities enhancing their income levels.

An adequate diet must include not only calories but the full range of nutrients that humans need. Of particular importance is protein, which is essential for muscles, bones, the antibodies that prevent infection, and the many enzymes that regulate all of the body's systems. Grains, beans, and seeds are common sources of protein in developing countries, while meat, milk, cheese, and eggs are more likely to be consumed in industrialized countries, and by the newly wealthy in



developing countries. The demand for these products is high, despite the inefficient use of land required to produce them. Reliance on fish as a protein source varies widely. Although fish provide only an estimated 6.5 percent of the animal protein consumed in North America, in Africa the figure is an estimated 21 percent, and in Japan, North and South Korea, and China, 22 percent. In regions where fish supply a significant percent of the protein, people's protein source is threatened by the continuous decline in quality and quantity of fish caught in all parts of the world.

#### **4.6. Radio Ownership and Listenership**

This study found that radio is the most pervasive media source for farmers in the study area. An overwhelming majority of the respondents (87.4%) owned radio sets, and all the respondents (140) indicated that they listened to radio.

Similar studies on rural farmers in Ghana have indicated equally high radio ownership and radio listenership (Chapman et al., 2003). Chapman et al. (2003), after a study conducted on 140 respondents, reported that 58% of the farmers owned radio sets, and all of the farmers had access to radio sets any time they wanted to listen to news. In Ghana, portable dry cell battery-operated radio sets are carried everywhere by farmers, even to the farms, to listen to news and community and rural development broadcasts (Panford et al., 2002).

A significantly higher number of men (75) than women (48) owned radio sets. This finding may be attributed to two factors. First women in northern Ghana generally have lower incomes as compared to men. Even though the women work so hard on the farms and most of them are engaged in income generating activities to support the family, they still remain poorer than the men. To afford the cost of buying a radio set may therefore be a financial burden, besides the additional problem of buying dry cells regularly to power the set. Presumably, therefore, the reason why women generally do not own radio sets is because of their general poverty situation as



compared to men. The study however also showed that many of the respondents had mobile phones which had radios built in them and that also served as a source of information.

**Table: 4.5 Radio Ownership**

Gender	yes	No	total
Male	75	5	80
Female	48	12	60
Total	123(87.9)	17(12.1)	140(100)

Source: field survey December 2015

The assertion that radio has great value for agricultural development among poor rural farmers (Monu, 1982) has been found valid by the results of the study. Indeed radio ownership has been found to be high, even among poor rural farmers in Africa, particularly in Ghana (Chapman et. al., 2003) and in Nigeria (Emenyeonu, 1987). Radio has become a common commodity largely because it has become the main source of information to rural farmers, and partly because of the availability of dry cell radio sets in the study area markets also because of radios in mobile phones.

The acute problem of lack of electricity has been circumvented by the availability of acute problem of lack of electricity has been circumvented by the availability of portable radio sets that are powered by dry cells (Chapman et al., 2003). In Ghana, the liberalization of the air waves within the past decade has promoted the setting up of more private FM Radio Stations, particularly in the urban center (Kafewo, 2007).

The Dalun community also continue to benefit from Simli in the district. The localization of public service radio through the establishment of regional radio stations has made radio an important source of communication for both the urban and rural populations in the country (Kafewo, 2007).



In this study research, radio ownership and listenership were both found to be very high, recorded at 87% and 100% respectively. This finding was expected, given that the use of radio for rural and community development is growing rapidly in Ghana. The study found that as radio becomes more and more pervasive, television viewing and newspaper readership remain confined to the urban centre's, with a painfully slow rippling effect on the rural communities. In my study, television viewing was found to be very low and newspaper readership was lowest. The data on radio and television viewing and newspaper readership were highly consistent with findings made by previous studies in Ghana by Chapman et al. (2003) and in Nigeria by Emenyeonu (1987). In contrast to the findings reported by Gunter (1987), this study found that radio remains the most important source of news - general news and agricultural news - for the poor rural farmers in the district.

Gender and income were found to be associated with radio ownership. This is further indication that poverty is a major hindrance to the acquisition of, and reliance on, television and newspapers for news by farmers in Kumbungu District.

#### **4.7 Media Exposure**

Farmers' media exposure was measured by summing up the numerical values of their responses to three questions regarding: their frequency of reading newspapers, frequency of watching television and frequency of listening to radio. As already mentioned, radio was the most popular media source among the farmers, as all the respondents mentioned they listened to radio; with 95% indicating that they listened to radio daily. However, television viewing was low. Only 5% of the farmers watch television once or more than once in a week, and a much smaller number (2%) read newspapers, with more than half of those who read the newspapers reporting that they read the newspapers only once or twice in a week.

#### 4.8. Respondents' Radio Listening Behaviors

Respondents' radio listening behaviors were measured by investigating their frequency of listening to radio, their radio listening times, their favorite radio stations, the number of radio stations they listen to, and their reasons for listening to radio

##### 4.8.1. Frequency of Radio Listening in a Week

The study found that all respondents listened to radio at least two days a week. An overwhelming majority of the respondents (82.86%) listened to radio daily (Table 4.7)

**Table: 4.6 Distributions of Respondents By Frequency Of Radio Listenership**

Frequency of Radio Listening per week	Number of listeners	Frequency Percent
Daily	116	82.86
5 – 6times weekly	10	7.15
3 – 4times weekly	10	7.15
1 - 2 times weekly	4	2.86

Source: field survey, December 2015

##### 4.8.2. Radio Listening Periods

Radio listening times were put into six categories: morning (5am - 9 am), late morning (9 am - 12 pm), afternoon (12 noon to 3 pm), late afternoon (3 pm -6 pm), evening (6 pm -9 pm), and night (9 pm - 10 pm). The morning and evening periods were the most popular listening periods for the farmers. The study found that more than 80% of the farmers listened to radio in the morning, and 90% listened in the evenings. In this study, the heavy radio listenership in the morning and evening periods can be explained in terms of the fact that the respondents are farmers, and they spend most part of the day, especially the late mornings and the afternoons, working on their farms and since they carry the radio sets to the farms they are able to listen while farming uninterrupted by anyone.



Agriculture programmes are aired between 8am to 10am in the mornings and 8pm to 10pm in the night weekend Agriculture programmes usually fluctuate depending on the programmes officer at the radio station.

#### 4.8.3. Reasons for listening to Radio

There are varied reasons why the respondents in the study listen to radio. The most popular reasons or purpose farmers cited for listening to radio included: for information on agriculture news, domestic news, development issues and family life education, for entertainment through music, announcements and sports. Other reasons mentioned included moral and religious education, and adult literacy programmes.

