

Transformative Engagement Network (TEN)

Building resilience against hunger and climate change in smallholder farming communities through transformative engagement

Masters in Transformative Community Development

Cover sheet for final research paper submission

Title of Research Paper: Investigating the influence of Communication Channels on Adoption of Climate Smart Agriculture in Bolero, Rumphi District in Malawi

Student Name: Pauline Kalumikiza Mbukwa

Student Number: MTCD/2C/7/13

Student Email: paulinembukwa@gmail.com

Institution at which student is registered: Mzuzu University

Name and email of supervisor(s):

1. Bennet Mataya bennet.mataya@gmail.com

I, Pauline Kalumikiza Mbukwa, certify that the research paper is my own work and I have not Obtained a Degree in this University or elsewhere on the basis of this Research.

ABSTRACT

A lot of agricultural technologies are being promoted in Malawi to encourage smallholder farmers to adapt to climate change effects. One such technology is Climate Smart Agriculture technologies (CSAs), which in this context, refers to an integration of conservation agriculture, agroforestry, irrigation, compost manure making, construction of marker ridges, integrated soil fertility management, intercropping, pit planting, and small scale livestock keeping. However, uptake of these new agricultural technologies remains low, and, lack of information, is presumed to be one of the major causes for low adoption rates.

A study was conducted in Rumphi district in Northern Malawi to investigate whether communication channels influence the adoption of CSA so as to inform CSA promotion programmes. The study was conducted in Jalira section of Bolero EPA, purposively sampled due to low adoption of CSA technologies. Three villages were then purposively sampled due to accessibility and proximity from which 104 farm households were randomly sampled to participate in the study that included two focus group discussions and key informants interviews (KIIs). Study findings revealed that extension officers and lead farmers, in that order, are currently the dominant communication channels being used for CSA technology promotion although they are inadequate and have limited coverage. In terms of the communication channel preferences, 69.2% indicated extension staff followed by radio 17.3%, and lead farmers 12.5% this implies the potential of using radio for CSA messages. The study also revealed that the CSA messages are communicated in a top-bottom approach hence necessitating the need for a more transformative engagement approach in which the farmers would not be merely passive recipients of information. Finally, there is poor coordination among the supply side of

information which may lead to confusion among farmers. These findings are of great significance at both local level and national level, because they inform key stakeholders in the agricultural sector of the potential of using innovative radio because it would enhance the reach of CSA messages in areas not reached by extension staff.

DEFINITION OF KEY TERMS

Climate Smart Agriculture: An integrative approach to address the challenges of food security and climate change, that aims at three objectives: (1) increase agricultural productivity, to support equitable increases in farm incomes, food security and development; (2) adapting and building resilience of agricultural and food security systems to climate change at multiple levels; and (3) reducing greenhouse gas emissions from agriculture (including crops, livestock and fisheries). CSA integrates these three objectives together at different scales - from farm to landscape – at different levels - from local to global and over short and long time horizons, taking into account national and local specific sites and priorities (FAO,2013).

Conservation Agriculture: An approach to managing agro-ecosystems for improved and sustained productivity, increased profits and food security while preserving and enhancing the resource base and the environment. CA comprises three principles namely i) continuous minimum mechanical soil disturbance ii) permanent organic soil cover iii) diversification of crops (FAO, 2015)

Communication: Communication can be defined as a two way process of reaching a mutual understanding on which participants not only exchange information ,news, ideas but also create and share meaning. The means through which a message is communicated from the sender to the receiver is termed **communication channel** while a **communication strategy, in this context,** refers to a package of communication channels that are being used to communicate messages on CSA.

ABBREVIATIONS

AEDC	Agriculture Extension Development Coordinator
ACO	Agriculture Communication Officer
AEDO	Agriculture Extension Development Officer
CA	Conservation Agriculture
CSA	Climate Smart Agriculture
DAECC	District Agriculture Extension Coordinating Committee
DIO	Diffusion of Innovation
EPA	Extension Planning Area
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
ICTs	Information Communication Technologies
MoAIWD	Ministry of Agriculture Irrigation and Water Development
NGO	Non-Governmental Organisation
NSO	National Statistical Office

CHAPTER 1

INTRODUCTION

1.1 Background

Agriculture is the major sector of the Malawi's economy. It employs about 80 per cent of the total workforce, contributes over 80 per cent to foreign exchange earnings, accounts for 39 per cent of gross domestic product (GDP) and contributes significantly to national and household food security. The Malawi agriculture sector is subdivided into the estate subsector, farming leasehold land and commercial oriented, and, smallholder subsector, farming on customary land, more subsistence and food production oriented (Government of Malawi, 2011). The smallholder subsector occupies about 80% of the land whilst the commercial sector comprises 20% (Government of Malawi, 2000).

Malawi has a subtropical climate with two seasons: cool dry season and a warm wet season. The rainy season extends from November to April with an annual precipitation of 725mm to 2,500mm (Fatch et al., 2010 in Kanchewa, 2013). The impact of climate change has affected 90% of subsistence farmers who rely on rain fed agriculture due to increased drought and floods, ultimately triggering poverty (Khonje, 2011). The most recent 2014/2015 rainy season has been very problematic as Malawi has been heavily affected by floods which have killed close to 200 people in the southern region of the country, in addition to rendering many others homeless and without food.

Bolero Extension Planning Area (EPA) in Rumphu has not been spared from the effects of climate change. It has experienced floods, drought, dry spells, river bank erosion, and shortage of food (Mataya et al, 2013). According to Jumbe et al, (2008), adaptation becomes necessary to assist the affected communities to adapt to climate change effects and disasters thereafter. However, the authors, note that there is a gap in the dissemination of climate change information consistent with Mandala (2015), who cited lack of knowledge in climate change and poorly coordinated communication as some of the factors that exacerbate the vulnerability of the rural poor to climate change effects hence indicating the need to rethink communication strategies currently being used in the dissemination of climate change.

CSA technology was selected based on their popularity in Bolero, but also because; they are among the key innovations which are helping many farmers to adapt to climate change effects. CSA is defined as a technology that contributes to sustainable development. It integrates the three dimensions of sustainable development (economic, social and environmental) by jointly addressing food security and climate challenges. It is composed of three main pillars: (i) sustainably increasing agricultural productivity and incomes; (ii) adapting and building resilience to climate change; (iii) reducing and/or removing greenhouse gases emissions, where possible. The CSA approach also aims to strengthen livelihoods and food security especially among smallholder farmers by improving the management of natural resources and adoption of appropriate methods and technologies for the production, processing and marketing of agricultural goods (FAO, 2013).

In Bolero, there are various stakeholders that are implementing CSAs. These include Ministry of Agriculture Irrigation and Water Development, Total Land Care, Catholic Development Commission in Malawi (CADECOM) and Find Your Feet. However, despite the wide spread dissemination efforts, not much has been studied on the effectiveness of the communication channels used by the change agents as they reach out to farmers with messages on CSAs. A channel connotes the means used to deliver a message to a receiver by mass media which include: newspaper, magazine, radio, television and other media (Rogers, 1974, Tucker and Napier, 2001; Dominick,1999 in Kanchewa,2013). Communication channels can be understood simply as modes or pathways through which two parties can communicate. They can be categorised into (i) physical channels such as visits, seminars, workshop, exhibition, agricultural shows and advisory village meetings;(ii) non-physical channels such as T.V, radio, phone calls, newspaper, magazine and other print media; iii) technical channels which could be physical and non-physical iv) human discipline channels for example uniform put on by professions such as medical doctors, nurses and army officer depict their profession; v) token of communication channels, which are channels in between physical and non-physical. For instance signals, gestures, idols at the shrines (Age, 2012).

Currently, very little is known on the effectiveness of these communication channels in the adoption of CSA technologies. The current study investigated whether channels of communication influence adoption of CSAs and what communication strategy is effective for the adoption of the CSA technologies among in farmers in Bolero. This study focused on the smallholder farmers, who are the primary target of the CSA information.

1.2 Problem Statement

Despite Government and Non-Governmental Organisations' (NGOs) efforts to promote CSAs among smallholder farmers to adapt to effects of climate change, farmers are not adopting as expected by these change agents. Farmers are still being subjected to continuous hunger and deeper cycles of poverty and vulnerability. This is an indication that adaptation measures are not being adopted by communities due to, among others, ignorance, financial or material resources or because the mode of communication does not appeal to communities (Khonje, 2011). Kanchewa, (2013) reported that low levels of adoption of agricultural technologies are among problems affecting the development of Agriculture in Africa, including Malawi with limited information being one of the major factors affecting adoption of agricultural technologies.

