

DISSEMINATION OF AGRICULTURAL INFORMATION TO RURAL FARMERS: A CASE STUDY OF THE SUSTAINABLE LAND AND WATER MANAGEMENT PROJECT IN WEST MAMPRUSI.

BY

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THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MA COMMUNICATION STUDIES DEGREE.

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DECLARATION

I declare that, except for references to other people's work which have been duly acknowledged, this dissertation is a result of my own research conducted at the Department of Communication Studies, University of Ghana, Legon. This work was supervised by Mr. Gilbert Tietaah.

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ABSTRACT

Most farmers in Ghana are not aware of the linkage between inappropriate farming practices such as tillage and water management practices on one hand, and environmental degradation on the other. With an estimated 64 per cent of the natural wealth of Ghana locked up in croplands, there is the need for a more focused attention to address poor agricultural land use and management. The study investigated how communication activities are conducted under the Sustainable Land and Water Management Project in West Mamprusi district, located in the northern region of Ghana, in order to obtain empirical data about the communication activities under this project.

Through a qualitative research approach that combined individual in-depth interviews, focus group discussions and observation, the study found that the farmers have a positive perception of the messages they received mostly through communication channels such as personal contacts with agric extension agents (AEAs) and mobile phones. The farmers viewed the AEAs and mobile phones as useful channels to receive messages about Sustainable Land and Water Management (SLWM), although the farmers had a preference for the AEAs. Even though the mobile phone is perceived as a viable alternative to personal contact with the AEAs, there are challenges with its use such as lack of electricity to charge mobile phone batteries and poor network service.

The findings of the study suggest that there is a difference in male and female access and utilisation of SLWM messages due to socio-cultural factors which tended to disfavour females. The study recommends among other things a further study about the impact of socio-cultural factors on the access to and utilisation of SLWM messages to verify the findings of this study.

DEDICATION

I dedicate this research to my mother Christy Ahenkora and my brother Junior for their love and support in my life. I also dedicate this research to my supervisor Mr. Tietaah, Sung Park, KMB, Dr. Este, Dr. Amoakohene, Professor Ansu Kyeremeh, Professor Audrey Gadzekpo, Benson Osei- Tutu, Francis Dompae and all lecturers at the College of Agric and Consumer Science for their impartation of knowledge in my life.



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CHAPTER ONE

INTRODUCTION

1.0 Background to study

The global demand for food is expected to increase by 60 percent in the next 37 years as the world's population is estimated to reach 9.2 billion by 2050 (Food and Agriculture Organization, 2013). These projections are made in the light of current and expected challenges such as the stagnation of the expansion of arable lands, scarcity of water resources, advancing environmental degradation and the negative impact of climate change. This suggests that if production targets of food stuffs were not met, there would be inadequate food supply which could affect the global economy adversely and further lead to social and political instabilities around the world.

Forebodings of these economic reverse and social instabilities are already evident. In 2008, there were riots in Burkina Faso, Cameroun, and Senegal, where people protested against the price of food due to inadequate supply of food. Inadequate supply of food also led to riots in Yemen and Egypt in 2012. In Yemen, the riots claimed dozens of lives whilst in Egypt the military had to control thousands of people during riots in Cairo due to the shortage of bread. In Guinea and Ghana the price of imported rice also increased by 35 percent between 2011 and 2012 (Sasson, 2012). According to the Ghana Statistical Service (2014), food inflation averaged 7.6 percent from 2013 to 2014. This situation indicates that food prices continue to rise in Ghana and this suggests that some Ghanaians will not have physical and economic access to sufficient food in order to meet their dietary needs and food preference for an active and healthy life, as the prices of food stuffs continue to increase.

The insufficient supply of food according to Nyantakyi-Frimpong (2013) is more prevalent in the northern regions of Ghana as compared to the southern regions. The food insecurity rate is approximately one to seven percent in the southern regions whilst in the northern regions it is approximately between 10 to 30 percent (Biederlack & Rivers, 2009). Therefore, there is the need to enhance farmers' productive capacity in Ghana especially in the northern regions to increase their yield, which will play a critical role in increasing the availability of food.

In order to enhance farmers' capacity for higher food productivity in the northern regions there ought to be effective transfer of innovation and information to combat agricultural challenges that are hampering food production. The main way of transferring knowledge or information to farmers is through agriculture extension. Agriculture extension is the application of scientific research and new knowledge to agriculture practices through farmers' education (FAO, 2011). This echoes Servaes' (2002) definition of extension as "the process of linking researchers (or the other producers of innovation) with the potential users of the research" (p. 168). Extension is about transferring research-based solutions to rural farmers, with the aim of farmers adopting the new solutions, innovations or technologies. This implies agriculture extension involves communication with farmers and other stakeholders involved in the intervention.

It is through effective communication among stakeholders that a technology is accepted and utilized. A technology, no matter how well developed, if not adopted, will be perceived as insignificant or useless (Gathecha, Bowen & Kochomey, 2012). At the same time, the successful adoption and efficient application of a technology depends on the effective communication of first, the utility of the technology, and second, the enablement of the skills efficacy of the user. In

Ghana there are numerous interventions aimed at achieving improved and sustainable agriculture production under the increasing challenging circumstances of scarcity of water resources, natural disasters, emerging diseases and advancing environmental degradation. An example of one such intervention is the Sustainable Land and Water Management (SLWM) project in northern Ghana which was introduced in 2012, although the conceptualisation and planning process started three years earlier (Ministry of Food and Agriculture, (2009).

1.2 Brief Description of Study Site

This study was conducted in West Mamprusi, one of the 26 districts in the Northern region of Ghana. The District Capital is Walewale. The total land area is 5,013 km² and shares boundaries with eleven districts and two regions – Upper East and West. The rainy season starts in late April, peaks in July-August and ends during the months of October-November. The area suffers from soil erosion because of high winds during the end of the dry season.

According to (Ministry of Finance and Economic Planning, 2012), the natural vegetation of the district is classified as Guinea Savannah Woodland, composed of short trees of varying sizes and density, growing over a dispersed cover of perennial grasses and shrubs. The climatic conditions, relief features and soil texture which foster water logged conditions (especially in the area west of the White Volta) in the rainy season and draughty soils in the dry season tend to develop a characteristically hardy tree vegetation adapted to long periods of dry spells.

Total land area in the District is 5013km², with 45,781 hectares being put to cultivation. The average farm size is between 0.5 – 2.4 hectares. Land is normally acquired either by inheritance,

from the chief or family heads. The principal land uses reflect the almost total rural base of the district economy (Ministry of Finance and Economic Planning, 2012). About 77.4% of the people depend on agriculture for their livelihood. Large amounts of land are therefore put to the cultivation of major crops like maize, millet, guinea corn, groundnuts and cotton. Important minor crops cultivated include legumes, cassava and yams. There are a lot of good lands for tree crops and large scale mechanised Agriculture (Ministry of Finance and Economic Planning, 2012).

1.3 The Sustainable land and Water Management (SLWM) Project

The SLWM project is an intervention effort by Ghana's government to diffuse to farmers in the northern parts of Ghana (Upper East, Upper West and Northern Region) improved sustainable land and water management practices to reduce land degradation and improve biodiversity conservation which will lead to improved soil fertility for the enhancement of food production (Ministry of Food and Agriculture, (2009). The intervention is jointly funded by the government of Ghana, Global Environmental Facility (GEF) and the World Bank.

The Ministry of Food and Agriculture (MoFA), Environmental Protection Agency (EPA), Forestry commission (FC), Wildlife Division, and the District Assemblies are implementing agencies to achieve the desired result. MoFA is in charge of disseminating the sustainable land and water management technologies to farmers. The Crop Services Directorate (Environment Land and Water Management Unit) and the Extension Services Directorate of MoFA, both at the national and district levels, are directly responsible for implementing the agricultural aspect of this intervention. According to Ministry of Food and Agriculture (2012), agronomic measures

such as intercropping, agro-forestry and soil management practices (SLWM technology) offer a means to address land degradation and enhance rural land productivity. This study focused on examining the extension service delivery system of the SLWM project.

1.4 Problem Statement

According to Davis (2013), many African countries have realized that extension services play a crucial role in helping to provide sufficient food. However, the challenges for extension services in Africa include inadequacies in financing, capacity and monitoring and evaluation. These factors have weakened the extension services effectiveness to relay the necessary technologies and information to the farmers. The ineffectiveness of extension services suggests that farmers are not going to benefit fully from new solutions that are designed to help them thrive under increasing agriculture challenges. Ngomane (2003) reviewed the developmental work of some non-governmental organizations in Africa and revealed research extension-linkages as a limitation to obtaining the reward of research. Ten years later, Asiedu-Darko (2013) identified technology dissemination as the weakest link in most National Agriculture Research Systems (NARS). Asiedu-Darko (2013) found four key challenges scientists, technical officers and extension agents experience in the dissemination of farming technologies and delivery of extension services. These challenges are similar to the challenges revealed by Davis (2013). They include: the lack of funds, perception that the technology developed is expensive, low level of training of extension agents and other low involvement issues on the side of farmers. During the presentation of a speech in April, 2014, the Minister of Food and Agriculture, Kofi Humado, said Ghana needs to find innovative ways to deliver extension services to farmers because of the current challenges of inadequate extension staff and dwindling resources affecting the agriculture

sector (Ghana News Agency, 2014). The statement made by the Minister and the evidence of Asiedu- Darko (2013) and Davis (2013) indicate that the extension delivery system can adversely affect agricultural interventions aimed at mitigating low food production especially given that extension to farmer ratio is 1:1500 in Ghana (Ghana News agency, 2013).

Also, in order to have maximum food production levels, it is important that both male and female farmers are empowered equally with the necessary resources and information. The role of women in agriculture is very important because they contribute to the value chain system in the agriculture industry. Women also play important roles such as planting, harvesting and post-harvest activities. According to Mehra and Rojas (2008) four decades of research indicates rural women produce more than half of the world's food in developing countries. However, Mehra and Rojas (2008) revealed that there is no commitment to women farmers and resources to strengthen their role in the agriculture economy. Akua-Duncan (2004) argued that women have limited access to resources compared to their male counterparts especially in areas of education, land, and agriculture extension, in spite of the important role women play in agriculture production. The evidence of Mehra and Rojas (2008) and Akua-Duncan (2004) indicates that women farmers are not being empowered with the necessary information and other resources. This observed bias in extension service provision against female farmers tends to follow the trend of male dominance in most rural farming communities in developing countries (Omogor, 2013).

Therefore, a weakened extension service and the inadequate support for women's information needs during this period of increasing challenging circumstances of food production can

adversely affect interventions aimed at solving the low food production problem. Moreover, in spite of the many interventions aimed at addressing the low food production problem, there is inadequate empirical evidence that these interventions are achieving their expected output. The question that arises with respect to the SLWM project is whether those responsible for disseminating the SLWM technologies to farmers are achieving their expected targets given the challenges affecting extension services delivery in Ghana. The study was therefore intended to provide empirical data about the communication activities under the SLWM project. Specifically, this study sought to find out how communication activities are carried out by the extension service providers and those directly in charge of the project.

1.5 Objective of Study

The objective of this study is to investigate how communication activities are carried out under the Sustainable land and Water Management Project in West Mamprusi, Ghana.

1.6 Specific Objectives

1. To explore the farmers' perceptions and response to the SLWM technology messages.
2. To find out the factors that influence farmers' preference of communication channel(s) available for receiving SLWM messages.
3. To find out the differences in male and female farmers' access to and utilization of SLWM messages.

1.7 Research Questions

1. What factors influence farmers' perception and response to SLWM messages?
2. What factors influence farmers' preference of communication channel(s) available for receiving SLWM messages?
3. How do male and female farmers access and utilize messages about SLWM technology?

1.8 Significance of Research

There has been no study on the SLWM project in Ghana. The study provided empirical feedback about the SLWM project in West Mamprusi. Therefore, the findings of the study can be of use by stakeholders of the project to illuminate and inform implementation and management decisions and this may help improve the delivery or implementation of subsequent interventions. The study highlighted the communication channels and challenges in their use for the dissemination of the agricultural technology promoted by the project as well as how farmers perceived, responded and adapted to the available channels which contributes practical insights about the role of communication in agricultural extension service delivery.