#### 4.9 Names of Programmes and Listenership

The table below shows the various programmes aired by Simli Radio and the number of listeners per programmes in the total number of respondents

**Table: 4.7 NAMES OF PROGRAMMES AND LISTENERSHIP**

NAME OF PROGRAMME	NUMBER OF LISTENER	PERCENTAGE
Farming programmes	140	100
School for life	60	42.86
<i>Youth empowerment for life</i>	60	42.86
Development (behagu Maligu)	100	71.43
CBO (community based organization)	87	62.143
Afanim saha (Islamic hour)	90	64.29
Sports	80	57.14



NHIS	110	78.6
Dolodolo saha (Christian hour)	30	21.42
Pagsung saha (time with the good woman)	67	47.86
Pagsara saha (time with the young woman)	70	50
Marketing information	80	57.143

Source: field survey December 2015

Each of the figures above are taken from the One hundred and forty (**140**) respondents. For a programme all respondents were asked whether they patronize it or not. Out of the total respondents all (140) representing 100% listened to the farmer programmes on air. 110 of the total 140 listen to the NHIS programme aired listened to it representing 78.6%. Behagu Maligu which means developmental programme had a listenership of 100 of the 140 representing 71.43%. Islamic hour and community development were the next most listened to which both had 90 respondents each which represents 64.29% of the total respondents. Community Based Organization programme which has 87 of the respondents listening to it representing 62.14%. The next is marketing information and sports which both had 80 respondents each it was therefore surprising to see a few women who were interested in football with some men really not being interested the percentage for this is 57.14% . Time with young lady (pagsara saha) which had 70 respondents representing 50%. Time with the good woman (pagsung saha) which had 67 respondents listening to it with a few men interested in this programme too with a percentage of 47.86%. the next are a couple of listened to programmes that is school for life and youth



empowerment for life which both had 60 respondents each of the total 120 representing 42.86% of the total. And the last but not the least was dolodolo saha meaning Christian hour which had only 30 listeners going to show the dominance of Islam over Christianity in the area.

The above percentages show the fact that the community places much premium on overall farming programmes. All respondents said that the farming programmes have helped in educating them on new farming methods, new farming practices such as seed selection, time to cultivate, time to apply fertilizer type of farming practices to use and many more. This they said helped them improve their farm production and helped them get better yields and this was all as a result of listening to the programmes on Simili radio. Some also offered their suggestions with regards to the number of times the Agriculture programmes are aired; they said they would want more of such programmes aired and that more agriculture personnel should be brought down to the station to give them more advice on more and new and improved agriculture practices to enhance their knowledge.

In general, however, farmers listened more to the broadcasts of the local service radio stations than they did to the commercial radio stations. All of the respondents (100%) indicated that they listened to the programmes of Simli, which is located in Dalun. Simli broadcasts in Dagbani.

The heavy reliance of the farmers on the public service radio stations could be explained in terms of the *homophily principle* in diffusion. Explaining the *homophily principle* in development, Rogers (1969) noted that the greater the similarity between a source and a receiver, the more communication is likely to have effect and produce results. Designing and tailoring their programmes to meet the needs of the rural folk, is a major reason that accounts for the popularity of the programmes of the public service local radio stations among the rural farmers in northern



Ghana. Since it is design to be directly linked to the needs of the community like Agriculture issue being their main occupation etc.

#### **4.10 Radio Agricultural Programmes**

Radio agriculture programmes aired by Simli included inviting resource personnel to teach farmers best farming practices to employ in order to achieve higher productivity especially with the changing weather conditions. They also embark on building capacity of farmers to undertake innovations that can enhance productivity. The station aside from airing live agriculture programmes, record interviews with resource persons and also trainings on agriculture and aired in-between times to allow all or most farmers to get the opportunity to listen to them later after it has been aired live, this allows for recall and better comprehension of agriculture issue on the station. During live programmes, there is usually tie for phone inn, that way farmers can phone inn to clear doubts or to communicate challenges in order to enhance better practices.

##### **4.10.1. Listening frequency to Agricultural Programmes in a Week**

In this study, radio was found to be a very popular source of agricultural information to farmers. This study found that all the farmers (100%) listened to agricultural broadcasts, at least once a week, on the local radio station (Table 4.9). The frequency of listening to the radio programmes within a week however varied. It was found that 3.57% listened to the radio agricultural programmes once or twice a week, and almost three quarters (74.3%) listened to the messages between three and four times a week. Simli radio station in Kumbungu district offers agricultural programmes/broadcasts most days in a week.

Ilboudo (2002), as cited by Whaites (2005), in his study described radio as the “Internet of Africa”. Perhaps this assertion is even more valid in the case of rural farmers in Africa, who see the radio



as a true companion. According to Ilboudo (2002), farm radio has been seen as a supplement to the work of agricultural extension (Whites, 2005). Okwu, Kaku and Aba (2007) discussed the importance of radio in agricultural development. They stated the need for farmers to be informed and educated about agricultural technology to enable them increase productivity. The mass media can be used as information multipliers capable of overcoming the pressures of time, population, geographical constraints and shortage of trained extension personnel.

**Table 4.8: Distribution of Respondents by Frequency of Listening to Radio Agricultural Programmes on Local Radio Stations**

<b>Number of days (per week) Farmers Listen to agricultural programmes</b>	<b>frequency</b>	<b>Percentage</b>
5 - 6 times weekly	31	22.2
3 - 4 times weekly	104	74.3
1 - 2 times weekly	5	3.57
Seldom/never	<b>0</b>	<b>0</b>
<b>Total</b>	<b>140</b>	<b>100.0</b>

Source: field survey December 2015

#### **4.10.2. Involvement in Radio Agricultural Programmes**

The study assessed the audiences' level of participation in local radio agricultural programmes. Whilst rural farmers' listenership to local radio has been found to be high, participation by way of involvement or contribution to the discussions has been found to be very low among peasants and rural folks in most countries. Participation in the context of development communication has been defined as the provision of avenues for feedback in a situation where there are avenues for a two-way sharing of ideas (Ansah, 1991, 1994). The results of this study indicates that most of the farmers participated in radio programme discussion via phone. From the total of 140, 74 respondents representing 53.9% a little above half of the total respondent population had







participated in radio agricultural programmes in the past one year. The participation was in the form of phone-ins to the radio station about 74 farmers were involved in this form of participation, involvement in radio interviews by radio staff as part of the radio programme production 3 farmer were involved in this form, and direct involvement in a radio programme as a panelist 2 farmers were panelist. In fifteen instances where farmers participated in the radio programmes the discussions were on crop production (nine occasions), animal production (four occasions), and issues relating to avoiding environmental degradation (two farmers). Farmers in the study area are always willing to contribute to the radio programmes on air, but severe constraints including lack of public telephone facilities, finance for the purchase of credit to make calls in the case of those who had phones hinder their involvement in local radio. Farmers' involvement in radio in the study area was found to be very low. This finding was not totally surprising. Only 12 (8.6%) of the 140 farmers, who constituted the sample, participated as listeners calling inn, panelist on the Simli to discuss issues on Agriculture in broadcasts within the past crop season (from the middle of 2014 to the middle of 2015). Seven of them made phone-ins to the radio stations, three farmers were involved in radio interviews by radio staff as part of radio programme production, and two others were directly involved in a radio programme as panelists.