The limited number of extension workers in relation to the number of farmers constrains the flow of information reaching farmers (Churi et al, 2012). In Malawi, section coverage information by Ministry of Agriculture Irrigation and Water Development (MoAIWD) in July 2009, indicated that 56% of the Agricultural Extension Development Officers (AEDO) positions were unfilled (Government of Malawi, 2009). The current extension worker to farmer ratio is 1:3000 farmers against the ideal ratio of 1:750 (Government of Malawi, 2013). This has created work over-loads and tremendous strain on existing staff which compromise the quality of services delivered to farmers (Government of Malawi, 2010).

According to Gauthier, (2005), research suggests that research uptake at local level has been limited partly due to the way scientific information is packaged and communicated. There is

extensive literature on how technology characteristics, adoption constraints and adopter characteristics influence adoption of improved agriculture technologies in Malawi. However, there is little research available on the effectiveness of communication channels in the dissemination and adoption of CSA information. Many researchers have confirmed that lack of credible information and the way the messages are communicated is one potential constraint to adoption of technologies (Griliches, 1957; Foster & Rosenzweig, 1995; Munshi, 2004; Bandiaera and Rasul, 2006; Conley and Udry 2010).

This study, therefore, sought to establish what communication strategies are effective for farmers and to investigate whether the channels of communication used can influence adoption of CSAs.

1.3 Justification

The study will contribute to the body of knowledge in Malawi on what role communication strategies play in influencing the adoption of Climate Smart Agriculture technologies. The study will help agricultural communicators, extension agents, and development organisations to rethink and reconsider their communication strategies before dissemination of CSA messages for enhancement of adoption of the technologies in Bolero and beyond. The use of communication channels such as radio and ICTs would provide new opportunities for the community to mobilise into community of practice such as radio listening clubs thus enable the transformative engagement between farmers, agricultural experts and researchers.

1.4 Objectives

1.4.1 Main objective

The overall Objective was to investigate whether channels of communication influence farmers' adoption of climate smart agricultural technologies in Bolero EPA

1.4.2 Specific Objectives

- To document channels of communication currently used to access information on climate smart agricultural technologies by farmers in Bolero
- To investigate whether or not channel of communication influences the adoption of climate smart agricultural technologies
- To identify farmers' preferred channels of communication for them to adopt climate smart agricultural technologies.
- To explore the role of communications in community transformative engagement.

1.5 Research Hypothesis

Farmer adoption of climate smart agricultural technologies is not influenced by the channels of communication.

CHAPTER 2

LITERATURE REVIEW

The purpose of this chapter is to give a brief background of the communication channels being used by farmers, theoretical frameworks guiding this study.

There are various definitions of communication. Hall (1973) defines communication as a process of encoding and decoding and based on four stages. The four stages include i) production: this is where encoding of the message takes place ii) circulation: how individuals perceive things iii) Use: This is the decoding or interpreting of message iv) reproduction: interpretation based on their experience.

Adebayo (1997) defined communication as a process of information flow by which ideas are transferred from a source to a receiver with the intent to change his or her knowledge, attitude and skills while Age (2012) defined communication as a process in which the participants create and share information with one another in order to reach a mutual understanding.

Age (2012) citing Agbamu (2006) explained that agricultural communication, deals with the planning and management of agricultural information and methods of effectively communicating agricultural technology in order to bring about desired changes in farmers behaviour and their farming practices for improved living. Lucky et al (2013) noted that there are a number of factors that make the efforts of communication less effective and these are: ability to read and write ability to speak a certain language, lack of experience, attitude of information agents. The

authors argued that attitude towards the information are the greatest obstacle in disseminating agricultural information to the farmers. They also argued that because farmers have low education levels, it becomes difficult for them to understand any new concept or idea. However this may not be generic, as some of the illiterate farmers can adopt a new concept because they have known the benefits after observing from their fellow farmer.

There are various communication channels being used in Malawi: these are extension worker to farmer, lead farmer, farmer to farmer, radio, print media and mobile phones. Extension was a key service to enhance agriculture productivity from colonial times. In 1903, government introduced organized agricultural extension that concentrated on advising farmers on improved methods of cotton production and later broadened to other crops and livestock (Kabuye and Mhango, 2005). The Department of Agriculture was established in 1907. At that time government sent out instructors to teach crop production practices. Later, the concept of 'Master Farmers' was incorporated into the mainstream of extension activities. The Master farmers were supported by government to go and train the farmers through demonstrations. From the Master farmer approach, the group approach was then recognized in 1970s as the best way to spread messages. The "block extension system", a modified training and visit system, was adopted in 1981 with the aim of improving farmer coverage. The approach then went beyond specialized groups and tried to contact a wider range of farmers, including the resource poor and women (Masangano and Mthinda, 2012). Currently, the extension worker to farmer approach is still the most common way of disseminating to farmers. With the 2000 Agricultural extension policy which encourages pluralistic demand driven extension services, new players such as non-governmental organizations (NGOs), the private sector and farmer organizations have come in to compliment

government's efforts. (Government of Malawi, 2000). The advantage of the traditional face to face extension approach is that farmers are able to ask questions and get feedback immediately. However this approach is constrained by challenges such as unavailability of extension staff in some areas. (Government of Malawi, 2009). It is not transformative as it focuses on technology transfer to farmers and not generating knowledge from farmers.

The 'Lead farmer' concept was employed due to the shortage of extension personnel. MoAIWD developed the "Lead Farmer" based extension model, in which AEDOs are encouraged to select and partner with one lead farmer in each village. The idea is that these lead farmers would reduce AEDO workload by training other farmers in some of the technologies and topics for which AEDOs would otherwise be responsible. The advantage of this is that the farmer will learn from fellow farmer and hence the farmers feel comfortable in communicating. The disadvantage could be the lack of current literature and maybe insufficient content with the lead farmer. According to Churi et al, (2012), 'Farmer to farmer' approach has remained to be the one of the main methods despite the inadequate reliability of information and experience shared among them. Farmer to farmer communication is enhanced by information delivery through formal village and district meetings.

The history of the use of radio dates back to as early as in the 1880s' when pioneering radio broadcasting experiments started with a focus on informative and educational broadcasts (Manyozo, 2008). He also noted that by 1940s, the general approach towards farm and rural radio broadcasting relied on the dissemination of pre-packaged agricultural information to 'mass

and faceless' audiences that would be supplemented by radio forums (Manyozo, *ibid*) Radio is one of the common communication channels being used not only in Malawi but in Africa, and more specifically in rural areas. Chapota et al argue that the rationale of using radio in extension and advisory services emanates from an understanding that radio is an excellent, cost-effective means of sharing knowledge, building awareness, facilitating informed decision-making and supporting the adoption of new practices by small-scale farmers (FRI, 2007) The Malawi national population and household census report of 2008 indicates that nationally 64.1% of households own radios, up from 49.9% in 1998. Radio regularly reaches 70% of rural households; it is affordable, it is accessible to the illiterate, it can use local languages and it can give voice to end-users. Radio, in combination with new information communication technologies (ICTs), such as mobile phones, offers an inclusive, personable and multi-dimensional communication platform. However Chapota et (*ibid*) al notes that effective radio programs are best developed with and for farmers, this entails engaging farmers throughout the program.

Kanchewa (2013), conducted a study to find out farmers' perceptions and use of communication channels for accessing agricultural information and found out that radio was the most used channel. However, farmers mentioned print media as their preferred medium despite it not being readily available for them to access. Kanchewa argued that the use of a communication channel does not necessarily mean farmers prefer that channel, but in the absence of their preferred channel, they will use whatever is available.

Print media is another channel that farmers use in order to access agricultural information. The advantage of the newspaper is that a reader can keep it and refer to it after a period of time unlike a radio program, which, once aired, is gone unless recorded. The challenge with newspapers is that they are not accessible in the remotest areas like Bolero and requires someone who is literate to read and understand. Leaflets and posters are also used to disseminate deep rooted emerging issues that the farmers are facing. The leaflets and posters and brochures are used by both government and NGOs and they are written in both English and Chichewa. An example is magazine called: *Za achikumbi*, which contains both news articles and feature articles written in vernacular language by the Agricultural Communications Branch. (Kanchewa,ibid) From observation, signposts and bill boards are also used by government, NGOs and private companies to disseminate messages. For instance there is a sign post along the main road of Rumphi to Karonga which reads: 'Adopt Conservation Agriculture'.

