FARMERS' USE OF AGRICULTURAL EXTENSION COMMUNICATION CHANNELS FOR RECEIVING FARM MANAGEMENT INFORMATION IN POLOKWANE LOCAL MUNICIPALITY, LIMPOPO PROVINCE

by

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DECLARATION

I Nelly Nokuthula Mahlangu declare that dissertation hereby submitted to the University of Limpopo for the degree Masters of Agricultural extension has not been previously submitted at any University before.

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Supervisor: Prof D.B Afful Date

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Date

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DEDICATION

I dedicate this work to my mother Teko Christinah Mahlangu.

LIST OF ACRONYMS

ACRONYM	NAME
AFRRI	African Farm Radio Research Initiative
FAO	Food and Agricultural Organisation
GIZ	Geselechaft international Zusamennibeit
LDARD	Limpopo Department of Agriculture and Rural Development
MPA	Mpumalanga Department of Agriculture
STATSA	Statistics South Africa
SMCR	Sender-Message-Channel-Receiver
SPSS	Statistical Package for the Social Sciences
TV	Television

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ABSTRACT

This study was designed to examine the perceptions of subsistence farmers about the use of the extension communication channels to receive farm management information including climate variability in relation to their innovation decision process. A survey approach was used in this study and by means of stratified sampling, 85 farmers were selected from 372 respondents from Mankweng and 251 from Tshebela service centres in Polokwane Local Municipality for interviews considering gender and their proportions in each service centre. Data were collected from individual respondents by means of personal interviews using a semi-structured questionnaire. The questionnaire was tested among similar farmers in a village near the University of Limpopo. The data were subjected to both descriptive and inferential analyses using the Statistical Package for the Social Sciences (SPSS) programme.

The findings around the research questions and the hypothesis test showed that all respondents received farm management information including climate variability through all 10 communication channels investigated. Furthermore, it was indicated that group discussion was the only channel through which most respondents received information most of the time. The study findings also revealed that of all the channels investigated, slightly more than half of the respondents preferred group discussions and of those who preferred group discussions, almost half of them preferred it as the first choice.

The hypothesis test further showed that the farmer characteristics that positively influence farmers' use of group communication channels were farming experience, farmer association membership and affordability group channels. In other words, a farmer who has more farming experience and belongs to a farmers' association is more likely to choose group channels for receiving farm management information including climate variability. The hypothesis test also indicated that the strongest predictor of reporting preference of group channels of communication channels was seeking innovation for a farm management problem in relation to climate variability.

Finally, the study found that time was the most serious constraint farmers face in assessing or receiving farm management information including climate variability.

In view of the fact that most respondents will have group discussions as their first choice, the use of this channel should be timed to allow respondents to attend. Extension agents therefore, have to discuss the timing of such meetings with participants to arrive at times suitable to most participants. Extension agents also need to realise that a subsistence farmer who is looking for information for a farm management problem including climate variability is more likely to seek it through the television.

Keywords: Perception, extension, group discussion, climate, variability, farm, management, innovation, channel, communication.

CONTENTS

CHAPTER 1

INTRODUCTION

1.1 MOTIVATION AND BACKGROUND

There have been extensive discussions on the controversy regarding extension impact on productivity gains and the methodological problems associated with these impacts (Feder & Slade, 1986). Despite methodological challenges, the positive impact of agricultural extension on agricultural output is generally acknowledged (Anderson, 2007). Improved yields have potential contribution towards farmers' food security (Irz, Thirtle & Wiggins, 2001). The importance of extension in change and as a change agency has also been ascertained.

The extension organisation achieves this purpose by means of communication, which can simply be defined as the process of sending and receiving messages through channels in order to establish common meanings between a sender and a receiver. In this study, effective communication only occurs if the receiver understands the exact information or idea that the sender intended to transmit. Khoshnodifar et al., (2016) show a positive link between channels used in communication and effectiveness of communication.

The myriad of reasons why farmers do not receive farm management information therefore includes the appropriateness of the channels used by the extension agent in relation to the type of farmer to be reached. It is important to take into consideration the appropriateness of communication channels used in extension work, because it might be one of the reasons why farmers do not receive farm management information. Research into this problem of appropriate communication channel for smallholder producers, who have different circumstances from commercial farmers, is needed for effective communication. This is important because of the body of evidence that advantageous innovations and the obvious benefits of new ideas do not 'sell' themselves (Rogers, 1995). With the appropriate communications channels through which subsistence farmers prefer to receive information identified, the extension organisation can put in place effective communication strategies targeted towards this group of farmers.