A basic reason for the setting up of public service local radio stations was to encourage a two-way communication with the rural folks by encouraging their participation in the radio programmes (Karikari, 1994). In this study, the request made by the farmers that they should be involved in the radio discussion programmes, and that they should be assisted and encouraged also to phone-in during programmes, is a legitimate response to the changing media equation in relation to radio broadcasting for development. Berringham (1979) in his study also observed that there is enough experience in the field of community participation that amply supports the view that rural

communities are capable of making a firm and positive contribution to the issues relating to their development and the development of their communities. The low audience' participation in the local radio programmes that the findings of this thesis revealed is due to several factors. The farmers said that they have been times one prominent farmer in the community has been invited to share his experiences with other farmers on air aside from him non other has been invited by the radio stations to take part in radio discussion programmes. Also, lack of public telephone facilities and inability of most of the farmers to own mobile phones in are major hindrances to the rural farmers' participation in radio programmes by way of phone-in messages.

The poor rural farmers in Ghana are not struggling for sophisticated modern information and communication technology (ICT) gadgets to enable them participate in radio broadcasting and derive maximum gain. Rather what they wish for is access to public telephone facilities with easy, affordable and accessible cards to enable them send their views to the radio station and to contribute to radio agricultural broadcasts.

Findings of this study suggest clear evidence that the rural farmer remains largely a receiver or listener, and not a partner in the radio communication process in the district.

#### **4.10.3. Respondents' Programme Format Preferences**

The local radio station in the study area uses four programme formats for agricultural broadcasts. The formats are: drama, discussion, magazine and straight talk. The study investigated respondents' programme format preferences, and the results (see Table 4.9) showed 40% of respondents preferred the discussion format most, and the same number (50.%) preferred the drama format. The magazine format of 4% and the straight talk of 6% were the least preferred formats. An earlier study on rural radio audience revealed that the drama and discussion formats were the most preferred by rural audiences (Chapman et al., 2003). In a study on the use of



vernacular programmes to promote soil and water conservation in northern Ghana, the researchers found that the drama component of the radio magazine programme was the most popular as “they (the farmers) seemed to have particularly enjoyed the drama” (Chapman et al., 2003: 9). Drama has been recognized as an effective tool for rural and community development. Alemna (1993) spoke of the importance of drama as he observed that oral tradition is important for transmitting information in Africa. The drama format in radio broadcasting is an adaptation of the traditional folk media, which are an important component of traditional oral communication in Africa and most parts of the developing world (Ansu Kyeremeh, 1989, 1997). The use of the drama format in innovation diffusion has the advantages of persuading the people to adopt the messages through a communication strategy that is akin to their values and expressions (Panford et al., 2001) and also stimulating them into action in relation to message adoption and behavior change.

The farmers were requested to give reasons for their preferred programme formats. Details in table 4.9 indicates that almost all those who mentioned the discussion format as their preferred programme format indicated that the format made it easy for them to understand the agricultural messages. The drama format was rated highest by farmers in terms of its ability to sustain their attention during broadcasts; whilst the discussion format was rated highest in terms of ease of understanding radio messages.

**Table 4.9: Distribution of Respondents by Radio Programme Format Preference**

<b>Programme</b>	<b>Frequency</b>	<b>Percent</b>
Discussion	56	40.0
Drama	70	50.0
Magazine	6	4.3
Straight Talk	8	5.7
<b>Total</b>	<b>140</b>	<b>100</b>

Source: field survey December 2015

**Table 4.10: Distribution of Respondents by Reasons for Their Radio Programme Format Preference**

Reasons for radio programme format	discussion	Drama	magazine	Straight talk	total
makes messages easy to understand	56	56	10	11	136
Sustains my interest in the programme	40	80	5	10	133
Makes for easy recall	50	70	5	5	130
Makes messages appear easy to adopt	60	70	2	5	137
Other responses	10	12	0	3	25

*Multiple responses were permitted Figures in brackets are percentages Source: field survey December 2015*

#### 4.10.4. Broadcast Times and Broadcast Duration

Farmers in the study area listen to radio most in the evenings because this is the time they are at home and free. As regards the broadcast times of the agricultural programmes, results of this study indicated that 90% of the respondents said they were satisfied with the times that the radio agricultural programmes are broadcast (see Table 4.12). The farmers (10%) who said they were not satisfied with the broadcast times were requested to suggest times that are suitable to them. They suggested times that were earlier to the usual time that is between 7-8pm instead of the usual time which was between 8-9pm for week days

In relation to the duration of the programmes, however, 50% suggested that the duration was short and should be extended. One third of the respondents (33.3%) suggested that the duration for the agricultural programmes should be 90 minutes, and 16.7% suggested that the radio stations that is Simli radio should allocate 120 minutes to each agricultural broadcast (see Table 4.12).



**Table: 4.11 Respondents' Views on Duration and Time of Agricultural Broadcasts Suitability of**

Broadcast Times suitable	Frequency	Percent
Yes	123	87.85
No	17	12.14
<b>Total</b>	<b>140</b>	<b>100.0</b>
<b>Suggestions on Broadcast Times</b>		
6 am -7am	1	0.71
7am - 8am	2	1.43
7pm -8pm	8	5.2
8pm -9pm	2	1.43
9pm-10pm	1	0.71
Others	<b>0</b>	
<b>Total</b>	<b>14</b>	<b>10.0</b>

Source: field survey December 2015

#### 4.10.5. Adoption of Radio Agricultural Messages

In relation to application of the radio messages, data in table 4.14 show that more than half of the farmers (58.9%) said they adopted the radio agricultural messages often. Age and income were found to have a significant relationship with reported message application. The chi-square value for age and message adoption was  $\chi^2 = 65.850$ ,  $df=1$ ,  $p<.001$ , and the value for income and message adoption was  $\chi^2 = 26.069$ ,  $df=1$ ,  $p<.001$ . The younger farmers reported that they adopted the messages more than did the older farmers. Also those with higher income reported that they adopted the messages more than those with lower incomes who reported same. Gender was however found to have no significant relationship with reported message adoption. The chi-square value for gender and message application was  $\chi^2 = 5.425$ ,  $df= 1$ ,  $p< .06$