1.9 Scope of the Research

The study aimed at studying a purposive sample of farmers who had adopted the SLWM technology and those who had not yet adopted the technology through the use of focus group discussions, in-depth interviews and observation. The extension agents and some officials directly involved in the implementation of the SLWM project at the district and national level were also interviewed. The study covered the factors that influence farmers' perception and

response to SLWM messages, their preference for the available communication channels and the gender differences in access to SLWM messages.

1.10 Chapter Summary

The SLWM project is an intervention effort by the government of Ghana to improve sustainable land and water management practices in northern Ghana. It sought to reduce land degradation and improve soil fertility for increased food production amidst increasing challenging circumstances of food production. However, the extension service delivery system seems to be struggling to discharge their mandate due to inadequacies in financing, capacity strength, monitoring and evaluation and dissemination of information to male and female farmers. This chapter among other things sought to investigate the communication activities carried out under the SLWM project. The next chapter explains the theoretical framework and a review of related studies.

CHAPTER TWO

THEORETICAL FRAMEWORK AND RELATED STUDIES

2.0 Introduction

This chapter is a review of relevant literature for the research. It is divided into two parts. The first part presents the theoretical framework that guided the study. It is followed by a review of related studies in relation to the research questions.

2.1 Theoretical Framework

Tietaah (2013) argued:

The theory and practice of development communication pivot from the logic that knowledge and information are essential if people are to successfully respond to opportunities and challenges of their environment and that to be useful such knowledge and information must be effectively communicated. (p. 39).

Leaning on the argument of Tietaah (2013), effective dissemination of agricultural information is a critical aspect of agriculture development. Sahin (2006) argued that Everett Rogers' diffusion of innovation theory is most appropriate for investigating the dissemination and adoption of a technology, because the theory considers most of the important factors that are involved in the dissemination of an innovation. Through the use of this theory as a guide, the researcher can better appreciate and evaluate how an innovation is disseminated. The concept of diffusion of innovations normally refers to extending of ideas from one society to another or within the same society (Sahin, 2006). The diffusion of SLWM management practices by MoFA to farmers in West Mamprusi district is an example diffusing ideas from an institution within a society to another part of the society. Diffusion of innovation is very essential because it is not easy to

invent new ideas or solutions to challenges as compared to acquiring these ideas or solutions from others (Rivera & Qamar, 2003). Diffusion is the process through which an innovation is communicated through certain channels over time among members in a social system (Rogers, 2003). Innovations or technologies are not communicated in a haphazard manner. Servaes (2002) explained that the diffusion of innovation “approach is concerned with the process of diffusion and adoption of innovations in a systematic and planned way” (p.13). Servaes’ explanation suggests that proper organization and planning are critical in diffusing technologies to farmers. Without proper organization and communication planning on how to carry out successful diffusion of the technologies, the end users will not fully achieve the benefits of the technologies.

The main components of the diffusion of innovation theory include innovation, communication channels, time and social system. Rogers explained an “innovation as an idea, practice, or project that is perceived as new by an individual or other unit of adoption” (Rogers, 2003, p 12). Rogers explained that an innovation does not necessarily have to be new. It may have been invented a long time ago, but if individuals perceive it as new, then it may be an innovation for them. Dearing (2009) further explained that the potential adopter’s perceptions of the attributes of the innovation such as its effectiveness, how simple it is to understand, the extent to which it can be seen in action, can all affect the adoption of the innovation.

Therefore, inferring from the explanation of Dearing (2009) the more the innovation is perceived positively, the more rapid its adoption rate is likely to be. Innovations are not communicated to the end users in a vacuum; the innovations are disseminated through channels of communication between or among two or more sources. Rogers defined a source as an individual or an

institution that originates a message and the channel as the means or medium by which a message gets from the source to the receiver(s). The receiver in this sense is the farmer who is expected to utilise the information. The information is received through mass media and interpersonal communication channels. Examples of the mass media channels include radio, television, print media and internet platforms. The interpersonal channel involves direct, often face-to-face, communication between two or more individuals.

Shedding light on the theory, Servaes (2002) explained that mass media channels were necessary to disseminate messages of awareness of new possibilities and practices. However, when it is time to decide whether to adopt or not, personal communication is far more influential. Sahin (2006) also concurred with Rogers (2003) and Servaes (2002) that the interpersonal channel is more powerful to create or change attitudes held by individuals, because mass media spread information but interpersonal communication spreads adoption. This implies that adoption of a technology such as the sustainable land and water management technology depends more on interpersonal communication, or face-to-face communication, than mass media platforms. Also, the diffusion of innovation theory considers how long it takes from the first time of knowing about the innovation until the time the innovation is adopted. Individuals vary in the length of time required to adopt an innovation. This indicates that the speed of individual farmers in the adoption of a technology varies due to what Rogers (2003) referred to as 'innovativeness'.

Rogers (2003) explained innovativeness as the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members in a social system. He defined the social system as "a set of interrelated units engaged in joint problem solving to

accomplish a common goal” (Rogers, 2003, p.23). Sahin (2006) added that members or units of a social system may be individuals, informal groups and organizations. In the social system, the members work together to solve a common problem, in order to reach a mutual goal. The social system is influenced by the social structure which is the patterned arrangements of units in a social system. Dearing (2009) asserted that the social structures include the norms and values of members in the social system and the roles of opinion leaders who influence other individuals’ attitudes. Therefore, the norms, value systems and other members within a social setting such as opinion leaders, the culture of the farmers, including notions on gender roles, and the implementing organization of an intervention, are critical to the adoption of new farming innovations. So, the social system affects individuals’ innovativeness (earliness in adoption) which is the criterion Rogers used to categorize adopters. The adopters can be categorized into five groups which include innovators, early adopters, early majority, late majority and laggards.

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Adopter Categories

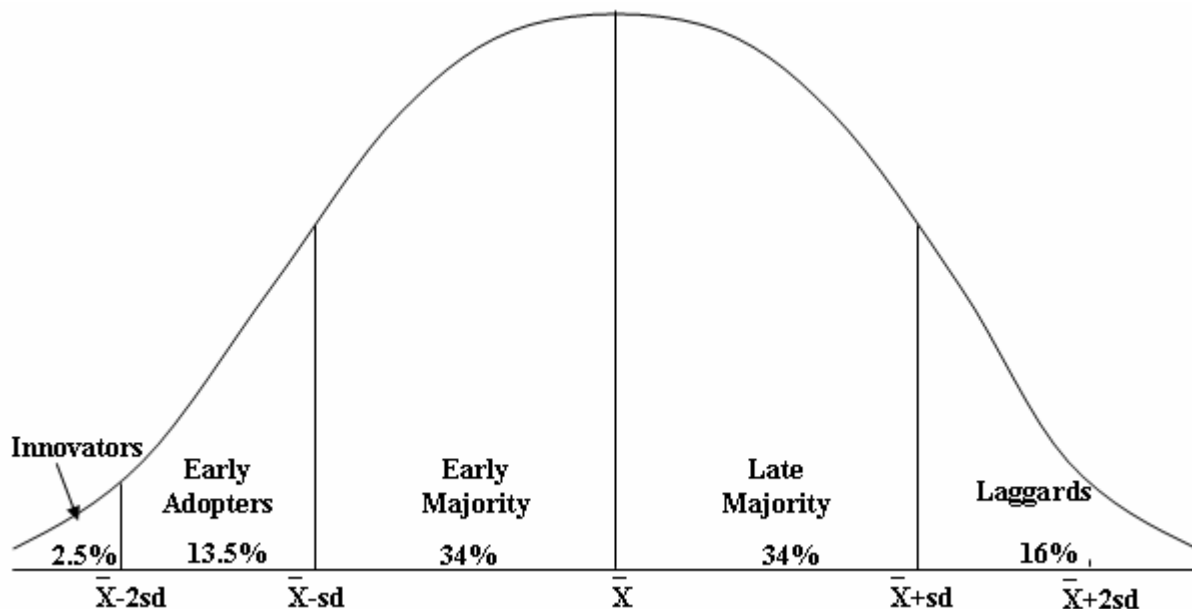


Figure 1.0. Adopter Categorization on the Basis of Innovativeness (Source: Rogers 2003)

Innovators

Innovators are those willing to experiment with new ideas. They normally take risk and are prepared for the consequences of a failure in their adventure. Dearing (2009) explained that needs or motivations differ among people according to their degree of earliness in adoption (innovativeness) and this explains why innovators are first to adopt because of novelty and having little to lose. However, Rogers (2003) argued that in spite of their originality the innovators may not be respected by other members of the social system because the innovators are often seen as non-conformist to the norms and values of the social system.

One can therefore suggest that the innovative farmers are those who are more prone to adopt new techniques of food production. Therefore, extension workers are more likely to target the innovative farmers first when introducing a new technology.

Early Adopters

Figure 1.0 shows the early majority, who are expected to adopt the innovation before the late majority and the laggards. Early adopters do not move outside the boundaries of the social system as much as the innovators. Early adopters normally hold positions in the social system and are normally opinion leaders. Therefore, other members of the social system see early adopters as role models who provide advice and information about innovations. These early adopters can be respected farmers in the community whose positive opinions about the innovation are seen as a seal of approval. An innovation is therefore expected to spread from early adopter farmers to early and late majority farmers through face-to-face communication.

Early Majority

This group interacts freely with their peers. They do not possess leadership roles in the social system but they are still influential in the diffusion process. Early adopters normally deliberate before adopting an innovation and they are neither the first nor the last to adopt it. Innovators and early adopters take decisions about the innovation before the early majority.

Late Majority

The late majority adopt the innovation mainly due to pressure from their peers. This group is very cautious about the innovation and its consequences. In this context the late majority can be farmers who adopt the innovation because of economic necessity. Rogers (2003) advised that to reduce the uncertainty about the innovation, interpersonal networks of close peers should persuade the late majority to adopt it. This is because as Sahin (2006) explained the late majority are often influenced by the fears and opinions of laggards. Dearing (2009) and Sahin (2006) independently agreed that it is very important for project implementers to focus on encouraging social norms rather than the benefits of the technology when dealing with the late majority adopters. This is because the late majority wants to hear that many of the other conservative people like themselves think the innovation is normal or indispensable.

Laggards

Laggards are more skeptical about innovations and change than the late majority group. Their interpersonal networks within the social system often consist of members of the same group. This group is expected to have no leadership positions within the social system. Due to inadequate resources at their disposal they do not take risk with the innovation. They prefer to be certain that the innovation works before they adopt it. This suggests that laggards are the farmers who take a longer time to adopt the technology than their peers.

In Rogers' (2003) view "the individuals or other units in a system who most need the benefits of a new idea (the less educated, less wealthy, and the like) are generally the last to adopt an innovation" (p. 295). Dearing (2009) and Sahin (2006) share a different view; they argued that

Rogers (2003) did not recognize that some adopters may have the characteristics of innovators and early adopters but will not quickly adopt while those who are less educated and wealthy might adopt quicker than the innovators and early adopters because they are supported by the implementers of the project to adopt the technology.

Relating the diffusion of innovation theory to the SLWM project, the Ministry of Food and Agriculture (2009) asserted that SLWM is not totally new among farmers in northern Ghana. The technology has been used in the past by some farmers, but not on a large scale such as the project sought to achieve. In the past, the available technology was used in isolation by some farmers. The new intervention offers an improved package of the technology to the farmers.

Therefore, through SLWM project, the technology is reintroduced as a new technology/innovation that can enhance farmers' production and improve the fertility of the soil for food production. The diffusion of innovations theory considers how a technology is communicated to people who are expected to adopt the technology.

This study sought to find out what communication channel(s) available are used to disseminate information to farmers about the SLWM technology and also the perception of the farmers about the channel(s). The theory also considers the time factor of how long it takes to adopt the technology. The study sought to find out the time it took for farmers in West Mamprusi to adopt (accept) the technology as a viable solution they could use in their farms to enhance soil fertility. The social system is another factor to consider in the theory. The study considered stakeholders who are involved in the implementation of the project. Some of these stakeholders include Ministry of Environment, Science and Technology (MEST), Environment Protection Agency,

Ministry of Food and Agriculture, the World Bank, extension workers and the farmers. All these stakeholders are interrelated and interact with each other at different levels. Considering the design of the project and the theoretical framework discussed thus far, one can infer that the intervention was influenced by the diffusion of innovations theory. The findings of the study would be used to verify this inference.