1.2 PROBLEM STATEMENT

Agricultural Extension work is achieved by means communication (van den Ban & Hawkins, 1996). Communication channels are therefore, important for linking information sources to information users in extension work. Agricultural extension plays an important role in agricultural productivity, increasing food security and improving rural livelihood. It is an important means of bringing new technologies to the farmers, identifying their problems in view of appropriate research (Baloyi, 2010). Agricultural production for most small and medium producers in most developing countries including, South Africa, however, depends largely on rainfall. This is the case in Limpopo province where only 25 per cent of crop production is under irrigation (D' Haese et al. 2011). Findings indicating the negative impacts of climate change and variability on agricultural production in South Africa are a source of concern and need urgent attention as it worsens existing vulnerabilities and ads to the pressures on the environment and natural resources on which so many South Africans directly rely (Green, 2007). For subsistence and smallholder farmers to achieve their goals of food security they need relevant farm management information, especially on coping and adaptation strategies under the current global phenomenon of climate change and variability. A survey of extension agents from Capricorn and Sekhukhune district municipalities in Limpopo province indicated that most of them promoted climate variability coping and adaptation strategies among farmers (Afful et al., 2014).

Much has been written on the part played by the field-level extension agent and the extension organization in the adoption of agricultural technologies, improving farmers' yields and helping farmers make informed decisions (Tiraieyari et al., 2010). The channel for sending the message, however, seems to receive very little study. A common complaint among extension commentators and smallholder farmers is that, farm management information, oftentimes, does not reach the vast majority of the clientele, who are the smallholder farmers. When farmers do not have access to formal extension services, they use other sources of information, sometimes using technologies such as mobile phones and Internet kiosks, or asking other farmers and their input dealers for advice ("The feasibility", 2012).

Various channels are available to the extension communicator. However, regardless of the channel or combination of channels used, it must relate to the stage in which a farmer

is regarding the innovation-decision process to achieve the desired effect (Rogers, 1995). This study therefore, addressed some subsistence farmers' use of extension communication channels receiving farm management information including climate variability in relation to the stage in which a farmer is regarding the innovation-decision process.

1.3 AIM OF STUDY

The purpose of the study is to examine subsistence farmers' use of extension communication channels for receiving farm management information including climate variability in relation to the stage in which a farmer is regarding the innovation-decision process.

1.4 OBJECTIVES OF THE STUDY

The study seeks to achieve the following objectives:

i To identify the communication channels through which farmers receive and prefer to receive farm management information including climate variability to manage their farming enterprises.

ii To assess the factors that influence farmers' use of particular channels to receive farm management information including climate variability to manage their farming enterprises.

iii To identify channel-based constraints farmers face in receiving farm management information including climate variability.

1.5 RESEARCH QUESTIONS

The following research questions will be answered to address the main aim of the study:

i. What are respondents' current and preferred channels for receiving farm management information including climate variability to manage their farming enterprises?

ii. What factors influence farmers' choice of communication channels for receiving farm management information including climate variability for managing their farming enterprises and how significant are they?

iii. What important communication channel-based constraints face farmers in receiving farm management information including climate variability from the public extension service?

1.6 RESEARCH HYPOTHESES

i. Respondents' socio-economic characteristics do not have any significant influence on their choice of particular communication channels for receiving farm management information including climate variability.

ii. Extension communication channel-based characteristics do not have any significant influence on respondents' choice of particular communication channels.

iii. The adoption decision stage in which the respondent is regarding the search for farm management information including climate variability does not have any significant influence on the choice of particular communication channels for receiving farm management information including climate variability.

1.7 SIGNIFICANCE OF THE STUDY

This study will fill some of the gap in knowledge regarding the effectiveness, credibility and utility of extension communication channels used by the public extension agent in Limpopo province as viewed by farmers. The probability sampling approach used in the study will ensure generalizability of the findings. The research will also bring out farmers' viewpoints on their preferred channels as well as the channel-constraints they face in accessing farm management information.

1.8 DEFINITION OF TERMS

Extension

Scholars have attempted to define the concept of extension (Bembridge, 1990, Oakley & Garforth, 1985) but due to its dynamic character a single definition is not acceptable, therefore extension can be described based on its character, being at least be classified in terms of its service into two dimensions: extension in terms of agricultural performance, extension as Communication channel: the pathway through which a message is sent.

Agricultural extension can also be defined as the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods and well-being.