**Table: 4.12 Adoption of Radio Agricultural Messages**

Characteristics	Message Adoption			
	OFTEN	SOMETIMES	NEVER	TOTAL
AGE				
21-30	20(14.3)	10(7.14)	7(1.1)	37(26.4)
31-40	34(24.3)	20(14.3)	2(1.42)	56(40)
41-50	12(8.6)	5(3.57)	4(2.9)	21(15)
51-60	13(9.3)	3(2.14)	4(2.9)	20(14.3)
61-70	4(2.9)	0	2(1.42)	6(4.3)
<b>TOTAL</b>	<b>83(59.3)</b>	<b>38(27.14)</b>	<b>19(13.56)</b>	<b>140(100)</b>
<i>Gender</i>				
Male	50 (53.4)	20 (14.3)	10(7.14)	80(86.8)
Female	33 (5.9)	18(12.85)	9(6.42)	60(13.2)
<b>Total</b>	<b>83 (59.3)</b>	<b>38(27.14)</b>	<b>19(13.56)</b>	<b>140(100)</b>
<i>Education</i>				
No form of education	28(20.00)	18(12.85)	10(7.14)	56(40)
Non-formal education	15(10.71)	10(7.14)	5(3.57)	30(21.42)
Primary School	10(7.14)	5(3.57)	2(1.42)	17(12.14)
Junior high	20(14.3)	5(3.57)	2(1.42)	27(19.28)
Senior high	8(5.71)	0(0)	0(0)	8(5.71)
Tertiary	2(1.42)	0(0)	0(0)	2(1.42)
<b>Total</b>	<b>83(58.9)</b>	<b>38(35.6)</b>	<b>19(5.5)</b>	<b>140(100)</b>

Source: field survey December 2015

**Table: 4.13: Respondents' Reasons for their Inability to Adopt Radio Agricultural Messages**

Reason	Frequency	Percent
Lack of money	130	<b>92.85</b>
Messages are not timely	30	<b>21.42</b>
I do not understand the messages	15	<b>10.71</b>
Messages are not useful to me	8	<b>5.71</b>
Others	<b>12</b>	<b>8.57</b>

Multiple responses were permitted  
N=140

Source: field survey December 2015



#### 4.11 Radio and other Sources of communication in the community

The study sought to investigate the communication sources (mass media and interpersonal channels), that the farmers rely on for agricultural information. Respondents therefore indicated all their sources of agricultural information. The study found that, radio, and interpersonal communication sources constituted the main sources of agricultural communication. The less popular sources were television and newspapers. This result is supported by Oladele (2006) and Monu (1982) who reported that several studies in Nigeria have identified extension agents, radio and neighbors and friends as the most important sources of agricultural information to farmers. Table 4.14 shows that almost all the respondents (96.42%) indicated they listened to radio agricultural programmes and 87.85% of the respondents got agricultural information from extension agents through both interpersonal and radio. The Extension Services Division of the Ministry of agriculture is also expected to provide free public service extension education to the country's farmers. Neighbors ranked third in terms of the provision of agriculture messages.

Eighty (80) respondents (57.14) mentioned that they received agricultural information from neighbors, 45%, mentioned family members, 21.42% mentioned assembly and unit committee members and 10.71% mentioned traditional rulers and lastly television recorded 5.7% Considering that all these four sources are interpersonal forms of communication, it means, more than half (53.1%) of the respondents relied on interpersonal communication sources for agricultural communication, in addition to other sources. This finding suggests the importance of interpersonal communication sources in the diffusion of agricultural information in rural communities in Ghana. Assembly and unit committee members, and traditional rulers, are opinion leaders. And also, some of the family members and neighbors mentioned by the respondents as sources of information could also be influential members in the communities. The interpretation therefore is that opinion





leaders and family members play significant roles in agricultural message dissemination in rural communities in Ghana. As reported by DeFleur and Cronin (1991), interpersonal communication channels are important sources of news diffusion. News stories from the mass media travel by word of mouth as it spreads through the community.

In Ghana, some opinion leaders in the rural communities are used as “contact farmers”. They are in close contact with the agricultural extension agents, and they help in spreading agricultural information to other farmers. Soola (1988) mentioned the “chief farmer” in the village, the traditional ruler (chief), village school teacher, the village priest, and other respected community members as the opinion leaders in rural communities in Nigeria. The categories of persons who constituted opinion leadership and spread information from extension agents in Nigeria are not different from those who constitute opinion leadership in Ghana. As found in this study, traditional rulers, assembly and unit committee members, and neighbors are among the sources of agricultural information to community members in Ghana.

To further determine the relative importance of radio and agricultural extension agents who use interpersonal communication channel in agriculture message transfer to farmers, the farmers were asked to respond to two questions: (1) the source they relied on most for radio messages, and; (2) the source they considered most credible. Nearly two-thirds of the respondents (60%) said the radio was their most reliable source of agricultural information, and 29% mentioned agricultural extension agents as the most reliable source reason being the frequency to which the relay of information is. However, information from agricultural extension agents was found to be the most credible. More than half of the respondents (53%) rated agricultural extension as the most credible as against 36.7% who stated that local radio was the most credible. The reasons given are that: (1) the extension agents are seen and provide practical demonstrations (which radio does not do, and



indeed cannot do, on air even though they are usually the same resource persons on the radio station); and (2) they had more face-to-face interactions with extension agents than they had with radio agricultural programme producers since time given for phone inn is mostly limited and too many questions to ask before the programme is over. For their reliance on radio, the basic reasons the respondents gave were that: the radio programmes were always on air at the scheduled dates and times; and messages from the radio are more regular than the face-to-face contact they get with extension agents. Interpersonal communication was found to be very useful channels of agricultural communication among the farmers. Over half (57.14%) of the respondents mentioned neighbors as sources of agricultural information they said they relied on neighbors for information especially when they miss either time on radio or when extension agents come and they miss them due to an errand outside the community, and nearly half (45%) mentioned family members reasons similar to that of neighbors. Other interpersonal communication channels mentioned included assembly member/unit committee member, traditional ruler, and development agents of nongovernmental organizations.

**Table: 4.14: RESPONDENTS' SOURCES OF AGRICULTURAL INFORMATION**

Source	Frequency	Percent
local radio	135	<b>96.42</b>
Agricultural extension agent	123	<b>87.85</b>
Neighbour	80	<b>57.14</b>
Family member	63	<b>45.71</b>
Non-governmental organization	30	<b>21.42</b>
Assembly member	15	<b>10.71</b>
Television	8	<b>5.71</b>

Multiple responses were permitted

Source: field survey December 2015

This study found that rural farmers in the district rely on radio to meet their information needs. The most popular reasons or purposes that farmers cited for listening to radio included: information



on agriculture news, domestic news, health news, development issues, family life and education, and entertainment through music, announcements, sports, moral and religious education, and adult literacy programmes. The results of the study demonstrated that while television and newspapers are highly insignificant in agricultural message delivery to farmers, radio remains the most reliable form of agricultural communication. Radio is relied on, more than the other sources, for agricultural communication. Almost all the farmers listened to radio agricultural broadcasts, and about two thirds of them relied most on radio, ahead of extension agents, for agricultural messages which was not happening too frequently. The popularity of radio as a source of domestic news and agricultural communication with rural farmers has been variously claimed and reported (Chapman et al., 2003; Okwu, Kaku and Aba, 2003).