2.2 Limitations of the Diffusion of Innovations Theory

The diffusion of innovation theory sees development as basically an acculturation process. This implicitly assumes that knowledge of governments/development agencies and their foreign specialists are always correct. The theory assumes indigenous populations either do not know or have incorrect beliefs (Servaes, 2002). Development communication scholars argue that this diffusion model is a vertical or one-way perspective on communication, and that active involvement in the process of the communication itself will accelerate development. Servaes (2002) explained that unlike the diffusion of innovation model, “the participatory model, on the other hand, incorporates the concepts in the framework of multiplicity and stresses the importance of cultural identity of local communities and of democratization and participation at all levels” (p.14). Similar to the argument of Servaes (2002), Mefalopulos (2008) argued that any development intervention needs to be based on a participatory model in order to be sustainable. Mefalopulos (2008) asserts that in order to achieve sustainability in rural development interventions, it will depend heavily on the perception of the stakeholders towards the proposed change and their involvement in assessing and deciding about how the change can be accomplished. This study sought to look into the perception of the farmers about the SLWM technology, which is the proposed change.

Servaes (2002) and Mefalopulos (2008) independently concurred that failure to sustain past development efforts employing top-down communication has inspired interest in participation and empowerment which involve the shift in the way individuals are considered, from passive recipients to active agents of development. Therefore, participation of the farmers in the project was considered in this study. Also, Sahin (2006) and Dearing (2009) asserted the diffusion of innovation theory does not take into consideration an individual's resources or social support to adopt the new technology. Inferring from the argument of Sahin (2006) and Dearing (2009), one may suggest that a farmer may be financially capable and risk loving and yet delay or refuse to adopt a technology because of other factors such as beliefs and religion. Also, farmers who are poor can be supported with resources to adopt a technology. Dearing (2009) cautioned that the recall problem in diffusion research may lead to inaccuracies when respondents are asked to remember the time at which they adopted a new technology.

2.3 Review of Related Studies

The aim of this study was to investigate and understand how communication activities are carried out when disseminating agriculture information to rural farmers, by using the sustainable land and water management project in West Mamprusi district as a case study. To successfully carry out this study, it was imperative to review literature related to this study. The major themes of the related studies are organized in line with the research questions.

2.3.1 Farmers' perception and response to extension messages

Tveden-Nyborg, Misfeldt and Boelt (2013) studied the diffusion of web 2.0 technologies to 12 Danish seed scientists who were responsible for disseminating the technologies to seed growers.

The study revealed that the new technologies were disseminated faster when the scientists focused more on opinion leaders among the seed growers. The findings of the study suggest the opinion leaders were an influential channel in getting their colleagues to adopt the technology faster. The evidence suggest that some channels of communication such as face-to-face interaction are better at getting people to adopt a technology, when a new technology is being disseminated.

Koundouri, Nauges and Tzouvelekas (2006) surveyed 385 farmers, in order to study how modern irrigation technology (Drip Irrigation) was diffused in Crete, Greece. The results of the study revealed that risk aversion played a significant role in the adoption of the Drip Irrigation technology, as farmers who were sensitive to the risk of extreme events adopted the modern irrigation technology earlier. This evidence found in Greece is contrary to Rogers' (2003) argument that laggards are people who perceive a high risk in adopting a particular technology and they are usually the last to adopt. Koundouri, Nauges and Tzouvelekas (2006) also found out sufficient information available to some farmers reduced their time of adoption of the technology. Majority of farmers in the survey who had a positive perception of the technology and access to adequate information about the technology adopted the innovation earlier than those who had a poor perception and inadequate information. This evidence implies that it is necessary for farmers to have a positive view of the technology as the right solution to their challenge. Also, inadequate information on the part of farmers can impede their adoption rate of a technology. Therefore, interpersonal communication among farmers who have a positive view and are well informed about the technology is expected to positively influence the adoption rate

of the farmers than those who are less informed and those who also do not view the technology positively.

Tveden-Nyborg, Misfeldt and Boelt (2013) suggested that interpersonal networks can also help reduce elements of uncertainty because farmers will have discussions among themselves and address issues of concern. However, Rogers (2003) argued that people within the social system are prone to share information and imitate others who are similar to them. This indicates that interpersonal communication alone among people is not enough to enhance adoption, but the interaction should be among people who have similar values and trust for each other.

Doamekpor (2006) also revealed that farmers who are skeptical about technologies would feel reluctant to give resources such as allowing farm demonstration blocks to be carried on their farms. This evidence suggests that farmers do not always lack resources or have challenges with the channels through which agricultural information is disseminated. This therefore indicates that some farmers may receive all the necessary information and support to adopt a technology, but their perception towards the technology plays a crucial role in the acceptance or adoption of the technology.

These studies reviewed thus far gave the researcher an indication of how influential people such as opinion leaders or community elders can influence the perception of other farmers to adopt a technology. They were, also the basis for posing questions in this study to the lead farmer about her possible roles in influencing the adoption of the SLWM technology and other innovations. The studies have also indicted that the perception of farmers towards the technology is crucial in

getting them to adopt. This study sought to find out what factors influence the perception of and response to the SLWM messages by farmers in West Mamprusi, it is a critical aspect that affects adoption.

2.3.2 Communication Channels used in disseminating agriculture messages

Ndilowe (2013) conducted a study to find out how conservation agriculture technologies were disseminated to farmers in Chisama, Malawi. Ndilowe's (2013) study is similar to this study, because the researcher also sought to find out how SLWM technologies were disseminated in West Mamprusi district of Ghana. Ndilowe (2013) revealed that farmers received messages mostly through communication with extension workers using lead farmers, demonstration blocks, village meetings and field days. In her study, mass media channels such as radio and printed materials were used on a limited scale as compared to interpersonal communication channels. Ndilowe's findings supported the prediction of the diffusion of innovation theory. Ndilowe (2013) found that poverty and illiteracy in the study area accounted for the ineffectiveness of mass media channels like print materials and radio. Farmers could not afford to buy batteries for radio; mobile phones were rarely used, illiteracy prevented the farmers from taking advantage of print materials. This study also sought to find out whether the same situation or otherwise persisted in West Mamprusi and to establish the factors that influence the farmers' preference of the available channels of communication.

WREN Media (2010) asserted that agriculture information is always on the development agenda and radio is still seen as one of the most effective ways of reaching rural populations. Tadesse (2008) agreed that mass media plays an important role in dissemination of agriculture

information and creating awareness in the shortest time possible over widely dispersed farming populations. These assertions indicate the influence of the mass media as a channel in disseminating agriculture technology to farmers. WREN Media (2010) further argued that although majority of farmers listened to radio for agriculture messages the farmers often learn best when they discuss issues in person and in groups and when they see a new technology or approach in action. The evidence from WREN media (2010) and Tadesse (2008) indicate that an integrated approach of disseminating agriculture information through mass media and interpersonal communication channels is crucial to the dissemination of agriculture information or new technology. This is so because sometimes it is better to use the mass media to create awareness about the technology and to use interpersonal communication to encourage adoption of the technology.

Apata and Ogunrewo (2010) examined the appropriateness, reliability and effectiveness of information disseminated to farmers by town criers in rural south western Nigeria. Their study revealed that most of the extension officers that exist in rural areas are now operating in urban towns, abandoning the rural areas. Apata and Ogunrewo (2010) found that the town criers were effective to fill the gap when they were trained as extension workers. However, the finding of the study stated that the use of town criers for information dissemination rarely met the needs of farmers because only one in every five farmers were satisfied with the town criers to meet their information needs. Apata and Ogunrewo (2010) assessed radio usage by some of the respondents in the study. However, radio did not provide salient information on agricultural issues. The finding of Apata and Ogunrewo (2010) indicated that some radio stations in rural areas are meant for commercial purposes and not for developmental agenda. Apata and Ogunrewo

(2010) recommended that the structure and medium of town crier as a channel of information dissemination should be enlarged and properly managed to serve farmers' needs. This finding also suggested that the use of town criers is an untapped channel of information dissemination which can be better streamlined to enhance its effectiveness to deliver important agricultural information. The study by Apata and Ongunrewo (2010) is relevant to this study because it informed the researcher of an indigenous channel of agricultural information which can be a viable alternative to other formal channels of communication.

Baumuller (2012) posited that businesses, government and non-government agencies are taking advantage of the rapid use of mobile phones in developing countries to deliver services in areas such as agriculture, health and education. Ofosu-Asare (2012) revealed that mobile phones are used by farmers in some cocoa growing areas to share information and to meet economic needs. According to Ofosu-Asare (2012), 61 percent of farmers in a survey in cocoa growing areas in Ghana (Western, Asanti, Brong Ahafo and Eastern regions) owned mobile phones which had contributed to an improvement in communication with extension workers and among the farmers themselves. Also in Uganda, Masuki, Kamugisha, Mowo, Tanui, Tukahirwa, Mogoi and Aders (2010) found that mobile phones enabled farmers to communicate with extension workers, customers and themselves. The studies by Baumuller (2012), Ofosu-Asare (2012) and Masuki, et al. (2010) gave the researcher an idea about the role of mobile phone as a channel for disseminating agriculture information in rural areas and will serve as a guide to find out the factors that influence the farmers' use of mobile phones.

2.3.3 Access and utilization of agriculture messages

Hahnke (2007) conducted a survey in Son La Province in Vietnam to understand how innovations are diffused, in order to better predict adoption rates of future innovations. The results of the study revealed that farmers tend to be more innovative when they are older with experience, knowledge and have higher education. Hahnke (2007) argued that well-resourced farmers with regular contacts with extension workers are more innovative. Therefore, by investigating how farmers receive SLWM messages in West Mamprusi the research will find out whether regular contacts exist between farmers and extension workers and whether age and education made a difference in the disposition and rate of adoption of the technology.

Hahnke's (2007) evidence revealed that the lack of regular information from extension agents and experience with the use of the technology inhibited adoption. So, Hahnke (2007) recommended setting up of demonstration farms by extension workers and regular agricultural training. In addition, Hahnke (2007) proposed that in situations where there are inadequate extension workers such as in Ghana, trained local farmers unions may fill the gap and self-organize more training in cooperation with the few extension workers.

Pemsl, Waibel and Witt (2006) had doubts about the effect of knowledge diffusion from trained farmers to non-trained farmers. Their study in Senegal compared two communities with similar characteristics but with different intensities of field farmers' school training. The results of the comparison between the two communities revealed that the number of trained farmers in a community is a decisive factor for adoption behaviour and knowledge diffusion. The study suggests that when introducing a technology like the SLWM in West Mamprusi, a critical

number of trained farmers are important to achieve effective dissemination of information which may generate positive stimuli for adoption. In the face of the limited extension service agents in Ghana, this study among others sought to establish if Pems, Waibel and Witt's (2006) recommendation is in practice as an alternative to improve access to SLWM messages.

Keyoung (2011) investigated whether cultural traits affect the diffusion of agricultural technologies in Ghana. The study tested whether religion and clan membership affect the likelihood of adopting pineapple farming, which was relatively a new technology in the study area. The results revealed that having more adopters of a particular technology in a cultural group raises the likelihood to adopt that technology. The results of the finding suggested the possibility of imitation effect within cultural groups may not be strong, cultural differences in attitudes may play a role in the adoption process. The evidence suggested culture plays a role in the adoption of a technology. Therefore, the culture of a people may influence their perception and attitude towards a technology. Based on the evidence of Keyoung (2011), the researcher sought to find out whether the culture of the farmers affects how male and female farmers access and utilize the information about the SLWM technology.

Tadesse (2008) studied the access and utilization of agriculture information by 160 farming households in Metema Woreda, Ethiopia. The evidence revealed that obtaining agriculture information by the farmers was not sufficient to ensure agriculture development, because the information the farmers obtained was not utilized effectively. Moreover, the limited agricultural support for utilisation of the information provided by extension workers was biased towards male farmers. This finding is similar to a study conducted more than 30 years earlier by Staudt

(1997), which showed that nearly 50% of all women surveyed had never benefited from extension service advice, compared to only 28 % of joint (male/female) farmers who had been visited by extension officers. Considering how male and female farmers have access to agricultural information, which is an aspect of research interest to this study, Das (2012) argued that in spite of the role women play in agriculture, women are less informed than male farmers due to socio-economic and cultural constraints. Das (2012) found that women farmers were dependent on a male or husband in the family due to inadequate economic power, agriculture knowledge and education. Therefore, Das (2012) advised that women needed accurate, reliable and quick information just as their male counterparts for improved agricultural development. Akua-Duncan (2004) also found that women have limited access to extension support in Ghana. The finding of Akua-Duncan (2004) is supported by the FOA (2012) report that stated that women were mostly side-lined during agricultural extension activities and yet they were the most active in the communities. This finding indicated that women needed information as much as their male colleagues to take advantage of new technologies. These revelations suggest the need to help farmers with different needs to make use of the information they receive through support systems such as training a critical mass of the farmers as suggested by Pemsl, Waibel and Witt (2006).