Mobile phones are also becoming popular in the rural areas especially the low cost phones. There are now concerted efforts by government and NGOs to use the mobile phones to send agricultural messages on crop production through an initiative known as the *3-2-1* platform. However, its potential is constrained by limited high level of illiteracy in the case of SMS however this would be overcome by use of audio messages.

In a study which was investigating the role of communication in the Malawi Agriculture Sector Wide Approach Special Project (ASWAp) it was established that farmers use a variety of communication channels such as interpersonal, electronic and print media and that it does not

matter whether print, electronic and interpersonal communication is used as they all play a an important role in communicating agriculture programs (Ndilowe,2013) However this study seeks to establish what communication strategies are effective for farmers in Bolero.

The research is theoretically embedded in the Diffusion Innovation Theory (DOI) which explains how innovations are adopted by individuals and groups. The adoption of CSAs in this study is viewed as innovations which are diffused over various communication channels over a long period of time. Innovation can refer to the introduction of new goods or productive methods, or the opening of new markets and new sources of supplies or the creation of new organizations (Manrique et al.n.d). The DOI also provides insights to change agents' decision making process.

The DOI model stipulates that in order for an innovation to be adopted, there are some factors that need to be considered by the individual or group such as relative advantage, compatibility, complexity, triability and observability of the innovation. Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. Generally people like to try something new which has been proved to be better than their normal way of doing things. In order for the farmers in Bolero to adopt the CSAs they would want to know the advantages Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and media of potential adopters. *Complexity* is the degree to which an innovation is perceived as difficult to understand and use. *Triability* is the degree to which an innovation may be experimented with on a limited basis. *Observability* is the degree to which the results of an innovation are observable to others (Jebeile and Reeve, 2003). The figure below summarises the factors that contributes to the spread of innovations. Figure 2.1)

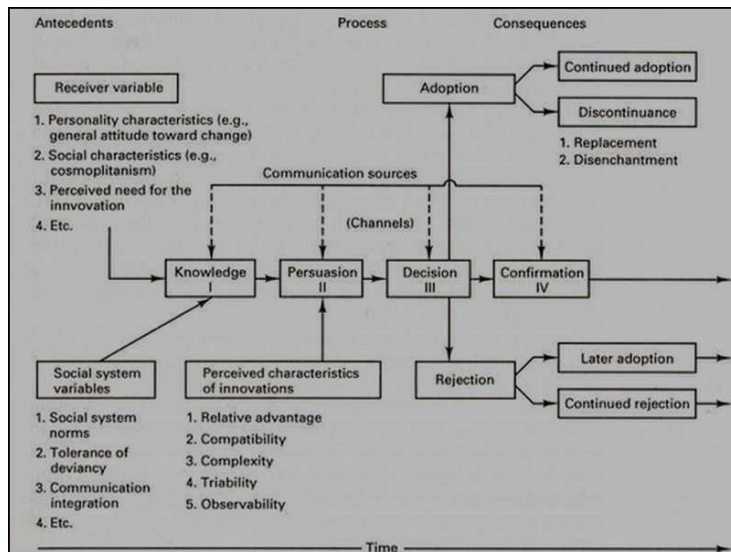


Figure 3.1 The diffusion of innovations model. (Source: Rogers (1995))

However for adoption of CSA to be effective, it is not only the five factors of relative advantage, compatibility, complexity, triability and observability, but the way the messages is communicated can either lead to adoption or no adoption. There also deep rooted issues of culture which may affect the adoption of a technology. In the developing countries, farmers sometimes become suspicious of the scientists, thus they sometimes take time to make a decision to adopt not because they have no resources but because they doubt whether the technology will yield results. These five factors of DOI would bring about transformation in Bolero community of practice through sharing knowledge and skills on CSAs. If the individual farmers would bring their experience after implementing CSAs, then their fellow farmers would learn and in the long term would lead to adoption of CSAs. There would also be need for the change agents to consider engaging the farmers so that they understand how the farmers perceive the technologies.

The second theory guiding this study is the uses and gratification theory. The approach, according to Rubin (2009) and Spurks (2006) in Kanchewa (2013), explains that media users

will seek and process information when they perceive that the information will be relevant and useful to them. In linking this theory to transformative engagement, most of the change agents do not conduct an audience research to find out the needs of the community because of power dynamics, they think that the community will use the information and change. But the community will use information which they think is relevant to their needs. Although the theory only looks at the relevance and usefulness of the information as criteria used by the users, education would also be one the factors that would affect utilisation of the information.

CHAPTER 3

METHODOLOGY

The study aimed to investigate whether the channels of communication influences the adoption of CSAs in Bolero (see appendix 1 for map). In order to achieve the study objectives, the researcher conducted both household questionnaires and in-depth interviews with key informants who play a crucial role in the provision of CSA information. The informants included personnel from Ministry of Agriculture, Total Land Care, Department of Land Resources and Conservation and Department of Forestry. The study also took a transformative approach of using focus group discussions with men and women separately in order to engage them and understand more from them. This chapter gives a detailed account of the process and procedure in participant selection, research design, instrumentation, data collection and data analysis procedures followed in this study.

3.1 Participants Selection

There were two groups of people that participated in the study: the smallholder farmers and key informants who comprised of government extension staff and NGO staff. The smallholder farmers were selected because they are the target for the extension services that are being provided in Bolero. Purposive sampling was used to identify Jalira section, which has low adoption of CSAs by farmers. From the section, three villages namely Kalonde, Zonde and

Nthumbatumba were purposively selected based on proximity (cost) and accessibility (rainy season). Homogeneity was considered in selection of these villages from which a total of 104 farm households were randomly sampled from a household list of farmers provided by the EPA. A total of 7 Key informants were purposively selected from institutions that are currently providing messages on CSAs namely the Department of Land Resources and Conservation, Department of Forestry, Total Land Care, District Communication Officer and Find Your Feet. The specific information collected from the key informants was on the CSA messages currently being communicated to farmers, channels used and challenges in communicating CSA information.

3.2 Research Design

The study was a cross sectional study that employed both quantitative and qualitative data collection methods. Quantitative data was obtained from the household interviews conducted using semi structured questionnaires. Qualitative data was collected from the key informant interviews as well as two focus group discussions held with men and another with women to understand their views and attitude towards CSA information. Both methods were used to establish statistical reliability as well as overcome biases associated with both qualitative and quantitative methods.

The study had four main research questions: *What are the current communication channels for disseminating CSA technologies in Bolero EPA? Does the communication channel influence adoption of CSAs? What are farmers preferred communication channels? and What is the role of communications in community transformative engagement?.* Based on these questions, a number

of variables were collected that included education levels, gender and socio economic characteristics, knowledge of CSA, accessibility of CSA information and their preferred communication channels.

3.3 Data collection tools

The researcher designed questionnaires for the household surveys with farmers, a check list for the focus group discussions and a guide for key informant interviews. The questionnaire for the household survey was reviewed through a pre-test to check for flow and some of the questions had to be rephrased as a result of the field test. The questionnaire had both open and closed questions. The instruments that were used for the farmers is attached in appendix 2 and the key informants tool is attached in appendix 3, the focus group check list is attached in appendix 4.

3.4 Field Testing

In order to test for feasibility, the researcher conducted a pre-field visit to Bolero EPA and interviewed 10 farmers and 1 extension officer. This helped in making adjustments to the questionnaire and to ascertain how much time it would take to complete one questionnaire.

3.5 Data Collection

Household surveys were conducted with 104 farm households using a semi structured questionnaire. The information collected from the farmers included socio economic characteristics such as sex, wealth, status, age, experience in farming, climate change smart

agriculture technologies being practised, accessibility and availability of climate smart agriculture technologies, and communication channels being used in Bolero.

Key informant interviews and focus group discussions (one with women and another with men) were done to seek views on what communication channels are used to disseminate climate change related technologies and what channels are considered effective for technology adoption. The researcher used a digital recorder to record the discussions and prior to recording, the researcher asked for consent.

3.6 Data Analysis

The household survey from farmers was entered in the Statistical Package for Social Sciences (SPSS) version 16.0. Descriptive statistics such as frequencies and percentages were generated for several variables.

Qualitative data was transcribed to English, typed using Microsoft word and categorized using common themes.

3.7 Study limitations

The language used in Bolero is Tumbuka, and so it was difficult to understand some aspects of the language where a respondent could not speak in Chichewa. However, this was overcome by use of an interpreter. Another limitation of the study was cost which limited the study scope to 1 section.