An important finding of the study, however is that slightly over half of the farmers mentioned the extension agent, ahead of radio and all other forms of mass media and interpersonal communication, as the most credible source of agricultural information. Perhaps the farmers relied on radio more than the agricultural extension agents for agricultural information because the radio simply is more available to them than the extension agent. The farmers have access to their radio sets all day, and they listen to the radio even when working on their farms. They do not have such limitless contact with extension agents.

The extension agents' visits to the rural communities, as this study found, are very limited. Farmers responses on the regularity of the visits of extension agents for agricultural messages, indicated that more than half of them had contacts with extension agents once in the last two months, and a further 12.3% indicated that they had contact with the extension agents once in more than a month; mostly once in about three months or more. Significantly, the general inadequacy of extension



education to the farmers by the agricultural extension services appears to be the most basic reason why the farmers relied more on radio than on extension services for agricultural communication. The farmers' trust in radio is not in doubt. This is supported by the high scores recorded on farmers' attitudes towards radio and their perceptions of the credibility of local radio and its programmes. However, farming is a practical venture; the radio can provide as much information as the agricultural extension agent can provide, but radio has the huge disadvantage of not being capable of providing practical field demonstrations to farmers in relation to the application of new technology, especially the use of agro-inputs, post-harvest handling and value-added agro-processing.

The major reasons mentioned by the farmers who indicated that the extension agent was more credible than radio were that: (1) extension agents offer practical field demonstrations; and, (2) there is also the opportunity for face-to-face interactions with the extension agents. Perhaps, Monu's (1982) view about the relative importance of radio and extension agents in agricultural communication is instructive. He is clear that radio and extension agents perform different functions in the adoption process.

While radio is used mainly to develop and increase awareness of an innovation, extension contact is crucial in the trial and adoption of innovations.

The study found again that apart from radio and agricultural extension agents, the farmers relied also on interpersonal communication channels for agricultural news. As noted by Rubin (1994), the media competes with other sources of information for satisfaction of needs by individuals. This suggests that the individual has several needs, and has a wide range of choices that will meet these needs, including face-to-face communication. De Fleur (1991) observed that substantial literature that has accumulated over the years demonstrated that important news stories within a system are



passed on to secondary audience by the processes of “diffusion”. De Fleur (1991) cited Robinson (1978), who reported that the importance of interpersonal dissemination of messages is not restricted to only societies that remain in oral tradition. This means that even in developed economies, interpersonal communication is still very much prominent in information dissemination.

Johnson (1978), cited by DeFleur (1991), observed that a number of Americans do not read newspapers, watch television or listen to radio, and for many news stories, the sole information channel to such people is through interpersonal communication. However, it is expected that the reliance on interpersonal communication sources for news in Africa would be more pronounced because television ownership is low, and high levels of illiteracy do not permit high levels of newspaper readership. Not surprisingly, therefore, this study found that interpersonal communication channels are an important source of communication of agricultural messages, alongside rural radio, extension agents, television and newspapers. Indeed more than half of the farmers reported that they relied more on interpersonal communication than on television and newspapers for agricultural communication. Bandura (1994) observed that diffusion processes make use of social network structures. He stated: “people are enmeshed in networks of relationships that include occupational colleagues, organizational members, kinships, and friendships, and they are linked by personal relationships” (Bandura, 1994:84).

In this study, the farmers mentioned neighbors, family members, fellow farmers, traditional rulers, assembly members and unit committee members, as their other sources of agricultural information, apart from radio and agricultural extension agents. Such relations do have an impact on people’s adoption of innovations because they convey more social information and demonstrate appreciable influences (Bandura, 1994).



Diffusion studies (Rogers, 1962, 1969) and the knowledge gap hypothesis (Tichenor, Donohue and Olien, 1970) have reported the existence of different levels of knowledge among members of a community as a result of different levels of education, income and media exposure. According to the knowledge-gap hypothesis, there exists a knowledge-gap among members of a social system, and the gap widens upon the introduction of information into the system. People who seek information actively and also learn fast, turn to be the sources of information to others in the same community. They are also normally those who rate high on education, income, and general knowledge (Tichenor, Donohue and Olien, 1970).

This study found that traditional rulers, assembly members and even family heads (mostly husbands) do play a role in agricultural information dissemination in rural communities. They appear to be the most influential opinion leaders, with profiles that are quite different from the opinion leadership described by the diffusion theory (Rogers, 1962) and knowledge gap hypothesis (Tichenor, Donohue and Olien, 1970).

In the Kumbungu District situation, we find from the results of this study that most people in the rural communities who tend to be opinion leaders may or may not rate high on income, education and knowledge. However, they would certainly possess one or more of a wide range of power attributes that I will venture to classify as follows: *traditional*, *pseudo-government* and *social*. *Traditional power* is wielded by chiefs, clan heads, and sub-chiefs; *pseudo-government authority* is reflected in the assembly and unit committee concept; and *social power* is reflected in the social responsibility assigned to assembly members, village or town development committee members, leaders of village youth groups, and village health volunteers. These categories of persons offer opinion leadership in rural communities in the district. This study found that opinion leaders are useful in agricultural message and information delivery.

#### 4.12 Innovations Communicated By Simli Radio and Number of Adopters

Table 4.15 below shows the various innovations as per the study has been constantly been communicated to the people in the study area and their response to these innovation.

**Table 4.15 Innovations Communicated By Simli and Number of Adopters**

Innovation introduced by Simli radio	Number of men adopters due to radio influence	Number of women adopters due to Simli influence	Total out of 140 respondents	percentages
Drought tolerant	60	60	120	85.71
Organic agriculture	80	10	90	64.28
Crop protection	48	28	76	54.29
Drip irrigation	45	25	70	50
Nitrogen use efficiency	40	15	55	39.3
Zero tillage	30	20	50	35.71
Integrated soil fertility management	28	10	38	27.14

Source: field survey December 2015

Table 4.15 shows the top seven(7) innovation that continually has been introduce on Simli radio station over the last ten (10) years in the district and the number of respondents have adopted the





innovation due to the influence of the radio station. The first innovation crop protection has been the focus of development stakeholders with respect to Agriculture production over the last five(5) years due to issues of over use of land over the years to somewhat improve the fertility of the soil in order to enhance growth. Out of the 140 respondents interviewed eighty (80) of them said they actually adopted the technology representing 54.29% due to the constant reminders on the radio station. Sixty eight (68) men and Twenty eight (28) women representing fifty four point two nine (54.29%) percent of the total respondents. The next is the use of drought/heat tolerant varieties, the situation where a farmer cultivates varieties that are heat resistance or also cultivating crops that have a quick maturing ability. Due to the changes in climatic conditions one is unsure of the frequency in rainfall so famers are usually advised to use drought resistant crops so that if there a prolonged drought before rain they can still hold out. The number of respondents who practiced drought tolerant variety use on their farms as a result of the radio influence included male 70 and female 50 making a total of 120 representing a percentage of 85.71%. The third is drip irrigation/sprinkler irrigation. Farmer respondents responded that they were all into some form of irrigation due to the existence of the Bontanga irrigation nearby. Some were into group farming through some NGO's in the community so they have farms in the Bontanga area to engage in dry season farming. The next is zero tillage, a process where no heavy machines are used to disturb the soil before cultivation a total of fifty 50farmers representing a percentage of thirty-fifty point seventy one (35.71%) of the total respondents. Integrated soil fertility management was another innovation that was communicated by Simli radio the total respondents who adopted this type was one hundred and ten, 28men and 10 women a total percentage of 27.13. The last two innovations communicated on the station were nitrogen use and Organic Agriculture these two recorded a total of fifty five (55) and ninety(90) respectively with percentages of thirty nine point three (39.3)