Doamekpor (2006) revealed that researchers and the extension workers were not motivated to foster working relationships to help farmers, but there was no information about the motivation required by the researchers and extension workers. However, this suggests that there may be challenges on the part of the researchers and extension workers that may render them ineffective in the discharge of their duties. Therefore, the evidence from Doamekpor (2006) indicates that

the challenges of agricultural information dissemination to farmers are not only on the side of the farmers, but also those who provide the information. Like Ndilowe (2013), Doamekpor (2006) recommended that emphasis be laid on communication skills for extension workers who play the important role of linking research information to farmers; research findings should be clear and easily understandable. He also recommended implementation of research findings with cost effective logistics to facilitate the diffusion and adoption of improved technologies.

Asiedu-Darko (2013) also sought to find out the factors that affect extension delivery in the country. In his findings, Asiedu-Darko (2013) revealed the need to actively inform farmers in the extension delivery process. This finding was consistent with the findings of WREN Media (2010) that farmers prefer interaction with the extension officials rather than imposing the knowledge in the top to bottom approach. Like Doamekpor (2006), Asiedu-Darko (2010) recommended that extension workers need the required competence and communication skills to enable them deliver effectively. Doamekpor (2006) and Asiedu-Darko (2013) independently found that the main challenges in extension service delivery in Ghana include lack of funds, perception that the technology developed is expensive to adopt, the level of training of extension agents and participation challenges on the side of farmers. This evidence indicates that these challenges affect the access and adoption of disseminated technologies. The evidence from Doamekpor (2006), Asiedu-Darko (2013) Tadesse (2008) are helpful in appreciating the challenges in the extension service in accessing and utilizing disseminated technologies.

This review of access to and utilization of agricultural message points to both demand and supply challenges. The review also established two broad issues on access and utilization which

have to do with physical and cultural constraints inhibiting the extension service delivery system. From the supply side, economic and resource constraints militate against the training and availability of quality extension agents which in Ghana has culminated into a wide extension-agent farmer ratio. This has been established in the literature to be problematic for the availability and physical access to extension agents by farmers. On the demand side, which can be perceived as an off-shoot of the supply constraints, cultural factors and gender biases are also shown to have some influences in access and utilization of agricultural messages.

2.4 Chapter Summary

The literature review considered various populations and aspects of agricultural information dissemination such as the farmers, extension workers, researchers, and channels of communication, the social settings, and the use of mobile phones by farmers, gender and cultural issues in agriculture. This review was relevant to the research questions of this study in order to provide a framework within which to discuss the findings of the study. The three major themes reviewed (perceptions, channels and access to agricultural messages) revealed that they are interrelated. This indicates that dissemination of agriculture information cannot be carried out without considering these three major themes and how they interrelate with each other. The related studies reviewed also revealed the need to have a well-planned communication strategy to guide the process of disseminating agriculture information during an intervention such as the SLWM project in West Mamprusi. The research therefore sought to find out if the findings in the related studies are consistent or different given that West Mamprusi is a different geographical area, where such a study has never been conducted. The next chapter explains the methods used to conduct the study, in order to obtain empirical data.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter outlines the methodology that was used to carry out the study. The chapter describes the population and population sample of the study, the study design, data collection instruments and methods, data analysis, quality assurance and ethical considerations.

3.1.3 Population Structure of the study area

The Ghana Statistical Service (2010) official figures of the 2010 population and housing census put the West Mamprusi district population at 168,011 people; the male population is 83,003 whilst the female population is 83,006. Takora Yilli is one of the villages in the district which was selected randomly from a list of six other villages in the district: Gbani, Tinguri, Gbeduri, Kpbgü and Boakudow, where the SLWM project has been implemented. According to the 2010 Population and Housing Census figures, Takora Yilli, a community in the Kparigu Area Council of the West Mamprusi district has a total population of 1,048 comprising of 493 males and 555 females. It has four sections namely: Takorafongu, Samarijangfongu, Frafrafongu and Takorakurafongu with a total of 54 compounds and 144 households. The community has one three-classroom unit block primary school, 17 boreholes, 35 hand-dug wells, one mosque and four corn mills (one not serviceable). The community has no clinic but is covered with a mobile outreach programme by the West Mamprusi District Health Services. There is a fair road network linking surrounding communities except for its bad condition especially in the rainy season. There are five crop based farmer groups, two non-agriculture related NGOs and four community organisations operating in the community.

There are four (4) ethnic groups in the community: the Mamprusis, Frafras, Fulanis and Busasis. The Frafras are next to the Mamprusis as majority ethnic groups with the Fulanis and Busasis as minority groups. The predominant language is Mampruli spoken by the Mamprusis. However, the Frafras speak Gruni and Talne, the Fulanis speak Fulfulde and the Busasis speak Bissa. Meanwhile due to out-migration to the south some community members speak Twi. The community has a chief as the head called Takora who is enskinned by the Kpaanaa (the Kparigu chief). Households are mainly headed by men. The head of the family/household is responsible for major decisions relating to agriculture in respect of which land and the size of land to cultivate; crops to grow; types of tools/implements to use and the appropriate technologies to adopt. Widows head the household and make decisions as to the use of the land in consultation with the late husband's family. The women mostly keep the cash money belonging to the household. However, the man takes the final decision in respect of which items to use it for. The man is custodian of all agricultural produce stored, while the woman does the marketing for the household. Land preparation is the responsibility of the man and the male children in the family. Planting and maintenance of fields grown with maize, rice, soybean, etc, are done by both the man and the wife. Thinning and transplanting are mainly done by male family members (Ministry of Food and Agriculture, 2012).

Harvesting and threshing of farm produce are carried out by both men and women in the family while the women solely winnow the crop. Pest and disease control is normally done by men. Transporting produce from farm to the house is the responsibility of both sexes but storage is done by the men. Decision in respect of sale of the produce is vested on the head of the

household whiles in respect of consumption it is the prerogative of both sexes (Ministry of Food and Agriculture, 2012).

The researcher visited the study area during July – August (2014); during that time, farmers were engaged in their farms putting the SLWM technology to use. The purpose of conducting the study during July- August (2014) was to give the researcher the opportunity to meet and observe the farmers use the SLWM technologies on the farm.

3.2 Study Design

This study was qualitatively designed by using qualitative methods namely focus groups, in-depth interviews and observation in order to obtain data from the target respondents. Bryman (2001) posited that the qualitative approach aids the understanding and explanation of meaning of occurrences and phenomena from the participants' perspective, in this case to investigate how communication activities are carried out under the Sustainable Land and Water Management Project in West Mamprusi from the perspective of the beneficiaries and those in charge of the project implementation. According to Miles and Huberman (1994), "qualitative research is conducted through an intense and/or prolonged contact with a field or life situation; these situations are typically banal or normal ones, reflective of the everyday life of individuals, groups, societies, and organisations" (p. 20). This implies that qualitative approaches can be used to better investigate social phenomena such as the dissemination of agricultural information to rural farmers. Miles and Huberman (1994) explained that whilst using the qualitative approach, the researcher seeks to obtain data on the perceptions of the local actors from inside, through a process of deep attentiveness, of empathetic understanding, and of suspending or 'bracketing'

preconceptions about the topics under discussion. The qualitative approach was also used to collect data, due to the low educational background of majority of the respondents in the study area. The qualitative approach also emphasizes more on words than numbers in data collection and analysis (Bryman, 2001).

3.3 Population and sample of study

The study population consisted of various stakeholders such as subject matter specialists at the district and national level who are involved in disseminating SLWM technologies to farmers, the farmers who have adopted, and those who have not adopted the SLWM technologies. The researcher interviewed thirty six (36) respondents that included the Director of Environment Land and Water Unit of the Ministry of Food and Agriculture, the District Director of Agriculture in West Mamprusi, and the Director of Crop Service West Mamprusi. The others included an Extension Agent, the Head of Marketing at Eagle 94.1 FM in Walewale, the Lead Farmer in the study area, twenty four (24) farmers who had adopted the SLWM technology in the study area and six (6) farmers who had not adopted the technology.

The researcher used purposive sampling to select the respondents. Purposive sampling is a form of non-probability sample. This means each member of the population did not have an equal chance to be selected. However, Babbie (2011) suggests that occasionally it is appropriate to select a sample on the basis of knowledge of a population, its elements, and the purpose of the study. Whilst studying a target sample of the population who are best suited to answer the research questions, the researcher may collect sufficient data from the respondents that address the issue the researcher is investigating (Babbie, 2011). In line with this background, the ability

to contribute to the research objectives formed the basis of the purposive sampling in the study. The farmers included both males and females within an age range of 21 to 63 years. The rest of the respondents constituting the total sample were all males because they were the relevant respondents in charge of providing the information needed by the researcher.

3.4 Data Collection Instruments and Methods

In-Depth Interviews

Lindlof and Taylor (2002) asserted:

Qualitative interviews are sometimes called conversation with a purpose and in-depth interviews are particularly well suited to understand the social actor's experience and perspective. The researchers usually select persons for interviews only if their experience and knowledge is central to the research problem in some way (p. 173).

This study used in-depth interviews because it enabled the researcher to understand the respondents' experience and perspective. In-depth interview was used to gather information about things and processes that could not be observed effectively by other means. The in-depth interviews were conducted with the aid of a semi structured guide so as to make the interview flexible to make room for probing further. The in-depth interviews were conducted with the Director of Environment Land and Water Unit of the Ministry of Food and Agriculture, the District Director of agriculture in West Mamprusi, the Director of Crop Service in West Mamprusi, an Extension Agent, the Head of Marketing at Eagle 94.1 FM in Walewale and the Lead Farmer in TakoraYilli. The researcher conducted the in-depth interviews in English with the exception of the in-depth interview with the lead farmer which was conducted in a mixture of Twi (Akan language) and English.

Focus Groups Discussions

Wimmer and Dominick (2011) posited that focus group or group interviewing is a good research method used to help the researcher understand people's attitude and behaviour. During focus groups discussions, between 6 to 12 people are interviewed at the same time, with a moderator who leads the respondents in a fairly unstructured discussion about the topic under investigation (Wimmer & Dominick, 2011). According to Carey (1994) cited in Lindlof and Taylor (2002), the major reason to interview people in focus groups is to exploit the group or collective effect, where the explicit use of the group interaction produces insights that would have been less accessible without the interaction found in a group. This suggests that members of the discussions can be influenced to speak out by the ideas and experiences expressed by others.

The researcher organized four (4) separate focus group discussions (FGDs) with the farmers. The first group involved eight (8) male farmers, the second group involved (8) female farmers and the third group involved (8) members: four (4) male and (4) female farmers. A focus group discussion was also conducted with six (6) farmers who had not yet adopted the SLWM technology. The non adopters were all males because it was difficult to find female non adopters. The researcher organised the three focus group discussions with the adopter farmers in that composition in order to discover if the various categories would elicit different responses, due to the fact different groups of farmers such as females might have different needs and challenges from males. Furthermore, the literature suggests that if the group is not well composed, some members might be reluctant to speak because of the composition of the group members (Krueger & Casey, 2009; Amoakohene, 2005). The categorisation sought to make members feel at ease to express their views and also observe if there would be any difference in response when both

female and male respondents were in the same group and when they were in separate groups. The focus group discussions were conducted in a mixture of English, 'Twi' and 'Mampruli'. The research understands and speaks English and Twi. The Mampruli language was translated by an indigene of Walewale, who speaks English, Twi and Mampruli. The FGDs were all recorded whilst field notes were also taken.