CHAPTER 4

RESULTS

This chapter gives the results of the study based on data collected and analysed. The purpose of the study was to investigate whether or not channels of communication influences the adoption of CSAs in Bolero EPA. Results from this study will inform agricultural research, extension officers and change agents on how they develop their communication strategies based on farmers' needs and to use appropriate communication channels that are available and accessible to farmers in Bolero.

4.1 Characteristics of the farming households in our survey

The study households were mostly male headed with a mean household size of 5.5. Most Participants in the study were of middle age (mean age 45 years). The majority of the respondents were heads of household (83.7%) had gone to primary or secondary (38.5%) as the highest level of education attained. The majority were farmers (97.1%) who had been farming for a mean period of 18 years. There was fair representation of gender 54% men and 46% women (Table 4.1)

Table 4.1: Socio-demographic characteristics of study participants

	Frequency	Percent
Sex		
<i>Male</i>	56	53.8
<i>Female</i>	48	46.2
Head of Household	87	83.7
Mean Household size	5.5	
Highest level of education		

<i>Secondary</i>	40	38.5
<i>Primary</i>	61	58.7
<i>Adult literacy</i>	1	1
<i>Never attended</i>	2	1.9
Mean landholding size	1.8	
Sources of Income		
<i>Farming</i>	101	97.1
<i>Remittances/gifts</i>	3	2.9
Mean # of years of farming	18	

4.2 Farming activities

The main crops grown were maize, tobacco and groundnuts in that order but beans were also grown. The mean land holding size was 1.8 acres. About 26% of the respondents were members of a cooperative and were reported to benefit from the cooperative through learning about farming practices focused on improved agricultural practices. Most of the cooperatives were affiliated to tobacco companies. The other benefits were access to farm inputs, loans and marketing. The respondents primary source of income is farming , most of the farmers earned within a range from a minimum of K10,000 to 165,000, with most of the people falling within the range of K70,000 to K90,000.00.

4.3 Household Asset Ownership

The respondents were also asked to list the assets owned in terms of what asset and quantity. In terms of the farming equipment, hoes were widely owned by the respondents (94.2%, this was followed by bicycles (67.3%), iron roof houses (59%), oxcart (18%) and ploughs 12%).

In terms of communication devices 70.3% of the respondents indicated to have owned a mobile phone, this was followed by radio (62.5%) and television 13.5%. Ownership of communication

channels by gender indicated that most of the communication devices are owned by husbands (52%) and mostly use the devices on a daily basis.

Table 4.2: Ownership of household assets

Ownership		
Asset	Frequency	%
Bicycle	69	67.3
Oxcart	18	17.3
Radio	65	62.5
Plough	12	11.5
Television	14	13.5
Mobile Phone	73	70.3
Hoes	98	94.2
Iron roof houses	59	56.7

4.4 Awareness of Climate Smart Agriculture

Climate Smart Agriculture Technology is not a single specific technology or practice that can be universally applied. It is an approach that requires specific assessment to identify suitable agricultural technologies and practices. The approach addresses complex interrelated challenges of food security, development and climate change. The approach also identifies barriers to adoption especially among farmers (FAO, 2013).

Almost all the respondents (98. %) have heard of CSAs while 2 % have not heard of CSAs. The major source of information on CSAs is extension worker (69.2%) followed by radio (17.3%), lead farmers, NGOs and Information Education Communication materials (IECs) were also cited as other sources of CSA information. The most common technologies known by respondents were Conservation agriculture, agroforestry and irrigation in that order.

Most of the respondents were aware of the organisations providing CSAs (60%) and 40% were not aware of the organisations providing CSAs. It was noted that government was the provider of CSA technologies (33.7%) This was followed by Total Land Care (12.5%), National Smallholder Association of Malawi (Nasfam) (5.8%), Cadecom (5.8%) and JTI and Fair Seed bank (Find Your Feet project) were also mentioned as organisations that have been providing information on CSAs. The common type of information offered by these organisations were agroforestry (24.2%) and conservation agriculture 24.1% and other types of CSA information were crop diversification and making energy saving charcoal burners. It was learnt from key informants that although farmers know how to plant trees, they lack knowledge in how to manage the trees, this affects the survival of the trees. It was also noted that some tobacco companies choose to implement tree planting on their own.

4.5 Available communication channels in Bolero

The extension worker is most commonly used and preferred communication channel, although lead farmers are the second mostly used by farmers, farmers prefer radio over lead farmers. The preference is mainly based on better understanding, accessibility and reliability of the channel. This reflects the true situation of the country, as the extension officers communicate useful information to farmers and farmers like to learn by example, thus the nature of extension service has emphasized face to face, farm meetings, demonstration plots and farmer field days.

Table : 4.5 Communication channels used and preference

Channels used	Frequency		Preference	
	(n=104)	%	Frequency	%
Extension Officer	58	55.8	72	69.2

Lead farmer	3	2.9	13	12.5
Radio	2	1.9	18	17.3
Others	41	39.4	1	1

4.6 Accessibility to Information on CSAs

The majority (61%) of the respondents have ever accessed information on CSAs to improve their farming and most of the information was sought through extension worker. It was noted that 39% of the respondents who do not have access to CSA information reported that they do not know where to get CSAs while a few did not appreciate the usefulness of CSA information (4.8%), about 1.0% could not relate with the language in which the information is packaged. The common specific messages on CSA information reported to be accessed by farmers were to do with how to plant trees (agroforestry) (41.3%) and tilling without a hoe, making compost manure (conservation agriculture) (31.7%)

Table 4.6 Access to CSA Information

	Frequency	Percent
Yes	72	69.2
No	32	30.8

4.7 Communication and Adoption of technology

90.4% of the respondents reported to have adopted at least one CSA and 9.6% have not adopted any type of CSA. The majority of the respondents are ready to take risk takers (63.7%) while 26.9% normally wait to see the results and only 5.8% normally doubt.

Table 4.7: Respondents reaction to new technologies

Interviewees response to new technologies	Frequency	Percent
I take the risk and practice what I have learnt	70	67.3
I normally wait to see others do and try later	28	26.9
I normally doubt	6	5.8

4.7.1 Reasons for adopting CSAs

The major reason for adopting CSA technologies was based on the following: cost benefit (61.5%), it has relative advantage as compared to traditional farming methods (19.2%) observability (8.7%) and the rest gave different reasons.

Table 4.8: Reasons for adopting CSAs

Interviewees responses	Frequency	Percent
It was being promoted on radio	3	2.9
It is not costly	64	61.5
It is better than the traditional method.	20	19.2
I observed the results of using the technology from fellow farmers	9	8.7
I just wanted to try out something ne	1	1.0
It is okay culturally	1	1.0
Others	6	5.8

4.7.2 Adoption of CSAs

The respondents were asked if they have adopted any CSA, 90% reported adoption of CSA and 10% reported that they have never done, the CSAs that were reported to be adopted were agroforestry, conservation agriculture and irrigation in terms of how they adopted the CSA

technologies, extension officers (58.7%) topped the list this was seconded by fellow farmers (24.0%) and the radio (13.5%) consistent with results on communication channels available.

Testing whether adoption of CSA is influenced by channel of communication

In order to measure the hypothesis whether mode of communication influences communication channel a test was done using chi square test to see if there is any association. (Table 4.9)

Table 4.9: Test of whether CSA is influenced by communication channel

		How did you adopt the technology				Total
		I heard from fellow farmer	I asked extension worker who helped me	I heard on the radio and the message helped me	N/A	
Have you adopted any CSA technology	Yes	24	57	13	0	94
	No	1	4	1	4	10

Table 4.10: Chi Square Test results of adoption of CSA and communication channel

	Chi-Square Tests		
	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	39.262 ^a	3	.000
Likelihood Ratio	20.712	3	.000
Linear-by-Linear Association	34.112	1	.000
N of Valid Cases	104		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is .38.

The Pearson chi square test indicates that there is no significant relationship between the communication channel and the adoption of CSA. The results showing no statistical significance is attributed to the limited scope of the study, as it was done in one section of Bolero EPA and also because the section is known to be among the areas with low adoption of CSAs.

4.7.3 Likelihood of adoption of technologies through various communication channels

The respondents were also asked to indicate their likelihood to adopt CSAs farmers if various channels were used. The extension worker emerged on top with (74.1%) indicating they would likely adopt, lead farmer was second (38.5%) newspaper (28.8%), radio 21.1% and leaflet 17.3%. With regard to newspapers, the results show that the farmers have the willingness to learn CSAs through newspapers but the newspapers are not widely accessible.