and thirty five point seventy one(64.28) respectively. From the above stats the seven (7) most communicated innovations on Simli radio for the last ten years has really helped in improving the agronomic activities of the farmers in the district. There was patronage among farmers but some received low patronage and the result was the inability to afford the cost of usage. A lot of farmers expressed their frustration by not being able to adopt some the innovations communicated above, innovations like integrated soil fertility and management, zero tillage, and irrigation farming. And the two they wished they adopted was composting and irrigation farming the main challenged however faced was the problem of finance, the inadequacy of money had left them to only wish they could have.

#### **4.13 Respondents' Suggestions on How to Make the Radio Messages More Beneficial**

Respondents were requested to give suggestions that will make them benefit more from the radio agricultural programmes broadcast by the local radio stations. More than fifteen suggestions were given (see Table 4.16). The most reported reasons were: radio discussion programmes on agriculture must include farmers in the discussion panels (58.57%); there should be an extension of the duration of the radio broadcasts (56.43%); the local radio stations should add more slots for agricultural broadcasts in their weekly programme schedules (30.7%); rural communities should be provided with public service paid phones to enable them phone-in to contribute to radio programmes (30%); the programmes should be broadcasts at the time of the day when all farmers are at home and free to listen (27.14%), and; local radio stations should assist farmers to access credit by including in their broadcasts, information on where and how to get micro-credit (23.57%) and so on.

In this study, the call made by the farmers that they should be involved in the radio discussion programmes, and that they should be assisted and encouraged also to phone-in during programmes,



is a response to the changing media equation in relation to radio broadcasting for development. Berringham (1979) observed that there is enough experience in the field of community participation that amply supports the view that rural communities are capable of making a firm and positive contribution to the pattern and pace of development. The practice of giving access to audiences and promoting their participation asks broadcaster to put aside some of the traditional notions of the professionalism they have imbibed and to open a new range of influences from the people they serve (Berringham, 1979; Nair and White, 1987).

**Table 4.16: Respondents' Suggestions on How To Make The Radio Programmes More Beneficial**

Suggestions	Frequency	Percent
Farmers should be involved in the radio discussion programmes	82	58.57
The duration of the programmes should be increased	79	56.43
The number of agricultural broadcasts per week should be increased	43	30.71
Farmers should be assisted and encouraged to phone-in duration radio programmes to contribute / seek clarification	42	30
Broadcasts time of the radio programmes should be fixed at the times/periods that all farmers are at home and are free to listen	38	27.14
As part of the radio messages, farmers should be given information on where and how to access credit to be able to buy agro-inputs and machinery	36	25.71
The radio programmes should be recorded in the rural communities with the farmers	33	23.57



Radio stations should seek farmer's views on the relevance of the radio messages/ and the performance of the radio presenters	28	20
All programmes should include short drama	16	11.42
There should be special programmes for women's problems and needs in relation to agriculture	16	11.42
All programmes should include a few minutes of traditional music	15	10.71
Radio staff should use familiar terms and names to explain technical issues	11	7.85
Names should be found in the local languages for agro-inputs and crop varieties	7	5
Those who handle the radio agricultural programmes should be trained so that the messages can be more comprehensible	7	5

Farmers -were permitted to give multiple reasons  
Some farmers did not have any suggestions

Source: field survey December 2015



This chapter offered a descriptive and analytical discussion of data gathered through the use of structured questionnaires. The average age of the 140 respondents was about 40years; most of the farmers were below the age of 50 years, with only 6% older than 60 years. This finding is most significant to agricultural development in Kumbungu District, as it suggests that the farmers are generally within the youthful and active working group. Age is an important factor in agricultural development in Africa, since it has an influence in agricultural information accessibility and utilization. A majority of them had no formal and non-formal education, the large proportion of illiterates among the rural farmers could pose a danger to knowledge acquisition of farmers and a danger to increased agricultural production in Ghana. This is because illiteracy and low level of

education do have negative effects on the diffusion of agricultural innovations to and acceptance of new technology (Rogers, 1962, 1969). Ghana is a developing country, where the majority of the population have very low incomes. Farmers particularly are among the groups with very low incomes. An overwhelming majority of the farmers were males. In northern Ghana, even though most of the farming activities are done by women, they are often not considered fulltime farmers; they are seen more as housewives providing labour to help their husbands on their farms. Most women are therefore denied access to land, especially in a highly patrilineal society like northern Ghana (Yazdani, 2000).

#### **4.14 Attitudes and Perceptions of Source Credibility**

Overall, the respondents held very high positive attitudes towards local radio.

Communication is a voluntary activity, and the propensity to get engaged in it will depend to a large extent on the perceived benefits to be derived from it. Our attitudes therefore are expressed by evaluating objects with a degree of favour or disfavour (Eagly and Chenken, 2001). A positive belief about an object therefore will produce a positive or favorable feeling towards the object (Bohner, 2001) Positive attitudes towards radio therefore are expected to evoke high listener-ship, to, and high participation in the radio station's programmes. Bohner (2001) observes in his study that attitudes modify behaviour, and people's attitudes have marked influence on their perceptions and thinking. Indeed, the high positive attitudes of the farmers, found in this study, appeared to have influenced also their perceptions of the credibility and acceptance of the local radio programmes. This study recorded a high perception of the credibility of the local radio programmes. Similar to the scoring on attitudes, the maximum possible total score on perceptions of source credibility of an individual farmer was 25, and the minimum was five. The study found that the lowest recorded score was 10, the highest was 23, and the mean was 20. Perceptions of

source credibility, like attitudes, have influence on audience members' level of participation in communication and message adoption. Perceptions of credibility of radio will have an influence on level of listenership. Credibility, which is the degree of perceived trustworthiness and competence that audiences ascribe to a communication source, is an important element in the spread of innovations (Rogers, 1969). The high scores on attitudes towards radio and perceptions of the credibility of the radio broadcasts suggest that the radio has a great potential to provide knowledge and skills to the poor rural farmers if effective programming factors are used.



## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATION

#### 5.0 Introduction

This chapter provides a conclusion and recommendation of the main findings of the study. The sections covered under this chapter are: general discussion, limitations of the study; the study's contribution to knowledge, suggestions for further research.