3.5 Data Analysis

The recorded data from the in-depth interviews and focus group discussions were manually transcribed by the researcher. The field notes were also used to supplement the transcribed data in the analysis of the findings. The researcher developed themes from the transcripts which were used in a thematic analysis. Aronson (1994) asserted that thematic analysis can be used by researchers to make sense of qualitative data, in order to analyse and describe a phenomenon. Ryan and Bernard (2003) explained that thematic analysis deals with identifying and describing clear and latent ideas by analyzing meaning and recurring themes that arise from the data. The researcher used the 'cutting and sorting' technique to identify the major themes and sub themes that emerged from the transcribed data naturally. Following the steps recommended by Ryan and Bernard (2003), the thematic analysis was done in a four-step sequence:

1. Familiarization with data
2. Reducing raw data
3. Generation of textual codes and coding of data
4. Categorizing codes into themes

The conclusions from this research were informed by the themes that emerged from this inductive process.

3.6 Quality Assurance

In line with research quality measures, validation of data with participants, also known as ‘member checks’, was routinely used as a measure of ensuring the credibility and quality of data. The participants were frequently contacted to update them about the stage of the research, seek clarification about the meaning of some data from transcribed interviews and to collect additional data to fill data gaps identified as the study evolved. Feedback received from them was incorporated into the study.

3.7 Ethical Considerations

The thesis and motive of the research were fully explained to participants. This enhanced their understanding of the demands of the study, enabled their informed consent and contributed to their authentic participation. Personal conversations with the respondents were confidential; all respondents in the focus group discussions and in-depth interviews were verbally assured of their personal anonymity and informed of the motive and nature of the study. The study therefore sought to adhere to ethical standards.

3.8 Chapter Summary

The chapter discussed the research population and sample; the research methods, instruments and procedures used in research. The chapter also discussed how data were organised and analysed and the ethical considerations that were taken into account during the research. Chapter four presents the data obtained from the focus groups discussions, in-depth interviews and the researcher’s observations.

CHAPTER 4

FINDINGS

4.0 Introduction

The general purpose of this research was to investigate how communication activities are carried out under the SLWM intervention in West Mamprusi district in the northern region of Ghana, with specific emphasis on Takora Yilli. Takora Yilli is one of the villages in West Mamprusi which was randomly selected from a list of five other villages, where the intervention had been implemented. The themes that emerged from the inductive thematic analysis were about how communication activities are carried out under the intervention in relation to the research questions. This chapter presents the data that emerged from the inductive thematic analysis for the purpose of answering the research questions.

Background of the farmers

The ages of the farmers who had adopted the SLWM technology range from 21 to 48 years. Twenty five (25) farmers had adopted the technology. Out of the 25 farmers who had adopted the technology, 13 were females and 12 males. Six of the farmers had not adopted. The ages of the six farmers who had not adopted range from 47 to 63 years. They were all male. Among the farmers who had adopted, two of the females had attained formal primary school education. Three of the female also had had basic Islamic education. The other eight females had no formal or Islamic education. For the males, one was currently studying at the polytechnic, four had attained basic Islamic education, three had attained formal primary and junior secondary education and four have not attained any formal education. Two of the six farmers who had not

adopted the technology had attained basic Islamic education whilst the other four had not attained formal education.

Implementation and communication structure of the SLWM project

The director responsible for the Environment Land and Water unit at the Ministry of Food and Agriculture, in an in-depth interview (22nd July, 2014) mentioned that the project is being implemented by government organisations. The director revealed there is no other parallel communication structure, but rather the existing structures for providing agriculture extension services. The district agriculture offices around the country are basically extension service organisations under the district assemblies. As extension service provision organisations, the district assemblies have the administrative responsibilities for leading the implementation of projects on the ground. Therefore, when it comes to communication about the project it is the district agricultural office that is responsible. However, the district agriculture offices work in collaboration with other relevant district organisations, where their input is important. Therefore, the departments of extension at the district level provide the gateway in communicating the project.

At the district level, the District Director of Agriculture in West Mamprusi (Walewale) in an in-depth interview (30th July, 2014) explained that:

In terms of communication, what we do internally is that we have monthly and emergency meetings, we put up notices on the notice board when there is new information and we also use emails. If there are pictures or diagrams that are useful for demonstration purposes I print copies out for the extension agents. Sometimes, if there are any new developments I make power point presentations. Externally, we engage the farmers through regular meetings to know their problems and train them on how to solve the problems. Sometimes, we call the farmers on phone because some of them have phones.

Communication Strategy

There is no communication strategy document for the project. However, there are plans to develop a communication strategy. The director of Environment land and Water unit at MoFA explained the non existence of a communication strategy document:

We don't have it now but there is thinking into the future to develop a communication strategy which I understand will be more focused towards giving visibility to the project. Now communication is targeted at getting the target beneficiaries involved in the project implementation and to get them to understand what the project is about, what they are supposed to be doing to benefit from the project. I believe that until you do those things, and the project is being implemented soundly on the ground there is no need, but for now talking about a communication strategy document with the sole aim of giving visibility to the project, then you are wasting resources.

At the district level, when the researcher asked the District Director of Agric and the District Director of Crop Service (He is the officer in charge of the SLWM project at the district level) about their communication strategy, they both said that having a communication strategy is part of your training as an extension agent and that extension is all about communication.

Participatory Communication

According to the Director of Environment Land and Water Unit at MoFA, there is a two-way flow of information between the farmers and the project implementers. He said the project implementers are sensitive to the needs and concerns of all groups of farmers within the project. The District Director of Agriculture was of the opinion that the participatory approach the project had adopted was very important, because the beneficiaries were included in decision making about the project. The District Director of agriculture said his outfit only facilitates most of the activities of the project which enables the farmers to own the project. When the researcher asked

the District Director of Crop Service in an in-depth interview (30th, July, 2014) whether the farmers were involved in finding solutions to their agriculture challenges together with the project implementers, he said:

Yes they are part, because the project belongs to them. We involve them; we start by discussing the problem with them. In fact, they even bring out the problems. Although we are often with them we don't know the entire problem.

Monitoring and Evaluation of the Communication goals

The project has systems in place to ensure that whatever information is being communicated to the beneficiaries is yielding the required result. The Director of Environment Land and Water at MoFA explained that:

There is communication between the regional, national and the district levels, and we get feedback in the form of reports. So as to know whether we are achieving the objectives and goals of the project, it depends on the agreed deliverables and the qualities of the deliverables. That will tell us whether we are achieving our goals or not.

At the district level, the Director of Agric, the District Director and the AEAs do their monitoring and evaluation through field visits: by virtue of the activities they see on the field and subsequently inform their superiors at the national office.

4.1 Farmers' perception and response to the SLWM messages

The farmers who had adopted the technology generally viewed the messages about technology as very useful for solving their farming problems such as persistent low yield, erosion, inadequate fertile land, inadequate water and erosion. The farmers responded to the SLWM messages because they were expectant that the 'new information' they had acquired through the AEAs will enhance productivity of their land, reduce erosion, increase the availability of water and enabled

easy movement within their farms. Some of the farmers who started using the technology in 2013 said they had already seen improvements on their farms. Through observation of some farms, the researcher observed that the farmers who had put the SLWM messages to use had more spacious farms to walk through because they used garden lines to sow their seeds. Others who were using organic manure had greener looking farms.

The project started in 2012, however the implementation of the project with the farmers started in 2013. Out of the 25 farmers who adopted the technology, 19 of them responded to the SLWM messages and adopted the technology in 2013 and the other six farmers adopted the technology this year (2014). The main reasons the farmers gave for their response and subsequent adoption of the SLWM technology were similar. These reasons included limited availability of virgin land, expectation of higher yields, influence of the demonstration farms, and support with clearing of lands and provision of seedlings, fertilizer and agriculture knowledge to tackle other agriculture challenges such as erosion and bush fires. Also, due to his experience working with farmers in Takora Yilli and other surrounding villages, the District Director of Crop Service said:

Women adopt the SLWM technology faster than the men because they have no alternatives. If she is given one acre she has to manage it till kingdom come. So she takes good care of the small acre she has.

In the FGD with the non adopters, all the six (6) farmers said they had heard about the technology through friends and through meetings they attended when the Agric Extension Agent (AEA) came to speak to the farmers about the technology during a meeting. The farmers revealed that they were waiting to see how things will turn out before they adopt because it was risky to adopt immediately. However, they said they were impressed with how the technology was helping their colleagues who had adopted. Because they had seen the benefits of the SLWM

technology, all the non adopter farmers said they had regretted not adopting earlier and would soon start adopting. They indicated that they will start adopting even without support but will however welcome any support.

4.2 Communication Channels used in disseminating SLWM messages

The means of communicating with the beneficiaries of the project included interpersonal communication and electronic communication. The types of interpersonal channels included personal contact with agric extension agents, farmer to farmer extension, demonstration blocks and field visits. The types of electronic channels included mobile phones and video clips/information vans.

4.2.1 Personal Contact with AEAs

The extension agents normally organise meetings with the farmers individually or in groups to find out the concerns of the farmers, disseminate SLWM messages and share fertilizers and seeds among the farmers. There was a consensus from the focus group discussions held on the 27th and 28th of July, 2014 that this is the most frequent way they receive information. Below is a representative example of a farmers' responses to how they receive information about SLWM technology, through personal contact with the AEAs.

We receive information about the SLWM technology through AEA's who work here. When there is any information about the project, the extension agents come here and tell us or show us what to do and they call us too sometimes.

The farmers were of the view that the project had put the village on the map because of the occasional presence of cars and motor bikes in the village due to the SLWM project.

4.2.2 Farmer to Farmer Extension

Not all the farmers were fully abreast with the SLWM technology. Some farmers had better understanding of the technology than others. Also, some of the farmers were trained by the extension agents to teach their colleagues. The quote below represented the views of the farmers in the focus groups discussions.

We give each other information; some farmers in this community and nearby communities come to ask for information when they have problems with the SLWM technology. Some of our colleagues started before some of us. So we go to them for information when the extension agents are not available.

4.2.3 Demonstration Blocks and field Visits

In order to induce adoption, the AEAs use demonstration farmers, where they use the SLWM technology for example they use manure to grow crops on those demonstration farms instead of the normal fertilizer that the farmers are used to. When the farmers observe the growth of the crop with the manure is better than what they are used to, the AEAs are of the view that the farmers will adopt the technology. Also, the AEAs visit the farms after training the farmers to observe whether the farmers are using the information disseminated accurately. According to the District Director of Agric, the field visits are a way of getting feedback to make the necessary adjustments to their plan of action.

4.2.4 Mobile phones

The farmers used phones to receive information about the SLWM technology. The AEAs have contact farmers (those trained) that they call to disseminate information to their colleagues. Some

of the farmers also call the AEAs individually for information. Below is consensus quote of focus group discussions confirming the farmers receive information through mobile phones:

We get information about SLWM through the phone from the agric extension agent. Also, when AEAs want to organise a meeting with us, they call first before coming here and sometimes we also call them for information.

4.2.5 Video clips/Information Vans

The farmers also receive information about the SLWM technology in the form of video clips.

The District Director of agric explained the use of the video clips:

We have video clips developed by the head office in Accra that we show the farmers every time we enter a new community and after some time we just play it back for them to refresh their memory. We have a mobile van at the regional office that we call for when we need it to show the clips.

The participants confirmed the use of video clips with the aid of the information van. They indicated that at the beginning of the project, the extension agents also use the information car to show videos and pictures in the evening. Occasionally, the information van also goes to the communities to broadcast messages about SLWM technologies. According to the District Director of Agriculture when the information van is not available, he invites some farmers to his office to watch power point presentations.

4.2.6 Radio

Radio has been used only once to disseminate messages about the SLWM technology, since the start of the project in 2012. The District Director of Agric explained why:

Unfortunately, it is not easy to pay for radio air time and Eagle radio have not given us free air time.

The head of marketing at Eagle radio 94.1 confirmed the presence of an AEA at the radio station in 2013 to give a talk about the SLWM technology. He indicated that he could not say much about the SLWM project because somebody has been here last year to talk about it but I did not listen to that program. However, majority of the framers could not remember hearing about the SLWM technology on radio.

Apart from the channels of information used by the project, there are other channels within the study area. Farmers residing in the study area (Takora Yilli) and the five other villages where the project had been implemented in West Mamprusi received information from Eagle FM, other radio stations in Bolgatanga (a nearby town) and non-governmental organisations working in those communities.