4.7.4 Farmers perception on channel of communication and adoption

Respondents were asked if they felt that the channel of communication influences adoption and results showed that almost half of the respondents (52.9%) agreed with the statement that mode of communication influences adoption with 44.2% mostly agreeing. In terms of what would characterise a good communication strategy, 49.0% of the respondents agreed that a good communication strategy is one that considers culture. Only a few respondents fully disagreed. The respondents were also asked whether it really mattered what type of communication channel is used to which 28.8% mostly agreed and 26.0% fully disagreed with the statement.

Finally the farmers were also asked whether organisations should consult farmers on communication channels before disseminating and 43.3% indicated they fully agree with the statement while 24.0% mostly disagreed and 15.4 somewhat disagreed. Those who disagreed did not know that they could also be consulted on their communication preferences, because for a long time they were accustomed to receiving information in whatever channel the organisations have decided for them. Some of the participants in the focus group discussion said

that they hold them as learned people so cannot be told what to do. The key informants were also asked whether they do engage the farmers when they want to promote technologies on different channels, most of the respondents said they do not consult do field visits, train the farmers, use the radio programs without asking them on issues of language, timing, type of radio station to be used, hence sometimes miss the targeted audience. This suggests the need for a transformative engagement of the community from research, planning and implementation of communication strategies in order to influence adoption of technologies.

4.8 Role of communications in community transformative engagement

It was also found from the focus group discussion that that communication plays a critical role in facilitating dialogue between the extension officers and communities. However it was noted most of the extension officers use downward communication. The extension officers said they do not normally ask what communication channel to use for CSA information; they use whatever channel they think is best for the farmer. A question was asked whether the extension should consult them which communication channel they should use for communicating CSAs, 52% of the respondents agreed that they need to be consulted while 48% did not agree. The results suggest a transformative approach when coming up with communication strategies. The participants were further asked why they prefer a certain communication channel most of the people said they prefer a channel that allows them to participate, ask and get feedback at the same time. It was also noted from the focus group discussion that the issue of language and culture also matters in transformative engagement, whereby if English is used in most of the print media, they are less likely to understand it. The participants also mentioned of conflicting messages in CSA as one of the challenges which affects adoption of technologies.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Available Communication Channels

The results have established that extension officers are the dominant channel often used for CSA technology dissemination based on their availability, immediate feedback and observability of the technology being promoted; the second most frequently used media channel are lead farmers followed by radio although radio was indicated as the second preferred channel after extension workers due to consistency and reliability. The results of the study are consistent with results of a recent study conducted by Mataya that identified extension officers as the most often used channel by farmers in Bolero (Mataya et al., 2013). However, this does not imply that it the most effective tool in disseminating CSAs because focus group discussions revealed challenges faced with extension officers such as inconsistency, unavailability of the extension officers. This collaborates with key informants who reported that Jalira section has not had an extension officer for the past two years. The problem of inadequate extension officers has been an issue of national concern. This calls for the need for government to recruit more extension officers in the study area.

With regard to communication devices, 70.3% of the respondents indicated to have owned a mobile phone, this was followed by radio (62.5%) and television 13.5%. The results on radio are consistent with the Malawi national population and household census report of 2008 which

indicated that nationally, 64.1% of households own radios, up from 49.9% in 1998. Radio regularly reaches 70% of rural households, it is affordable, accessible to the illiterate, can use local languages and can give voice to end-users. The results of the ownership of mobile phones show improvements in ownership when compared to the 2010 Malawi Demographic Health Survey findings which reported that a mobile phone was owned by about 32.3% of the population (NSO, 2011). The reasons could be reflect a change in technological advancement in the rural areas where the mobile phone is now becoming popular because it is portable and information comes to them instantly but could also be as a result of the availability of low cost mobile phones introduced by mobile phone operators in Malawi which have made the phone more accessible.

Ownership of communication channels by gender at household level indicated that most of the communication devices are owned by husbands (52%) who mostly use them on a daily basis. This is in agreement with a study by Nichol (2014) on gender and ICTs, that found gender disparities between men and women in that men listened to the radio more frequently than women. The reasons for this disparity were that women are busy with household chores and that, culturally the radio is perceived to be a masculine household object. In Bolero, women also said men have more time to listen to the radio and can take it anywhere they want.

The demographic characteristics results show that the majority the respondents had only attained primary education (58.7%). This could explain why the respondents prefer interpersonal communication over mass media because they would be able to ask the extension officer when

they do not understand an innovation. This could explain why newspapers were the least used channel.

In terms of awareness of CSAs, the results show that most of the respondents are aware of CSAs and have heard about CSAs. Agroforestry, conservation agriculture and irrigation were cited as the common CSAs practiced in the area. The results conform to the key informants on nature of farming practices in the area.

On the likelihood of adoption of technology using various channels, people were willing to adopt any method with use of any communication channel including newspapers although preference would still be for the extension officer. However the decision to adopt will depend on consistency in dissemination, language used, timeliness and relevance of the message. Kanchewa's study conducted in 2013 in Lilongwe also revealed that the farmers preferred print media for receiving agricultural information based on convenience as well as flexibility. This also augurs well with information collected from the district communication officer that they have inadequate print materials to share with farmers even though they know that there are farmers that can read the print.

5.2 Communication channel and influence on adoption of technologies

The farmers who had indicated they have adopted CSAs cited the extension staff, fellow farmers and radio as the causative agents that helped them adopt CSAs. The extension worker was dominant because the farmers explained that that the complexity of some of the technologies requires that that they understand more through interaction with extension officers and also by

observation. For example, through demonstrations, they are able to see the new technologies being promoted as compared with just listening to the radio. This implies that one communication channel is not adequate for farmers to adopt the technologies hence need to use various communication channels that would enhance the adoption of technologies.

With regard to whether communication channels influence the adoption of technologies, the results showed that 52.9% of the respondents fully agreed with the statement that channel of communication influences adoption while 44.2 mostly agreed and 2.9% somewhat agreed. This, however, does not mean that the channel in itself is the one that causes the farmer to adopt the technology as there are other factors that contribute to technology adoption. According to Chi (2002), factors that affect farmer adoption of technologies include access to technical training, meeting, oral transmission, trust on the technician and belief in the technology. It was also learnt from farmers that the lead farmers lack adequate knowledge on CSAs hence need training.

The communication channel alone cannot influence the adoption of technology but the way the message is communicated. For example technical messages on pit planting were reported to have been using different measurements of boxes by different organisations, thus this may confuse the farmer adoption of the technology. The focus group discussion also mentioned of the conflicting message on use of hybrid seed and local seed varieties. While government is promoting the use of hybrid seed because of the early maturity characteristics, Fair Seed Bank a project run by Find Your Feet is encouraging the farmers to plant local varieties. The aim of Find Your Feet is to preserve the indigenous species which can become extinct if not preserved. This augurs with Lucky's study that the extent to which the farmers develop depend upon their access to accurate

and reliable information. Lucky and Achebe (2012) stressed that the dissemination of farm information is as important as the development of technology itself. Kanchewa (2013) reiterated that adoption is a complex issue which involves many factors. While using an effective communication channel plays a crucial role, there other factors such as cultural, social and economic factors which must be considered.

5.3 Farmers preferences for adoption of CSA technology

The farmers were probed further in terms of what channel they would prefer for CSA information and they indicated the lead farmer, extension officer and radio in that order based on the proximity of the lead farmer. With regard to preferred communication channels, cross tabulations among gender groups were run to compare their preferred communication channel there was significant difference where women preferred lead farmers and men preferred extension officers. It was also noted that the women focus group discussion would like a female lead farmer because they thought that they could be more open with fellow woman while men on the other hand said they would prefer a female lead farmer because they thought the woman would be more committed to work than men.

5.4 Role of communications in community transformative engagement

The study revealed that the communities want to be consulted and involved in the communication strategy. The engagement of the community would enable them not to understand the technologies being promoted, but also to fully own the initiative beyond the lifespan of the project. Currently when an NGO implements a project on for example agro-

forestry and the project ends, only a few farmers continue to practice because they did not own the project.

The results also show that language and culture have an influence in community transformative engagement. Culture can also be a factor to influence change in a community or to retrogress development. Some of the women in the focus group discussion revealed that when it is a male lead farmer or extension officer, their husbands becomes suspicious but they said they have no choice since most of the extension officers are men, but given a chance they would prefer a female extension officer.

The study also shows that the coming in of ICTs such as radio and mobile phones open up more opportunities for scaling up transformative engagement approaches, as the radio gives a chance for wider access and participation of the community. The radio would also be one of the tools to empower the communities to hold the duty bearers accountable for their actions.