The study was conducted to assess the effect of Simli radio on the adoption of agricultural communication in Kumbungu district. In this respect, an investigation into retention of agricultural news after broadcast and how reliant farmers are on radio for agricultural messages was found to be useful in assessing the potential of Simli radio for agricultural knowledge transfer to rural farmers.

The survey methodology used profiled rural radio listeners in the study area. It examined the general sources of news for rural farmers, their levels of reliance on radio for agricultural messages, radio listening behaviors, radio programme format preferences, attitudes towards radio, and perceived credibility of the radio messages. In addition, the survey offered an investigation into farmers' perceived levels of recall and comprehension of the local radio agricultural messages.

The diffusion model provided a basis for analyzing and presenting the findings of the data gathered through the survey research. The diffusion theory is emphatic that media behaviour, position in the social structure and personal characteristics have great value in distinguishing the early adopters from the late adopters of innovations in a social system (Rogers, 1969, 1976). Perceived credibility by recipients of radio messages and the source of the message and the perceived importance of the message disseminated by the source to the receiver have been identified also by



Rogers (1969) as factors that influence message reception and adoption. These variables were investigated in this study.

The study showed that though the innovations were communicated to the people in the area, the innovations wasn't adopted immediately by the farmers in the area the respondents reported. They made it clear that there were farmers who adopted early and because of the benefit it brought to them, others followed suit. The early were the one who were considered to be wealthy, and had better social status like the village magajia, assembly man and the educated in the community these are often ready to try new thing with the aim of improving their production then later the late adopters who wait till they have really seen improvement then go if they have to also try the innovation and these farmers the respondents who some of were included don't even adapt fully but use a few of the resources and when they see change they then wish to have done a bigger investment in the innovation

### **5.1. Main Findings**

The study involved 140 small scale rural farmers. The sample was taken from 4 rural communities.

An overwhelming majority was married. The assertion that radio is the most important media for development among poor rural farmers in literature has been found valid by the results of the study.

Radio was found to be the medium that is relied on most by the farmers for general information and for agricultural messages.

Radio ownership and listenership were both found to be very high. Television viewing was low and newspaper readership was lowest among respondents. The data on radio and television viewing and newspaper readership were highly consistent with findings made by earlier studies in Ghana (Chapman et al., 2003) and in Nigeria (Emenyeonu, 1987).



In contrast to the findings reported by Gunter (1987), this study found that radio remains the most important source of news - general news and agricultural news - for the poor rural farmers in Ghana. Gender and income were found to be associated with radio ownership. Since men had the largest numbers of radio acquisition in the community than their female counterparts, this is further indication that poverty is a major hindrance to the acquisition of radio, television and newspapers for news by the farmers.

The mass media are believed to have strong influence in the dissemination of new ideas (Emenyeonu, 1987) including agricultural messages and innovations. The results of the study demonstrated vividly that whilst Television and newspapers are highly insignificant in agricultural message delivery to farmers, radio remains the most reliable form of agricultural communication, ahead of any medium of mass communication and any form of inter-personal communication. Nearly all the farmers (98.8%) reported that they listened to radio agricultural programmes, and 60% said they relied most on radio, ahead of extension agents (29%) for agricultural messages.

An important finding of the study, however is that more than half (53.7%) of the respondents mentioned the extension agent, ahead of radio and all other forms of mass media and interpersonal communication, as the most credible source of agricultural information. This arouses a valid question: do the farmers rely on the radio simply because it is more available to them than the extension agent or because of its innate qualities as a tool for communication? The farmers' trust in radio does not appear to be in doubt. This is supported by the high scores on attitudes towards radio and the perceptions of the credibility of local radio and its programmes. However, farming is a practical venture: radio can offer as much information as the farmers require, and it can provide the depth of explanation of farming technology as the extension officer may provide, but radio has the huge disadvantage of been unable to offer practical field demonstrations to farmers. The major



reasons mentioned by the farmers who indicated that the extension agents was more credible than radio were that: extension communication offers them practical field demonstrations and there is also the opportunity for face-to-face interactions with the extension agent.

The farmers mentioned neighbor's, family members, fellow farmers, traditional rulers (chiefs, sub-chiefs and heads of clans), assembly members and unit committee members, as well as field staff of non-governmental organizations, as their other interpersonal sources of agricultural information. Diffusion studies (Rogers, 1962, 1968) and the knowledge gap hypotheses (Tichenor, Donohue and Olien, 1970) are definite on the existence of knowledge gap among members of a community as a result of different levels of education and media exposure. People who seek information vigorously and also learn fast, turn to be the sources of information to others in the same community.

In the Ghanaian situation, most of such people in the rural communities tend to be opinion leaders. Farmers' participation in radio was found to be very low. This finding was rather surprising. A basic reason for the setting up of public service local radio stations was to encourage a two-way communication with the rural folks by encouraging their participation in the radio programmes. The respondents want to get involved in radio broadcasts, but they are not able to do so because of certain constraints. Some respondents said they were not being invited to take part in the radio programmes, and they lack telephone facilities to enable them make calls to the radio stations to contribute to the radio broadcasts.

The study found that age was the most important factor in message comprehension, message recall and the adoption of agricultural messages. Education was found to be associated with message recall and message adoption, but not with message comprehension. Also, income had a relationship with only message adoption. The implication of these results is that the youth hold the



key to agricultural growth in Ghana. By this result, this thesis research confirms other research findings that reported that education has influence on how much we learn from broadcast news (Stauffer, Frost and Rybolt, 1980; Gunter, 1987), and which categories of farmers, in terms of the socio-economic characteristics, will adopt innovations (Rogers, 1969)

This chapter was meant to serve as a broad source of information on the characteristics of the farmers, their general media exposure, radio listening habits, attitudes towards radio, and their perceptions of the credibility of the local radio and its messages. An important objective was also to investigate the importance and effectiveness of local radio as a source of agricultural information to the rural farmer.

In this study, an exploration of the effect Simli radio has on the adoption of innovations in the district was carried. The study established that farmers indeed enjoy the services of Simli, especially towards farming activities. The station has been the greatest source of information, education and entertainment. It has provided opportunities for them to even market their goods, the study also established that Simli radio is a major source of information for some probably the only source. On the part of innovation dissemination, Simli radio amongst others have done a tremendous job. The other sources included interpersonal interactions with AEA's, NGO's etc., but almost all stated radio was the main source, 87% of the respondent population cited this. This same number owned their own radios and the rest tuned in via radio on their phones. Adoption of innovations was slow mainly due to financial but communication of innovations was done regularly so understanding was clear, just funds to implement was the challenge.



## 5.2 Recommendations

Based on the findings of the study, the following are the recommendations made;

More sensitization should be done on innovations communicated via the radio station to enhance adoption which will in turn increase yields of farmers. It also recommends that MoFA should increase their extension service visits in the area, because respondents complained they rarely had interactions with them on a regular face-to-face basis.