4.3 Farmers' Preference for the Channels of Communication used to Receive SLWM Messages

4.3.1 Factors influencing the preference for Face-to-Face Interaction with AEA's

The farmers similarly perceived the face-to-face interaction as the best channel and their most preferred choice of communication among the other communication channels. The factors or reasons the farmers mentioned for their preference include in-depth explanation of the technology by the AEA's and opportunity to seek clarification from the AEA's.

In spite of their preference for the AEA's, the farmers complained of not having adequate AEA's as indicated in the following statement presenting the general view of the farmers:

Sometimes we need the extension agent to be around more because it is not always that when we need them we get access to them. So they should provide

us with more extension agents. We like our extension agent but if we can get more extension agents, it will help us more.

4.3.2 Factors influencing the preference of Mobile Phones as an alternative to the AEA's

When the extension agents were not available in person the farmers viewed the mobile phone as the best alternative to receive SLWM messages. The statement below represented the general sentiments of the farmers:

When the extension agent is not around and you have a problem, you can also call him to help. The phone is also useful during emergency. When the AEA's are not available and we need to know something quickly, we call the extension officer to help us.

Even though the farmers generally viewed the mobile phone as a fast and convenient alternative of receiving and providing information to their colleagues from AEA's, the farmers complained that the speed and the convenience of using the mobile phone as an alternative was not 100 percent guaranteed. The general sentiments from the farmers are illustrated in the following comments:

There is no electricity in this village. We charge our phones on the solar street light pole; there are some places on the solar light poles that we put our phones to charge. We need more of the solar street light poles, because we have only two in this village and it is not enough to charge the phones. We have to wait a long time before we charge our phones. These solar lights came at the beginning of this year (2014), before we used to go to Kparigu and neighbouring towns to charge our phones.

Sometimes with mobile phones, I may be in my house, but no network coverage, two or more people may try to contact me but they will not get me. So for me I think it is better to get the extension agent here than using phones. Sometimes it is also difficult to get mobile phone credits to make calls especially MTN and it is more expensive here than in Walewale.

Also your phone may be in your pocket on the farm but people may not reach you because there is no network. So, I prefer that the extension agents come to me often than the phone. It's not all of us who have phone. We prefer to see and listen to the agric extension agent which is more helpful than the phone.

In my room I don't often have network coverage with MTN network and have to move around before I can make a call with my MTN but the Vodaphone network is better. Also we don't get MTN credit to buy here easily and when they bring it here is more expensive because they say they have travel from the town to this place. So, the extension agent is better but the mobile phone too is good sometimes. Some of us have not been to school so we don't use the phone to send text messages.

Also, the researcher observed that only one of the women in the mixed focus group owned a personal mobile phone and only three women in the all female focus group owned a personal mobile phone. In the mixed focus group three of the four males owned personal mobile phones. In the all-male focus group six out of eight males owned personal mobile phones. This information was made known when the researcher asked the focus group participants how many of them had a personal mobile phone.

4.4 Access and Utilisation of SLWM messages

4.4.1 Access to SLWM messages

The District Director of Agriculture said they provide equal access to information for all the beneficiaries with gender mainstreaming as a guiding principle. This is done by organising sole women and sole men groups when there is suspicion that women in certain communities might not feel comfortable expressing their views in the presence of males. Through observation during the focus group discussions, it was noted that women in Takora Yilli freely expressed their views among men. This happened during the focus group discussions which consisted of four women

and four men. The researcher was also informed by the farmers and the AEAs about the work of some NGOs in Takora Yilli concerning gender awareness. This education about gender relations by the NGOs according to the AEAs and the District Director of agric had contributed to the farmers having equal access to information. The researcher was informed that women leaders known as ‘Magaziyas’ are consulted on every decision that is made in the community. These ‘women leaders’ subsequently pass on the information to their fellow women.

However, in an in-depth interview (31st, July, 2014) with one of the AEAs he said:

Sometimes in the community the men feel that they should get the information before it gets to the woman. So sometimes I target the man first because, the man is the head and he takes the final decision about the use of the land but once the women have been put in a group, I give them the information directly. But, the men tell the women the same information we tell them.

Female participants in the mixed and all female focus groups confirmed the assertion of the AEA. The women indicated that sometimes they were busy, so when the men go for meetings with the extension agent they come back and tell them what they discussed at the meeting.

4.4.2 Socio-Cultural Challenges Accessing SLWM Messages

Even though there seemed to be equal access to information to both male and female farmers, there were some challenges that also seemed to affect the equal access and utilization of SLWM messages. The challenges include land ownership challenge for females, the absence of any female AEA and the limited access to mobile phones by females. Concerning the land ownership challenge, the District Director of Crop Service said:

Women don’t own land here and before you involve women you have to go to their husbands and beg for land and what happens when they are divorced?

Where will that woman farm again? So women don't own land they only share with their husbands and you know marriage is not permanent as anything can happen so women's participation in the project so far as land ownership is concerned is a problem.

The issue of land ownership was also captured in the mixed focus and all male focus group discussions. There general consensus in the all male focus group and the mixed focus group discussions about land ownership was captured in this statement:

The men are the heads and the man takes the decision about the land so is very important for the man to get the information first and he will later tell his wife. What if the woman gets the information first but can't take the decision without the man who owns the land?

However, the females had nothing to say about land ownership in the FGD involving them alone as well as the in the mixed FGD.

4.4.3 Absence of female AEAs

The researcher found that providing women information was a challenge because women AEAs were not available in Takora Yilli and there was only one woman extension agent working on the project in another village known as Tinguri. An AEA working in Takora Yilli and the District Director of Crop Service said they had challenges providing information to women in the evenings because it is inappropriate to call or visit someone's wife in the evening, even though the information may be needed urgently. The District Director of crop service said a woman extension agent would have done that easily. He added that it is easier for a female AEA to mobilize her colleagues and pass on information to them than the male AEAs.

The District Director of Crop Service said there is limited access to the females because they are often engaged on the farm, in the kitchen, taking care of children or in the market. The researcher

observed that the men were more easily mobilised for the focus group discussion than the women. It took a longer time for the women to be ready for the discussions because they were engaged in other activities, even though they were informed two days earlier about the date and time of the discussions.

4.4.4 Gender and Access to Mobile Phones

The researcher observed that more men had personal mobile phones as compared to women. When the researcher asked how many of the eight female farmers in the all female focus group discussions owned a personal phone. Only three women said they had a personal mobile phone. However, six men out of the eight men in the focus group discussion said they owned a personal mobile phone. In the mixed focus group of four men and four women, three men owned mobile phones whilst only one woman owned a phone. During one of the focus group discussion a participant confirmed that men had access to mobile phones more than women but added that the men tell the women whatever information they receive through the phone about SLWM.

4.4.5 Challenges affecting the Utilization of SLWM Messages

Even though the farmers had a positive perception about the SLWM technology, some of them complained about their inability to use the messages. The farmers said factors such as inadequate rainfall, late arrival of support from the project, inadequate equipments such as donkey carts to carry the inorganic manure, technical challenges on the part of the tractor operators and unavailability of labour all impede the use of the messages they receive. It emerged that seedlings sometimes did not germinate because the seedlings arrived too late often when the rains had ceased. Some of the farmers complained their lands have not been cleared and also the

tractor operators who are to clear their land do the opposite of what the AEAs have instructed. The following comments represented the views of some farmers regarding land preparation and other problems:

Those who operate the tractors don't like to plough across the slope, and that causes erosion but it is a difficult for the operators of the tractors who often refuse to plough across the slope for us. They only plough across the slope for us once a while. They rather prefer to plough along the slope. Also, some of our lands are yet to be cleared.

They (AEAs) have given us a lot of information about the use of manure that is helping us but the problem is that we don't have enough donkey carts to be carrying the manure in to our farms. The information is good but we need donkey carts to help us use the information.

However, the researcher found out that not all the farmers are encountering such difficulties. Some famers have received support whilst others are yet to receive the necessary support.

4.5. Key Factors Affecting Information Dissemination of SLWM Messages

According to the District Director of Agric, unavailability of resources to purchase a generator is affecting communication work because there is no electricity in the villages we operate in. There is a need for power to show video clips and make PowerPoint presentations. He said the only available mobile van vehicle is stationed in Tamale and is not always easy to have access to it.

Also, the District Director of Crop Service explained his struggle to afford mobile phone credit for official duties in elaborate detail:

If you don't have money to buy credit what will you do? Whether we like it or not this mobile phone is one of the tools which are very important but a farmer will normally "flash" you, for you to call him back and discuss problems more than 30 minutes with your limited credit and is very crucial. Crucial in the sense

that, for example when you have given them fertilizer and thought them how to apply it and it gets to the time they are applying, but it has rained heavily there more than in the community here and they ask you considering the way it has rained, should we apply the fertilizer now? Meanwhile, you are not there and you can't use the rainfall where you are to tell them yes apply. So what will you tell them? This is crucial because it is urgent. So, you have to call one of your knowledgeable contact farmers and give him some instructions to follow so as to determine the best solution. If you don't have enough credit can you do that? Sometimes you need to have longer discussions with the farmers on phone; it is not a matter of five minutes. If you take your motorbike to go there, before you get there they might have dispersed and that was the right time they should have applied the fertilizer and if they didn't apply you can imagine what will happen. So you have to use the phone to listen to them and explain further what to do.

The main AEA responsible for TakoraYilli also explained his challenges to frequently move to communities where he is needed:

These days fuel is a problem, moving often to the farmers frequently is not easy. The nature of the road to the farmers is very bad. When it starts raining, the road is flooded and moving there to work is very risky. And sometimes when you pass through the flood with your motorbike and you return safely, you have to service your motorbike every week otherwise it will break down and movement will become a problem for you.

The researcher observed that there were a limited number of extension agents, because during the interaction with the farmers they were happy with the work of the AEAs but they requested for more because the AEAs working with them were not enough to address their concerns. The District Director of Crop Service said the AEA to Farmer ratio is one AEA to 1500 farmers (1AEA: 1500 Farmers). He also said the AEAs are few in number, yet some of them are limited in knowledge so far as SLWM technology is concerned, in spite of their training. According to the Director of Crop Service, the communication skills of the AEAs including himself need to be upgraded, because some of the AEAs are not succinct enough when delivering information to

farmers. He said through his observation on the field, the AEAs sometimes go off track when addressing the challenges of the farmers. He was however, optimistic that communication training will enhance the performance of the AEAs.

4.6 Chapter Summary

Chapter four presented the research data obtained from interviews and discussions with the Director of Environment Land and Water Unit at MOFA, the District Director of Agric in West Mamprusi, the District Director of Crop Service in West Mamprusi, an AEA working with farmers in the study area, and farmers in Takora Yilli. The data obtained were grouped under themes and sub-themes that emerged from the coding, in order to make sense of the data. The next chapter presents the discussions of data, conclusion and recommendation of the study.

CHAPTER 5

DISCUSSION OF FINDINGS, CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter discusses the data presented in chapter four. The discussion is done in relation to the research questions, the diffusion of innovation theory guiding this research and with reference to relevant literature on the dissemination of agriculture information to rural farmers.

5.1 Farmers' perceptions and response to SLWM messages

In this study, the innovation is the SLWM technology which has been disseminated to the farmers with the available communication channels on how to increase agricultural productivity whilst at the same time maintaining the integrity of the natural resources. The data presented about the farmers' perception and response to SLWM messages indicate that the farmers who had adopted the SLWM technologies had a positive perception about the technologies. The positive perception of the farmers was influenced by their urgent need of a solution to address the consistent decline of their yields due to land degradation. The positive perceptions of the farmers were also influenced by the promise of the project implementers to support them adopt the technologies by providing land preparation services, free fertilizer and the necessary information (messages) to combat land degradation. This indicates that the problem of low yields influenced the response to adopt the SLWM technologies which the farmers perceived as a solution to their problem, in spite of unknown uncertainties associated with adopting the technologies.

On the other hand, the non adopter farmers also had the same problem of low yields. However, they were uncertain about the outcome of adopting the technology, even though they were promised support to adopt the technology. The non-adopters perceived the SLWM technology as risky. Therefore, they wanted to see the expected outcome of adopting the technologies from those who had adopted, before taking a decision. Thus, the non adopter farmers responded by not adopting, in spite of the challenges of low yields which they were also faced with. However, the non adopters said they intended to adopt the SLWM technologies as soon as possible because they had seen the benefits of the technologies now. Therefore, the non adopters in the project can be considered as laggards and late majority because Rogers (2003) posited that laggards are people who see a high risk in adopting a particular technology.