5.5 Contributions to theoretical perspectives

The results of the study have showed that the farmers' use of the extension officer is based on face to face and immediate feedback thus explaining one of the theory's factor of observability and relative advantage to other channels. The study has also shown that people prefer a communication channel that satisfies them by meeting their relevant needs, the farmers prefer extension officers based on the interaction and multiplier effects while radio was also preferred based on consistency and convenience and timeliness of the messages they get on the radio.

5.5 Limitations of the study

The major limitation of the study is that the researcher's first language is Chichewa and was very difficult to probe more from farmers in the focus group discussion.

Secondly the sample size cannot be generalized for the whole EPA, this was partly due to time and finance constraints.

Finally the results show that farmers would like to be consulted before deciding on which communication channel to use for CSA 43.3% indicated they fully agree with the statement that farmers should consult while 24.0% mostly disagreed and 15.4 somewhat disagreed. This demonstrates that the farmers would like the communication strategy be designed in a participatory manner and this calls for a transformative bottom to top approach in devising communication strategy. This would entail conducting an audience research before disseminating CSA information on a channel that will not be used by the farmers.

5.6 Implications for future research

Further research could be conducted to study the association of adoption and communication channels in a larger area, since this study only focused in one section; more documentation is needed on adoption levels of CSAs as there were no statistics readily available at the time of study, with the increasing ownership of radio and mobile phones, a study could be conducted explore the role of radio to empower the communities to hold the duty bearers accountable in implementation of climate change policy. With a growing number of people having access to

mobile phones, a study could be done to explore the role of mobile phone for communicating Climate information such as weather or early warning systems

5.7 Conclusion

The study findings should inform the change agents, agricultural communication officers, NGOs and government of the need to do research based communication strategies, as there are so many factors that need to be taken into consideration for the community to adopt the technologies. The power dynamics at local level also have to be taken into consideration, the local district authorities such as traditional chief are very key to influencing change among farmers. In order for the communities to adopt the technologies, sometimes it requires the local authorities. The Uses and gratification theory stipulates that people will use information if they see it is it is relevant for them, so even if the change agent may have the power to over the community, the consumption of the information will still depend on several factors such as relevance, timeliness and consistency. The current way of communicating message still puts the farmer as a receiver of information and this needs change so that both the farmers and change agents are engaged in a dialogue so that knowledge is generated and shared. If the messages are well designed, timely, consistent, relevant and in a language best understood by the farmers, there is a high likelihood of adoption of any technology including CSA. A strong coordination among stakeholders efforts will also prevent confusion among farmers. In view of the challenges currently being faced by extension staff such as the lack of resources to reach more farmers, a combination of extension officers, lead farmers, radio can increase the participation of the farmers and influence farmer adoption of technologies as well lead to improved farming practices and adaptive capacity to climate change among farmers. Transformation cannot happen without their participation, and their participation also has to be active participation, because most of the times the voices are not

heard because they are perceived to be uneducated and yet they have rich indigenous knowledge which can be shared with the change agents.

Based on the major findings, the following recommendations are made:

- i. The need for change agents to develop participatory communication strategies which engages the community to define their own priorities and provide possible solutions to the problems they are facing. This would also allow the community to select what communication channel is relevant to them and this would promote adoption of the technologies.
- ii. There is need for change agents take full advantage of the using innovative advisory and extension services such as radios and mobile phones as this would enhance the reach of CSA messages beyond areas where the extension officer cannot reach. The radio would give the opportunity for the communities to listen to CSA radio programs, discuss and learn, generating new knowledge and ultimately implement the CSAs. Mobile phones could also be used to send and receive CSA information
- iii. Coordination and harmonization of messages on CSAs by stakeholders is important to avoid confusing farmers regarding the new technologies
- iv. Gender mainstreaming in the programs is also crucial. Based on the results from the study, women said they would prefer female lead farmers because their husbands become less suspicious and so that they can express their opinion freely due to cultural barriers.

CHAPTER 6

6.1 REFERENCES

Adebayo, K. (1997) *Communication in Agriculture*, Greenlinks International Abeokuta, Nigeria
102p

Age, A.I. (2012) *Communication for Sustainable Rural and Agricultural Development in Benue State*, Nigeria Sustainable Agricultural Research, No 1 February 2012, Canadian Centre for Science and Education available at www.ccsenet.org/sar

Agwu, E.A., Adeniran, A.A. (2009) *Sources of Agricultural Information Used by Arable Crop Farmers in Isale Osun Farm Settlement*, Osogbo, Local Government Area of Osun State. *Journal of Agricultural Extension* Vol 13 (1)

Bandiera, O., & Rasul, I. (2006). "Social networks and technology adoption in northern Mozambique." *The Economic Journal*, 116(514), 869-902.

Boykoff, M.T., and Roberts, J.T. (2007) *Media Coverage of Climate Change: Current Trends, Strengths and Weaknesses*. United Nations Development Program Human Development Report Office Occasional paper, Oxford University Centre for the Environment.

Chapota, R., Mthinda, C., and Fatch, P. (2014). *The Role of Radio in Agricultural Extension and Advisory Services – Experiences and Lessons from Farm Radio Programming in Malawi – MEAS Case Study # 8*. Michigan State University. USA

Chi, N.T.C., Yamada, R. (2002) *Farmers affecting farmers' adoption of technologies in farming system: A Case study in Omon District Can Tho Province, Mekong Delta, Vietnam*

Churi, A.J, Mlozi, M.R.S., Tumbo, D., Casmir, R. (2012) Understanding Farmers Information Communication Strategies for Managing Climate Risks in Rural Semi-Arid Areas, Tanzania. *International Journal of Information and Communication Technology Research* 2 (11),838-845
<http://www.esjournals.org>

Conley, T. and C. Udry (2010). “Learning about a New Technology.” *American Economic Review*,100(1), pp 35-69

Farm Radio International. (2007). Proposal submitted to Bill and Melinda Gates Foundation on the African Farm Radio Research Initiative. Ottawa. Canada

Farm Radio International. (2010). The Effect of Participatory Radio Campaigns on Agricultural Improvement Uptake: a Preliminary Case Study Initiative

Food and Agriculture Organisation of the United Nations (2013) Climate Smart Agriculture Source Book available at www.fao.org accessed on 12th April 2015

Food and Agriculture Organisation of the United Nations (2015) Climate Smart Agriculture. Available online at <http://www.fao.org/climate-smart-agriculture/en/> accessed on 12th April 2015

Foster, Andrew and Mark Rosenzweig (1995). “Learning by Doing and Learning from Others: Human Capital and Technical Change in Agriculture”. *Journal of Political Economy* 103(6), pp. 1176-1209.

Gauthier, J. (2005). *Popularize, produce and disseminate*¹², Radio Ottawa: International Development Research Centre (IDRC), Canada.

Government of Malawi. (2000). *Agricultural Extension in the New Millennium: Towards Pluralistic and Demand-driven Services in Malawi - Policy Document*. Department of Agricultural Extension Services, Ministry of Agriculture, Irrigation and Water Development, Lilongwe, Malawi.

Government of Malawi (2009). *Ministry of Agriculture and Food Security Annual report*.

Government of Malawi (2011) *Malawi Agriculture Sector Wide Approach (ASWAp) Malawi's – A prioritised and harmonised Agricultural Development Agenda*, Ministry of Agriculture and Food Security, Lilongwe

Grilliches, Zvi (1957). *Hybrid Corn: An Exploration in the Economics of Technical Change*. *Econometrica* 25(4), pp. 501-522.

Hall, S (1973) *Encoding and Decoding in the Television discourse*, Birmingham, England, Centre for Cultural Studies, University of Birmingham

Jebeile, S. and Reeve, R. (2003) “*The diffusion of e-learning innovations in an Australian secondary college: strategies and tactics for educational leaders*”. in *The Innovation Journal*. Vol. 8 (4), 2003

Jumbe, L.B.C, Wiyo, A.K, Njewa, E., and Msiska, F.B.M. (2008) *The role of government, donors, civil society and the private sector in climate change adaptation in Malawi:*

Scoping Study. Discussion Paper. Centre for Agricultural Research and Development, Bunda College, Lilongwe, Malawi.

Kabuye, E. S., and Mhango, J. A. (2006). *A brief history of agricultural extension services in Malawi from 1948 to 2000*. An outline of the organization, policies, systems and methodologies. Agricultural Communications Branch.