The Simli radio station should also alternate times for airing Agriculture programmes to improve listenership also live programmes on Agriculture should be done regularly than repeated broadcast, this way farmers can all in to ask questions. More time should be allotted for both Agriculture programmes and call-in time to give listeners the opportunity to air their views and clear doubts. Success stories of farmers who have adopted innovations whether via radio or interpersonal source should be reported, and most especially such persons should be made guest on programmes, this will serve as encouragement to other farmers who may otherwise have not heard about such stories. There should be collaboration between all stakeholders in the community to do more trainings for farmers and also raise funds to assist farmers who actually are in need of support. The study showed that the farmers loved interpersonal way of transferring information to farmers, since it afforded them the chance to personally deal directly with stakeholders, with this in mind the stakeholders should together come and organize training sessions on capacity building and the need to apply new farming practices to enhance agriculture productivity, this programme could be aired live on the radio station so all who are in farther communities and can attend will follow via the station, broadcast can be recorded and aired later for all who were not available to take part.



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**APPENDIX 1**

**EXPLORING THE EFFECT OF SIMLI RADIO ON THE ADOPTION OF AGRICULTURAL INNOVATIONS IN THE KUMBUNGU DISTRICT**

**Section 1: Respondents' Demographic and Socio-economic Characteristics**

**Questions in this section are meant to investigate respondents' socio-economic and demographic characteristics**

1. What is your age?
2. Sex:
  - a. Male ( ) b. Female ( )
3. What is your highest educational qualification?
  - a. No education b. Non-formal education c. Primary School d. Junior Secondary e. Senior Secondary
  - f. Tertiary g. Others (please specify)
4. What is your marital status?
  - a. Married ( ) b. Single ( ) c. Widow/Widower ( ) d. Divorcee ( )
5. How many dependents do you have?
6. How much income did you earn from agricultural activities last crop season?
7. What other sources of income do you have other than agriculture?
8. Please indicate the total income you earned last year from all other economic activities?
9. Do you think the climate is changing?
  - a. Yes ( ) b. No ( )
10. What are some of the signs to show the climate is changing?
11. What are the effects of climate change in your Agriculture production?
12. Has there been the introduction of new way of farming over the years?
  - a. Yes ( ) b. No ( )
13. Can you describe some of them?
14. Have you had any information on climate adaptive measures?
15. Have you used any of the above in the last cropping season?
  - a. Yes ( ) b. No ( )
16. Which ones did you use?



a. Composting b. Mulching c. Early cropping d. Others specify

17. How did it help in your crop yield?

18. How do you obtain information on climate adaptive measures?

a. TV ( ) b. Radio ( ) c. Newspapers ( ) d. Town crier ( ) e. Others specify ( )

## Section 2: Media Exposure

**This section sought to measure participants' sources of Information on and their sources of agricultural news**

19. Name the sources of mass media you rely on for news.

a. Radio ( ) b. Television ( ) c. Newspapers ( ) d. Others (please specify) ( )

20. Name your sources of agricultural information.

a. Agricultural extension agents ( ) b. Television ( ) c. Newspapers ( ) d. Non-governmental organizations ( ) e. Assembly/Unit Committee Members ( ) f. Traditional rulers ( ) g. Family member ( ) h. Friends ( ) Neighbor ( ) i. Other (please specify) ( )

21. Do you have a radio set?

a. Yes ( ) b. No ( )

22. What stations do you listen to?

a. Zaa radio ( ) b. Savanna FM ( ) c. Diamond FM ( ) d. Simli radio ( ) e. Might FM ( )

23. Do you listen to Simli Radio?

a. Yes ( ) b. no ( )

24. What are the programmes you enjoy listening to on Simli radio?

25. Do they have programmes on Agriculture production aired on the station?

a. Yes ( ) b. No

26. Has there ever been introduction of agriculture technologies innovations on Simli radio?

a. Yes ( ) b. No ( )

27. Do you apply the knowledge you gain from local radio?

a. Yes always b. Sometimes c. I do not apply ( )

28. If you do not apply the messages often, please state your reasons?

29. How many times a week do they discuss issues on Agriculture on air?

a. Once a week ( ) b. Twice a week ( ) c. Thrice a week ( ) d. Four times a week ( ) e. Five times a week ( )

f. Six times a week ( ) g. The whole week ( ) i. Others specify ( )



30. What times of the day do they discuss these Agriculture issues?

31. Will you say that the times the agricultural messages are broadcast are suitable to you?

a. Yes ( ) b. No ( )

32. If no, state the times you prefer for agricultural broadcasts

33. Is the duration for the agricultural broadcasts adequate?

a. Yes ( ) b. No ( )

34. If no, please indicate your preferred duration for the broadcasts.

35. Do you find the radio agricultural messages relevant?

Give reasons.

Respondents' Attitudes, and Perceptions of the Credibility of Local Radio

**This section 3 aims at measuring respondents perceptions of the credibility of local radio and their attitudes towards public service local radio stations and their agricultural broadcasts.**

36. Perception of Source credibility

a. strongly agree ( ) b. Agree ( ) c. don't know/Not sure d. Disagree ( ) e. strongly disagree

{Please check as appropriate}

The local radio station is trustworthy 1 2 3 4 5 ( )

The presenters/producers have full knowledge of the agricultural messages they broadcast 1 2 3 4 5 ( )

The local radio stations disseminate useful messages 1 2 3 4 5 ( )

The radio stations sometimes present false Information 1 2 3 4 5 ( )

The local radio stations always present accurate information 1 2 3 4 5 ( )

Attitudes towards Local Radio

The local radio station is my best companion 1 2 3 4 5 ( )

It is not a waste of time to listen to local radio 1 2 3 4 5 ( )

I personally do not like to listen to local radio 1 2 3 4 5 ( )

Whether the local radio station exists or not, does not make any difference in my life 1 2 3 4 5 ( )

The local radio station is not popular with the people 1 2 3 4 5 ( )

37. Are the times for these discussions good for farmers in the district?

a. Yes ( ) b. No ( )

38. Have you ever adopted an innovation you heard on Simli radio?



a. Yes ( ) b. No ( )

39. Was it easy to understand since it wasn't face to face discussion?

a. Yes ( ) b. No ( )

40. Do you get the opportunity to clear your doubts during programmes?

a. Yes ( ) b. No ( )

41. If yes how?

42. Apart from Simli radio where else do you get information on Agriculture innovations?

43. Comparing these other channels and Simli radio which one do you think best gives you the satisfaction of proper understanding and adopting innovations easily?

**This section 4: intends to investigate respondents' views in relation to how the radio stations' agricultural broadcasts can be improved in order to make farmers benefit more from local radio.**

44. Do you have any suggestions on how Simli Radio can improve their programmes especially one on Agriculture to help improve your knowledge and increase your adaptation of innovations they air on the Station?