The adopter and non-adopter farmers had the necessary information from the AEAs to enable them adopt the technology. However, the perception of the non adopters influenced them not to adopt. This finding is similar to that of Doamekpor (2005) who revealed that some farmers may have all it takes to adopt certain technologies, but their perception towards those technologies plays a crucial role in the acceptance or adoption of those technologies. The adopter farmers perceived the SLWM technology messages as useful so they responded by adopting it in spite of the risks that the technology might not work according to their expectations and the project implementers might also not deliver on their promise of support. Therefore, these farmers could be described as the innovators because they seem not to be perturbed about the risks in their adventure of adopting a new way of farming. An example of such a farmer is the lead farmer whose farm was used as a demonstration farm. Through the farmer-to-farmer extension, the trained farmers and some elders in the community who had adopted earlier influenced their

colleagues' perceptions about the technology. This finding is similar to that of Tveden-Nyborg, Misfeldt (2006) which indicated that face-to-face interactions are better at getting people to adopt a technology. The influential farmers could be described as early adopters, because they used their influence to change the perception of other farmers. This evidence suggests that it's very important for interaction among the various categories of farmers to positively influence the perception of each other about the technology, through farmer-to-farmer extension and other forms of collegial interpersonal communication. This will enhance adoption of the technology.

5.2 Communication Channels used in disseminating SLWM messages

From the findings, the means or channels by which the SLWM messages reach the farmers are mainly through interpersonal communication: personal contact with the AEAs, farmer to farmer extension, demonstration blocks and field visits. The other main channel was through electronic communication: video clips/information van and radio. It is important to point out that radio was used only once at the beginning of the project. The findings of this study about the communications channels that are used to receive information about the SLWM is in line with Rogers' (2003) diffusion of innovation theory, in terms of using interpersonal and mass communication channels to disseminate technologies. In literature, the finding of this study is consistent with the study of Ndilowe (2013) where farmers received messages mostly through interpersonal communication such as communication with extension workers, using lead farmers, demonstration blocks, village meetings and field days. She further revealed that mass media channels such as radio and printed materials were used but on a limited scale. The use of mobile phones in Ndilowe (2013) study was a rare phenomenon unlike farmers in Takora Yilli in this study.

Also, farmers in Takora Yilli did not receive SLWM messages through the print medium of communication. This may be because of high illiteracy rate in the area because most of the farmers in the community had not attained formal education and therefore could not read. The diffusion of innovation theory states that there are two main communication channels: mass media and interpersonal channels. Shedding light on the diffusion of innovation theory, Servaes (2002) explained that mass media are necessary to disseminate messages of awareness of new possibilities and practices. However, when it is time to decide whether to adopt or not, personal communication is expected to be far more influential. This explanation indicates that mass communication is less likely than personal influence to have a direct effect on whether to adopt or not to adopt a technology. The explanation by Servaes (2002) is a plausible reason why the implementers of the SLWM project used radio and the information van during the awareness phase of the project and decided not to spend money further on radio programs, in order to get the farmers to adopt the technology. However, the District Director of Agric argued that the cost involved using radio to disseminate SLWM message was the deterrent. The argument of the District Director of Agriculture supports the finding of Apata and Ongunrewo (2010) which suggested that some radio stations in rural areas in some parts of Nigeria were meant for commercial purposes and not for developmental agenda. However, the head of marketing at Eagle FM in Walewale, Ghana said they have a developmental agenda for their listeners but admitted that both government and non-government development organisations interested in using their platform to discuss developmental projects have to pay. This sounded illogical because paying before getting air time to carry out a development program becomes commercial unless there is a significant discount or subsidization of the cost by the radio station. This reasoning is backed by the claims of the District Director of Agric that it is expensive to carry

out programs using the radio station. In effect, this is consistent with the conclusion of Apata and Ongunrewo (2010) that radio stations in rural areas are meant for commercial purposes and not for developmental agenda. It is in this vein that Apata and Ongunrewo (2010) suggested the search for alternative indigenous channels of information dissemination such as ‘town criers’ in rural settings as a more effective approach of information dissemination. However, radio still remains an important source of agriculture information such as SLWM messages.

5.2.1 Farmers preference of the available communication channels

The study revealed that the farmers preferred interpersonal communication such as personal contact with the AEAs and farmer-to-farmer extension to electronic forms of communications such as, video clips, information van, radio and mobile phones. This is because they can only hear the message but cannot see the message in action without the help of an AEA. This finding about the farmers’ preference for personal contact with the AEAs is similar to that of WREN media (2010) that although farmers listen to radio for agricultural messages they also need to hear the same message in person from someone they trusted. This is because farmers often learn best when they discuss issues in person and in groups and when they see a new technology in action.

The study revealed that the presence of the project implementers and the AEAs in the village had brought prestige and recognition to the inhabitants because the farmers were of the view that the project has put the village on the map because of the occasional presence of cars and motor bikes in the village. This indicates that the human interaction in the dissemination of agricultural information is not only an effective channel but also enhances the prestige of those receiving the

information. This seems to serve as an incentive for adoption. Even though more farmers preferred the personal contact with the AEs, they also perceived the mobile phone as a very useful channel through which they received information because it served as an alternative channel which was very fast and sometimes reliable when the AEs were not available in person. This finding is similar to the findings Ofosu-Asare (2011), Baumüller (2012) and Masuki et al (2010) suggesting that the use of mobile phone is gradually improving in Africa and serving as a viable channel of information dissemination for agricultural production. The finding of Masuki et al (2010) suggested that farmers normally report that mobile phone makes it convenient for them to communicate to extension workers, customers and themselves which is also consistent with the findings of this study. The farmers who had mobile phones said they use it to call the AEs and their colleagues when they needed information especially when they were faced with emergency situation.

The finding about the positive use of mobile phones indicates that it is an important channel of disseminating SLWM messages which complements the AEs and has the potential to make information more accessible to farmers. In spite of these benefits and critical role of the mobile phones, the farmers are of the view that the factors mitigating against the use mobile phones such as inadequate charging poles, poor network coverage, unavailability and higher prices of some recharge cards affects the viability of the mobile phone as an alternative channel for disseminating SLWM messages. Masuki et al (2010) also made similar findings indicating farmers reported challenges in charging their phone batteries because they were not connected to the national grid which is a similar situation in villages in West Mamprusi. However, some villages in West Mamprusi like Takora have solar street light poles which make it possible to

charge mobile phone batteries. The farmers said the two solar street poles are inadequate to charge their phone as they have to do so in turns and in queues.

5.3 Access and Utilisation of SLWM messages

In sensitizing the farmers about gender issues, the separate groupings of male and female farmers to give them information and the purported role played by the ‘Magaziyas’ all help to enable equal access to information for male and female farmers. However, cultural factors such as land ownership systems, which favour the male farmers impedes the utilisation of the messages by the female farmers, because the female farmers may have access to information but can’t put it to use without the permission of a male. Also, the complaint made by the District Director of Crop service and the AEA about the difficulty in mobilising female farmers which the researcher also observed and the absence of female AEAs negatively affects access to information for female farmers.

The District Director of Crop service and the AEA were of the view that female AEAs could facilitate the access to information to female farmers especially during odd hour of the day and other circumstances where it will be very challenging for a male AEA to provide information to married female farmers. This view of the District Director of Crop service and the AEA suggests that the role of the ‘Magaziyas’ is not as effective as it is purported to be. Another factor that seems to affect access to information for women is the inadequate access to the mobile phone, because the mobile phone is a viable channel used to receive information, in spite of its challenges. Even though the male farmers argued that they normally pass on the information to the females, this may not always be the case because the male farmers might sometimes have

problems with the females and deprive them of information. The male farmers may also forget to relay the message without any malice. So it is better to empower the females to have access to information through owning their own mobile phones. The finding of Masuki et al (2010) which is similar to this finding suggest that male farmers generally benefits more than female farmers from the mobile phone as a channel to receive agricultural information. Similarly, Das (2012) found that in spite of the role women play in agriculture, women were less informed than male farmers due to socio-economic and cultural constraints. This argument is supported by keyoung (2011) that culture is likely to affect technology dissemination in a society. Das (2012) argued that women needed accurate, reliable and quick information just as their male counterparts for improved agricultural development.

5.3.1 Challenges affecting the Utilisation of SLWM messages

The data indicates farmers have challenges utilising the SLWM messages due to late arrival of support from the project authorities, inadequate equipment to put the message to use, technical challenges on the part of tractor operators who clear the lands and inadequate rainfall. Whilst nature is difficult to control, the other challenges are relatively easier to manage. These challenges impede the utilisation of the messages; this implies that even though the communication channels may be efficient and the message positively appreciated by the farmers, their inability to act on the information will not solve their agricultural challenges. Similar to this finding, Tadesse (2008) revealed that obtaining agriculture information by the farmers was not sufficient to ensure agricultural development because the information the farmers obtained was not utilised effectively. Tadesse (2008) further revealed the limited agricultural support for utilisation of the information provided by extension workers is biased towards male farmers.

This finding suggests the need to help both male and female farmers make use of the information they receive through support systems which are timely and effective. Furthermore, the male farmers have more access to SLWM messages indicate that the male farmers have a better chance of utilising the messages because unlike the female farmers the final decisions about the land usage rests with the male farmers, in spite of the challenges both male and female farmers may encounter.

5.3.2 Time of Adoption of SLWM messages

The farmers heard of the technology in 2012. However, the implementation of the project on the ground started in 2013. Within the first month of implementation, most of the farmers who had access to the required information needed to kick start adoption started using the technology. Koundouri, Nauges and Tzouvelekas (2006) noted that sufficient information available to some farmers reduces their time of adoption of the technology. The quick adoption was also because the farmers were in need of solutions to their production problems. The farmers were influenced by the messages of the AEAs through personal contacts, their friends, families and the demonstration blocks. This is in line with the diffusion of innovation theory that interpersonal communication channels are more likely to influence adoption rate faster compared to mass media channels which are rarely used in the SLWM project.

5.3.3 Inadequate resources for communication activities

The challenge of inadequate resources to carry out communication activities indicates that the communication aspect is not being prioritized as much as other aspects of the project. This suggests the AEAs are not fully equipped and motivated to discharge their duties effectively.

This is buttressed by the lack of a documented communication strategy of the project. Doamekpor (2006) revealed that the challenges of agricultural information dissemination to farmers are not only about the farmers' attitude towards the technology but also the poor motivation of those who provide the information. This evidence from this study and the literature suggests that poor motivation due to inadequate resources can render the AEAs ineffective for which Doamekpor (2006) recommended the dissemination of research findings with cost effective logistics to facilitate the diffusion and adoption of improved technologies. To compound the problem of inadequate AEAs in the country in general, the findings of this research suggest the AEAs who are well abreast with the SLWM technology are inadequate. This situation puts a lot of pressure on the few available AEAs. This prompted the farmers to appeal for more AEAs. This indicates the need for more information because the few AEAs available are not satisfying all their informational needs. This is evident when some of the farmers asked the researcher to plead with the few AEAs available to visit them more often because they needed more information and this underscores a growing demand-driven phenomenon for the technology.

Pemsl, Waibel and Witt (2006) found that the share of trained farmers in a community is a decisive factor for adoption behaviour and knowledge diffusion. They suggested that when introducing a new technology, a critical number of trained farmers are important to achieve effective dissemination of information which may generate positive stimuli for adoption. This finding of Pemsl, Waibel and Witt (2006) suggests the need to train as many farmers as possible. Hahnke (2007) also found that the lack of regular information from extension agents and experience with the use of the technology inhibited adoption.

The AEAs also need to upgrade their communication skills to enhance the dissemination of the technology. This was justified by the District Director of Crop Service who admitted his own need for training to improve his communication skills. Similarly, the extension workers in Ndilowe's (2013) study in Malawi said they required some training in communication skills so that they could communicate better with the farmers. A poorly communicated message to the farmer will have little or no impact, because the farmer needs to understand the message being communicated to him/her, in order for him/her to take the appropriate action. If there is no effective communication between the AEA and the farmer the problems of the farmer may not be solved. For this reason Doamekpor (2006) and Ndilowe (2013) both recommend that emphasis be laid on communication skills for extension workers who play the important role of linking research information to farmers.