Kanchewa, M.F. (2013) *Agricultural Information Perceptions and Behaviours of Smallholder farmers in the Central Region of Malawi*. Unpublished MSc, West Lafayette, Indiana.

Purdue University.

Khonje, Z. (2011) *Participatory Communication and the Public Sphere: The case of Climate Change Communication*. MSc, School of International Development of University of Anglia

Lucky, A.T, and Achebe, N.E.E (2013) *Information Communication Technology and Agricultural Research (IAR)* Ahmadu Bello University, Zaria, Kaduna State, *Research Journal of Information Technology* 5(1) 11-17-13 ISSN:2041-3106;e-ISSN:2041-3114,Department of Library Information Science, Ahmadu Bello University,Zaria,Kaduna State,Nigeria

Manyozo, L. (2008). *Communicating with Radio: What do we know, findings from a review of selected rural radio effectiveness evaluations*. Farm Radio International

Mare,A. (2011) *Climate Change Media and Mediatization: Towards Climate and Environmental Journalism*.Afrika Adapt Symposium,Addis Ababa,Ethiopia,9-11th March 2011.

Masangano, C., and Mthinda, C. (2012). *Pluralistic Extension System in Malawi*. The International Food Policy Research Institute (IFPRI): Eastern and Southern Africa Regional Office. IFPRI Discussion Paper 01171

Munshi, Kaivan (2004). "Social learning in a heterogeneous population: Technology diffusion in the Indian Green Revolution." *Journal of Development Economics*, 73(1), pp 185-215.

National Statistical Office, (2008). 2008 Housing and Population Census report. Zomba, Malawi: NSO

National Statistical Office, (2010) Malawi Demographic and Health Survey 2010. pp 22. Calverton, Maryland, USA: NSO and ICF MACRO

Manrique, E., Marcen. F., Maza, M.T., and Olaizola, A. (n.d) *Commercial strategies and horizontal diffusion of innovations in a sheep farming co-operative enterprise: the case of "Carne-Aragón"*. Accessed online (on 29th January 2015) from: <http://ressources.ciheam.org/om/pdf/a38/99600143.pdf>

Mandala, O.S. (2015) Vulnerabilities, adaptive capacity and climate resilience, *Daily Times*, Lilongwe Accessed on 26th January 2015

Mare, A. (2011) Climate Change Media and Mediatisation: Towards Climate and Environmental Journalism. Afrika Adapt Symposium, Addis Ababa, Ethiopia, 9-11th March 2011.

Mataya, B., Tembo, M.D., Kasulo, V. and Singini, W. (2013) *A Socio- Economic Environmental Survey on Community of Practice Profiling in Bolero Extension Planning Area, Rumphi District*

Malawi. Transformative Engagement Network Project Household Survey Report, Unpublished
Mzuzu University, Mzuzu, Malawi.

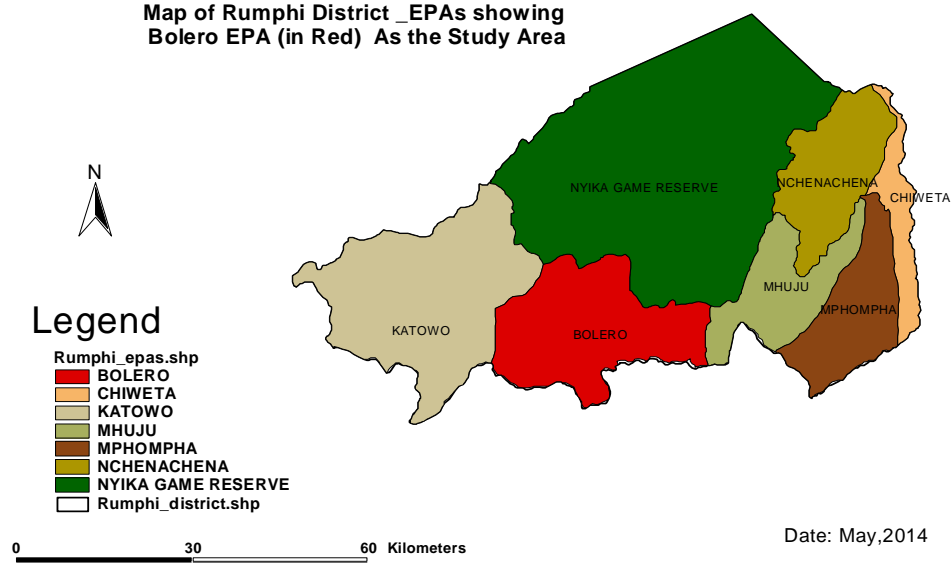
Nichol, R. (in press) *Gender and Access to ICTs: The case of IRI Maziko Project at Farm Radio Trust, Malawi*, Farm Radio Trust, Lilongwe.

Ofuokor, A. U. (2012) *Influence of Extension Agents' and Farmers' Communication Factors on the effectiveness Poultry Technology messages* (2010) Department of Agricultural Economics and Extension, Delta State University, Asaba campus, Asaba, Delta state, Nigeria in *Tropical Agricultural Research and Extension* Vol 15(1)

6.2 APPENDICES

6.2.1 APPENDIX 1: Map of Bolero EPA

Map of Rumphi District _EPAs showing Bolero EPA (in Red) As the Study Area



6.2.2 APPENDIX 2: Questionnaire for household survey

Investigating the influence of communication channels on farmer adoption of Climate Smart Technologies in Bolero EPA, Rumphu

Guidance for introducing yourself and the purpose of the interview

- My name is Pauline Kalumikiza Mbukwa and I am a Master's Student at Mzuzu University.
- Your household has been selected by chance from all households in the area for this interview. The purpose of this interview is to understand the communication strategies for disseminating climate smart agricultural technologies (CSAs)
- The survey is voluntary and the information that you give will be confidential. The information will be used to prepare reports, but will not include any specific names.
- Could you please spare some time (around 45 minutes) for the interview? Consent given

SECTION A: DEMOGRAPHIC INFORMATION

Name of Respondent: _____

Name of the Village: _____

Name of Section: _____

Sex: 1=Male 2=Female

Age: _____

Marital Status : 1=Single 2=Married 3= Divorced 4=Separated 5=Widowed
6=Others

Are you head of Household: 1=Yes 2=No

How many members are in your family: _____

What is the language you use for communication?.....

SECTION B: SOCIO ECONOMIC CHARACTERISTICS

1. What is the highest level of education you have completed?

1=University 2=Secondary school 3=Primary School 4=Adult literacy
5=Never attended school

2. What is your primary source of income?

1=Farming 2=Business 3=Formal Employment 4=Casual labour
 5=Gift/Amenities Other

3. If it is farming, how many years have you been farming.....

4. What crops do you grow?.....

5. How much money do you earn from farming on average annually?

6. How many hectares of land do you have for farming?.....

7. Are you a member of any group/cooperative? 1=Yes 2=No

8. What activities do you do in that group?.....

9. How often does the group meet?.....

1= Daily Once a week 2=Once a month 3=Once a year 4=Twice a week
 5=Twice a month 6=twice a year

10. When someone is wealthy in your community, what does he or she have?

11. a) In the table below indicate the household assets you own

Item	Number owned	Item	Number owned
Bicycle		Radio	
Ox-cart		Television	
Plough/Ridger		Mobile Phone	
Iron roof house		Hoe	

11 b) If Other please specify.....

12. Who owns or controls the communication devices (radio, TV and mobile phone)

1=Husband 2=Wife 3.=Both 4=Others

13. How often do you use the communication devise?

- a) Radio: 1=Daily 2=Weekly 3=Monthly 4=Rarely 5= Never
- b) TV: 1=Daily 2=Weekly 3=Monthly 4=Rarely 5= Never
- c) Mobile phone: 1=Daily 2=Weekly 3=Monthly 4=Rarely 5= Never
- d) Newspaper: 1=Daily 2=Weekly 3=Monthly 4=Rarely 5= Never

SECTION C: KNOWLEDGE OF CLIMATE SMART AGRICULTURE TECHNOLOGIES

14. Do you know or have you heard of CSAs?
1=Yes 2=No
15. If yes, can you mention the technologies?.....
.....
.....
16. If No, why not when this is one of the areas well known for CSAs
.....
.....
17. How did you know about the technologies?
1=Extension Worker 2=Lead Farmer 3=Radio 4=Television 5=NGOs
6=Posters 7=Others
18. What CSAs are being promoted in your area?
1=Conservation Agriculture 2=Agroforestry 3=Compost Manure
4=Marker Ridges 5=Integrated Soil Fertility Management
6=Water harvesting 7=Growing of leguminous trees/crops
8=Others
19. Are you aware of any organizations or institutions that are providing CSAs?
1=Yes 2=No
20. If yes list the organizations/institutions and the specific information on CSAs that they provide

Organization	Type of information offered	Channel used

SECTION D: AVAILABLE COMMUNICATION CHANNELS

21. How do you receive or get CSA information in your area?
1= Extension worker 2=Radio 3=Newspapers 4= Television
5=Lead farmers 6=own traditional knowledge/ experience

7=Community meetings 8= NGOs

22. What communication channel do you use often to access CSA information?

1=Extension Officer 2=Lead Farmer 3=Radio

4=Newspaper 5=Mobile Phone 6=Others

23. Why do you often use the channel mentioned above?

1=I understand more if it is face to face 2= It is affordable

3=It is always accessible 4= It is a reliable channel

5= It uses my language 6=It allows me to participate

7= I get to see the actual technologies being promoted

24. Which communication channel do you find most reliable and why?

.....

25. Given the opportunity what would be your preferred communication channel for learning CSAs?

.....

26. Why would you prefer that communication channel?

.....

SECTION E: ACCESSIBILITY OF CLIMATE SMART AGRICULTURE TECHNOLOGIES

27. Have you sought any CSA information in the last six months?

1= Yes 2=No

28. If you accessed, why ?

1= I just came across the information 2= To know what type of seed to plant

3=To improve in my farming 4=To address the effects of climate change

5=Others Specify.....

29. How did you access CSA information?.....
.....

30. What specific messages did you get on CSA technologies

.....

31. If you have not sought CSA information why not?

1=I don't know where to get it

2= The information is not relevant to my village

- 3= The information is not in my own language, so I don't understand it
- 4= I do not need Climate Smart Agriculture information
- 5= I don't think Climate Smart Agriculture can be useful for me
- 6=Others specify.....

SECTION F: ADOPTION OF CLIMATE SMART AGRICULTURAL TECHNOLOGIES AND COMMUNICATION CHANNELS

32. When new technologies come what do you do?
 1=I take a risk go and practice what Im learn 2= I normally wait to see others first 3= I doubt about the technology 4=Others specify.....
33. Have you adopted any of the climate smart agricultural technologies?
 1=Yes 2=No
34. What climate smart agriculture technology did you adopt?
 1=Conservation Agriculture
 2=Agroforestry
 3=Compost Manure
 4=Marker Ridges
 5=Integrated Soil Fertility Management
 6=Water harvesting
 7=Growing of leguminous trees/crops
 8=Others
35. If yes why did you adopt the technology?
 1=It was being promoted on radio
 2=Cost benefit
 2=it is better than the traditional method (relative advantage)
 3=I observed the results of using the technology from fellow farmer (Observability)
 4=I just wanted to try out something new (Triability)
 5= It is okey culturally
 6=Others
36. If not why have you not adopted?
 1=I did not understand, because of the way it was communicated (Complexity)
 2=I do not have capital/resources
 3=It is against my culture
 4=It cannot be done in my area due the geographical area
 5=It requires too much effort and labour
37. If yes, how did you adopt the technology?

1= I heard from fellow farmer 2= I asked Extension worker who helped me to implement the technology 3= I heard on the radio and the message helped me to implement 4= I read about the technology in the Newspaper 5= I watched the Television how the technology is done

38. If the following communication channels are to be used for CSAs indicate the likeliness of adopting a technology

a)Extension worker:

1=Somewhat likely to adopt 2= Likely to adopt 3=Neutral 4=Most likely to adopt Most definitely adopt

b)Lead Farmer :

1=Somewhat likely to adopt 2= Likely to adopt 3=Neutral 4. Most likely to adopt Most Definitely adopt

c) Radio

1=Somewhat likely to adopt 2= Likely to adopt 3=Neutral 4. Most likely to adopt Most Definitely adopt

d) Newspaper

1=Somewhat likely to adopt 2= Likely to adopt 3=Neutral 4. Most likely to adopt Most Definitely adopt

e) Leaflets

1=Somewhat likely to adopt 2= Likely to adopt 3=Neutral 4. Most likely to adopt Most Definitely adopt

39. Please indicate your level of agreement with following statement

- a) The mode of communication channel used can influence me to adopt climate smart agriculture technology: 1=Fully disagree 2=Mostly disagree 3=Somewhat disagree 4 =Neural 5= Somewhat agree 6= Mostly agree 7=Fully agree
- b) The best communication channel is that which takes into consideration of culture diversity: 1=Fully disagree 2=Mostly disagree 3=Somewhat disagree 4= Neural 5= Somewhat agree 6= Mostly agree 7=Fully agree
- c) It does not matter what communication channel is used for CSA information
1=Fully disagree 2=Mostly disagree 3=Somewhat disagree 4=Neural 5=Somewhat agree 6=Mostly agree 7=Fully agree
- d) In order for adoption to take place, organisations should consult us first on what communication channel works well: 1=Fully disagree 2=Mostly disagree 3=Somewhat disagree 4=Neural 5= Somewhat agree 6 =Mostly agree 7=Fully agree

Investigating the influence of communication channels on farmers adoption of Climate Smart technologies in Bolero Extension Planning Area, Rumphi

Guide to Key Informant Interview

- My name is _____ and I am a Masters Student at Mzuzu University
- You have been selected purposively to participate in this interview. The purpose of this interview is to understand the communication strategies for disseminating climate smart agricultural technologies (CSAs)
- The survey is voluntary and the information that you give will be confidential. The information will be used to prepare reports, but will not include any specific names. There will be no way to identify that you gave this information.
- Could you please spare some time (around 45 minutes) for the interview? Consent given

Discussion Topic	Key Concepts to be Explored	Guide Questions
1. Provision of climate smart agriculture information	a) Type of CSA Information provided b) Experience of provision of CSA c) Gender and CSAs	<ul style="list-style-type: none"> • Do you provide extension services? • Are you able to reach the target? • Do you provide CSA technologies information in your area • What has been your experience working in communicating CSAs • What specific climate smart agricultural technologies are you promoting? • What communication channels are you using to disseminate the information • Are CSAs gender friendly? • In terms of participation who is actively practising CSAs between men and women
2. Adoption	d) Linkage of communication channel and adoption of CSA	How do you get feedback from the farmers on the messages you disseminate? <ul style="list-style-type: none"> • Do you consult with the farmers on which communication channel they prefer?

Discussion Topic	Key Concepts to be Explored	Guide Questions
		<ul style="list-style-type: none"> • Does the preferred channel promote increased adoption? • What is the rate of adoption of CSA technologies, how many are aware and are practising and how many aware but are not practising?(Rate: number and period of practice) • How do you ensure quality of the information when disseminating CSA information?
3. Coordination	e) Linking Stakeholders working in CSA	<ul style="list-style-type: none"> • Who else/which other institutions are providing CSA information in this area? • How do you coordinate with the organisations mentioned?
4. Recommendation	f) Areas for improvement in order to encourage enhancement of adoption of CSA	<ul style="list-style-type: none"> • What do you think are the main challenges in communicating CSA technologies to farmers? • What do you think needs be done in order to improve the farmers' adoption of CSA technologies?

6.2.4 APPENDIX 4: Checklist for focus group discussions

Investigating the influence of communication channels on farmers' adoption of climate smart agriculture technologies in Bolero EPA in Rumphi

- My name is _____ and I am a Masters Student at Mzuzu University
- You have been selected purposively to participate in this interview. The purpose of this interview is to understand the communication strategies for disseminating climate smart agricultural technologies (CSAs)
- The survey is voluntary and the information that you give will be confidential. The information will be used to prepare reports, but will not include any specific names. There will be no way to identify that you gave this information.
- Could you please spare some time (around 45 minutes) for the interview? Consent given

1. What do you say of the rains this year?
2. Do you know/have you heard anything on Climate Smart Agriculture?
3. What Climate Smart Agriculture Technologies are being practiced?
4. How do you access CSA technologies information?
5. What communication channels are available in your area?
6. Which one do most of people prefer and why?
7. What do you think about language in communication?
8. Does gender have any effect on communication for example if it is a man communicating /or if it is woman communicating?
9. Does the communication come at the right time when you need it?
10. How is feedback given to the sender?
11. How have the CSA messages enabled you to consider adopt the technologies or not?
12. What do you think are the limitations to adoption of CSAs
13. Do you consider communication channel as something that can influence you to adopt or not adopt CSA technology
14. What should be done in order to ensure that the information is effective CSA and improved adoption?