The success of the extension service delivery also depends on other factors/activities in the social system which constitutes the fourth and final element of the diffusion of innovation theory. Rogers (2003) explained that the social system looks at the interrelated units that are engaged in problem solving to achieve a common objective. There are different organisations both at the national and local levels working together in partnership to achieve the objective of this project. The Director of the Environment Land and Water Management unit said they work in collaboration with the relevant district organisations when their input is needed. For example the forestry commission and the natural resource departments provide technical support which is further processed into messages for onward dissemination to the farmers by the AEAs. The Extension service unit provides the gateway in communicating the project through the AEAs

working at the district level. Overall, the findings of this study seem to support the diffusion of innovation theory to a significant extent.

5.4 Limitations of the Research

The findings of this research should be considered contextually. The sample (participants) of the study is not representative of the population and the views of the respondents may not be the same in other settings. Because of this, perspectives of other farmers, AEAs, among others outside the study area must be sought to verify the findings of this study. Due to the qualitative nature of the study, it cannot be generalized beyond the study area of the research.

5.5 Conclusion

The study sought to investigate how communication activities are carried out under the SLWM project in West Mamprusi. The study gives an insight into how communication activities are carried out under the project. The findings of the research suggest that farmers receive messages about SLWM predominantly through AEAs, farmer-to-farmer extension, farm demonstration blocks and field visits. All these are interpersonal communication channels. Farmers also receive information about SLWM less prominently through electronic channel mobile phones, video clips, radio and information vans.

The farmers were of the view that personal contact or face-face interaction with the AEAs is the best channel and their most preferred means of receiving information about the SLWM technology. This is because they prefer interaction with the AEAs to ask questions and seek clarification and also learn from each other. The farmers view the mobile phone as a complementary alternative to the AEAs and perceive it as fast and sometimes reliable when they

need information about SLWM urgently. However, the farmers perceive the mobile phones as not always efficient and reliable as compared to the interaction with the AEA in person due to a multiplicity of challenges with phone use. Due to the different limitations of the available communication channels, they play a complementary role in extension service delivery under the project.

The farmers generally perceive the information about SLWM technology as a new technology which is very useful for solving the agriculture land potency challenges they are experiencing. The farmers were expectant of overcoming the challenges with the SLWM technology. The positive expectations account for the technology being positively perceived by the farmers hence their response with a high adoption rate. The findings also suggest there was a difference between male and female farmers' access and utilisation of SLWM messages because of some socio-cultural factors including land ownership, the absence of female AEAs, female lower access to mobile phone use and the difficulties associated with mobilizing women for training and meetings because women are often engaged with caring for children, cooking, cleaning and working on the farm. They therefore have limited time to access and utilize SLWM messages. However, both male and female farmers have challenges with the utilisation of the SLWM messages with respect to the late arrival of support, seedlings and fertilizers, and clearing of land. Other challenges include inadequate equipment such as donkey carts to transport manure, the tractor operators clearing the wrong side of the slope and poor rainfall. These factors affected the utilisation of the SLWM messages. At the project implementation of level, there are inadequate resources available for communication activities such as mobile phone recharge credits, lack of a

generator, and inadequate knowledgeable AEAs all affect the dissemination of SLWM negatively.

5.6 Recommendations

Based on the research findings, it is very important to further enhance the utilisation of SLWM messages, through the provision of timely and effective support systems to the farmers. Females' access and utilisation of SLWM message should be improved by training female AEAs to attend to the informational needs of females. The impact of social-cultural factors on the access and utilisation of agricultural messages should be studied further, because the findings of this study suggest such factors can negatively affect access and utilisation of agricultural messages. As much as personal contact with AEAs is an important channel of information dissemination which positively influences adoption of a technology it is also important to strengthen the use of other alternative channels such as mobile phones to facilitate information dissemination. This is in view of the limitations of the various communication mechanisms including the interpersonal contacts with AEAs.

The farmers should be supported with more solar street lights to enhance the charging of mobile phones which is an important communication channel to receive SLWM messages or connection of Takora Yilli and other villages to the national electricity grid. Telecommunication service providers should improve their network coverage in rural areas around the country such as Takora Yilli, because mobile phones play an important role in enhancing agriculture productivity.

AEAs should help purchase mobile phone recharge cards in the nearby towns on their way to the farmers and sell to the farmers at the exact price based on demand and supply basis, so that the vendors do not exploit the farmers because, the village is in a remote area. The skills of the AEAs should be upgraded to make them more effective in the discharge of their duties. The needed communication resources should be provided to facilitate the dissemination of information. A quantitative study should be conducted to quantitatively verify the findings with a larger sample size than the one used in this study.

5.7 Chapter Summary

This chapter discussed the research findings taking into consideration the four stages of the diffusion of innovation theory, the research questions and existing relevant literature. Conclusions and recommendations were made based on the findings of the research.

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APPENDIX A

INTERVIEW SCHEDULE

General Objective

To investigate how communication activities are carried out under the Sustainable land and Water Management Project in West Mamprusi.

How do you communicate the sustainable land and water management project to the beneficiaries?

What administrative process/structures are there to support communication activities of the project in west Mamprusi?

How is your communication strategy developed and who participates in them for this project?

At the National level, how do you ascertain whether your communication goals/objectives are been achieved?

Do you have any policy or consideration in how male and female agricultural information needs are addressed with this project?

Specific Objectives

1. To explore the farmers' perceptions and response to the SLWM technology messages.
 - Explain what you think about the SLWM information you receive?
 - Why did you start using the technology?
2. To find out the factors that influence farmers' preference of the available communication channel(s) for receiving SLWM technology.
 - How do you receive information about SLWM technology?
 - What do you think about the ways you receive information about SLWM technology?
 - How do you prefer to receive information about technology and why?
 - How do you give information to farmers about the Sustainable Land and Water Management Project?
3. To find out there difference in male and female farmers' access and utilization of SLWM messages.
 - Do you have any policy or consideration in how male and female agricultural information needs are addressed with this project?
 - How do you give out agricultural information to farmers specifically about the Sustainable Land and Water Management Project?
 - Are you treated differently from women/men when it comes to receiving information on SLWM? Please explain your answer!

APPENDIX B

INTERVIEWER SELF DISCLOSURE

Good day everyone! My name is Samuel Moore Banya, and I am a student of the School of Communication Studies at the University of Ghana, Legon. Thank you all for coming. I am here to have a discussion with you about the sustainable land and water management project so that our discussion here can help complete my research for a master's degree in communication studies. The title of my research project is 'Dissemination of Agricultural Information to Rural Farmers: A Case Study of the Sustainable Land and Water Management project in West Mamprusi.

Everything we discuss here is for academic purposes. No names will be used when your comments are used in this research project. Also, I ask you to respect the privacy of the other group members by not discussing anything that anyone else says, so that our conversation here is confidential.

Everything that each and everyone here have to say is important and I encourage everyone to share his or thoughts. There are no wrong or right answers in this discussion and all different opinions are welcomed.

In order to help me remember what we discuss here accurately, I will be recording our discussion therefore; I encourage us all to speak one at a time so that the recording is smooth and well understood.

Participation is voluntary therefore if anyone wishes to discontinue our discussion he or she may do so at anytime. I hope we will all enjoy the discussions.

APPENDIX C

INTERVIEW GUIDE FOR THE VARIOUS RESPONDENTS

1. THE DIRECTOR OF ENVIRONMENT LAND AND WATER UNIT: MINISTRY OF FOOD AND AGRICULTURE (NATIONAL HEAD OFFICE, ACCRA).
 - What do you seek to achieve with the Sustainable Land and water management Project?
 - How do you communicate the sustainable land and water management project to the beneficiaries?
 - What administrative process/structures are there to implement and support communication activities of the project in west Mamprusi?
 - How was the communication strategy of this project developed and who participated in developing it?
 - At the National level, how do you ascertain whether your communication goals/objectives are been achieved?
 - Do you have any policy or consideration in how male and female agricultural information needs are addressed with this project?

2. DISTRICT DIRECTOR OF AGRICULTURE WEST MAMPRUSI (WALEWALE)
 - What do you seek to achieve with the Sustainable land and Water Management project.
 - How do you disseminate the SLWM technology to farmers in this district?
 - What administrative structures/processes are there to support communication activities within West Mamprusi?
 - How was your communication strategy developed and who participated in developing it?
 - How do you ascertain whether your communication goals/objectives are being achieved?
 - From your perspective, how do the farmers within this project prefer to receive information?

- Do you have any policy or consideration in how women/men agricultural information needs are addressed with this project.
- What are some of the challenges with communicating the information needs of the farmers with this project?

3. THE DIRECTOR OF CROP SERVICE (WALEWALE), WHO IS ALSO THE OFFICER IN CHARGE OF THE SUSTAINABLE LAND AND WATER MANAGEMENT PROJECT

- How do you develop your communication strategy for this project?
- How do you normally disseminate the SLWM technology to the farmers in this district?
- How do you ascertain whether your communication goals/objectives are being/have been achieved?
- Have you received any special training on SLWM technology? If yes please tell me about it.
- In terms of disseminating the SLWM technology to the farmers, what are some of the challenges?
- Are the farmers part of the solution to the problems? If yes how?
- In your opinion, why haven't some farmers adopted the SLWM technology?
- So are you saying they don't know how to use the technology?
- So how about providing women information?
- Do you have anything thing else to say about disseminating the SLWM technology to farmers within this project?

4. AGRIC EXTENSION AGENT WORKING ON THE SUSTAINABLE LAND AND WATER MANAGEMENT PROJECT IN WEST MAMPRUSI: TAKORA YILLI

- What do you seek to achieve with the Sustainable Land and water management Project?
- How do people normally receive information in this district?
- How do you give out information to farmers about the SLWM technology?

- How do you ascertain whether your communication goals/objectives are been achieved?
- In your opinion, how do the farmers you work with like to receive information?
- Whilst giving out information to a farmer who is your main target, a man or women and why?
- Have you received any special training on Sustainable Land and Water Management technology?
- Where were you trained as an AEA?
- In terms of disseminating the SLWM technology to the farmers, what are some of the challenges?

5. THE HEAD OF MARKETING EAGLE 94.1 FM (WALEWALE)

- How does your radio station address developmental issues?
How do you address developmental issues for farmers?
- What do you do about the Sustainable Land and Water Management Project on going in this district on your station?
- At what time of the day do you air the program for the farmers?
- How many times during the week do you air the program for farmers?
- How is the program for farmers and fishermen organized?
- So does this mean experts are not involved in this program (Farmers and Fishermen)?
- Is the program you organize for the farmers, fishermen and experts free?
What are some of the challenges you encounter whilst working with the farmers?

6. LEAD FARMER IN TAKORA YILLI

- How do you normally receive new information in this community?
- How do you normally receive information about the SLWM technology in this community?
- What is your opinion about the ways you receive information about SLWM in this community?

- What role do you play in getting your colleagues to adopt SLWM and other technologies?
- What do you think is the most preferred way of receiving information about SLWM technology in this community?
- What do you think about the SLWM technology information you receive?
- When did you start using the SLWM technology?
- What are your reasons for adopting the SLWM technology?

7. FOCUS GROUPS WITH FARMERS (ADOPTERS)

- How do you normally receive new information in this community?
- Any example of the information you are talking about?
- Since there is no electricity in this community, where do you charge your mobile phone?
- How do you receive information about the SLWM project?
- Have you received information about SLWM project on radio?
- What do you think about the way(s) through which you receive information about SLWM?
- What do you think about the SLWM technology information you receive?
- What are your challenges/obstacles with the adoption and use of the SLWM?
- Are you treated differently from women when it comes to receiving information on SLWM? Please explain your answer!
- When did you start using the SLWM technology?
What are your reasons for using SLWM technology?
- What is your opinion about the agricultural extension agents who inform you about the SLWM technology?

FOCUS GROUP WITH NON ADOPTER FARMERS

- Have you heard about the SLWM technology?
- What do you think about the SLWM technology information?
- How did you hear about it (SLWM)?

- So why haven't you adopted the technology?
- Do you intend to ever adopt the SLWM technology in the future?