Communication

Communication is a process by which two or more people exchange ideas, facts, impressions in way that each gains a common understanding of the meaning, content and use of message (Leagan, 1961). Any subject may be communicated or discussed through communication. Ray (1999) defined it as anything that conveys meaning that carries a message from one person to another.

1.9 OUTLINE OF DISSERTATION

The remainder of this study is organised as follows: Chapter two focuses on literature review, chapter 3 describes the methodology; the way in which the information was sought (questions on the questionnaire are channelled in a way that will satisfy the proposed objectives of this study) and the way data was collected and analysed.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The aim of this chapter was to provide a critical synthesis of the literature on human communication. It was limited to Innovation Diffusion theory, Communication theory and models, to justify how the study addresses the gap identified in the literature and to outline a conceptual framework for the study. This framework was to provide guidance to the development of the questionnaire for data collection on mass, group and inter-personal channels of communication to help address the issue under study.

2.2 COMMUNICATION THEORIES AND MODELS

- **Definition of communication**

Scholars in the field of human communication science agree that the concept 'communication' is not easy to define (Littlejohn & Foss, 2011). This is especially so in view of Dance's (1970) three points of conceptual differentiation, namely, level of observation, intentionality and normative judgment. This notwithstanding, Conrad and Poole (1998) defined it as the process by which people interactively create, sustain, and manage meaning.

2.2.1 Communication theory

Communication theory is a field of information theory and mathematics that studies the technical process of information and the process of human communication (Shannon, 1948). This definition is similar to the one put forward by Dainton & Zelly (2017) as any systematic summary about the nature of the communication process.

There are many theoretical traditions in communication science because of a lack of a single definition for the concept 'communication' (Littlejohn & Foss, 2011). Craig (1999) thus provides seven of such theoretical traditions; some oppose others while others overlap. These traditions are, semiotic (communication as the mediation of science); phenomenological (communication as the experience of dialogue with others); cybernetic (communication as the flow of information); socio-psychological (communication as the interaction of individuals); sociocultural (communication as production and reproduction of

social order); critical (communication as a process in which all assumptions can be challenged) and rhetorical (communication as the practical art of discourse).

Another typology of communication theories according to Suresh (2003) consists of the following: structural and functional theories (believe that social structures are real and function in ways that can be observed objectively); cognitive and behavioural theories (focus on psychology of individuals); interactions theories (view social life as a process of interaction); interpretive theories uncover the ways people actually understand their own experience) and critical theories (concerned with the conflict of interests in society and the way communication perpetuates domination of one group over another) .

These theoretical traditions find expression in different communication models.

2.2.2 Communication models

- **The linear model of communication**

The linear model is the earliest depiction of human communication. It is a one-way street of communication. This means, it is only one direction communication; the message is being sent by the sender to the receiver. This type communication model was very popular in the past (Weaver, 1949). An example of this model is the Shannon and Weaver model (1949).

In the case of agriculture and extension, the sender is the researcher, the extension agent etc., the message is the information communicated and the receiver is normally, the farmer. For many years, agricultural education followed this simple model of communication. Agricultural information was sent through published materials, radios and televisions. But Hebel (2013) indicated that this model has been criticized in the last twenty-five years because it presumed that communication had a definable beginning and ending and communication was done only by the senders (Anderson & Ross, 2002). As a result, the extension system is only obliged to receive information from the researchers and deliver it exactly as it is to the farmers. Farmers' questions and views are not easily attended, implying that the recipient is passive (lack of feedback) (Rader & Kurth 1988). Another limitation of this model is its assumption that 'noise' arises only in the channel. The model is represented as follows (Fig.2.1).

Figure 2.1: Linear model of communication

Berlo (1960) expanded on the Shannon and Weaver model with Sender-Message-Channel-Receiver (SMCR) model. Although the model separated the communication process into clear parts, it was still linear. In this sense it was no improvement over the earlier model.

- **Interactional model**

This kind of model is more sophisticated than the linear model. It is bi-directional therefore, it encourages a two-way communication. The model describes the active participation between the extension agents and farmers.

The interactional model (Figure 2.2) accommodates feedback in the communication process so that while the communication was going-on communicators were both senders and receivers at the same time. An example of this interactional model is the Schramm model (1954). The interactional model (Schramm, 1954) puts more emphasis on the interpretation of meaning by the parties involved in the communication process and therefore, the impact of the message on the receiver. It also includes relationship and its influence on the parties involved. Another improvement in this model is the inclusion of the social environment and its influence on the frame of reference of the parties involved in the communication process. These advantages notwithstanding, a major drawback is the suggestion that the sender and receiver of the messages take turn to express and interpret messages.

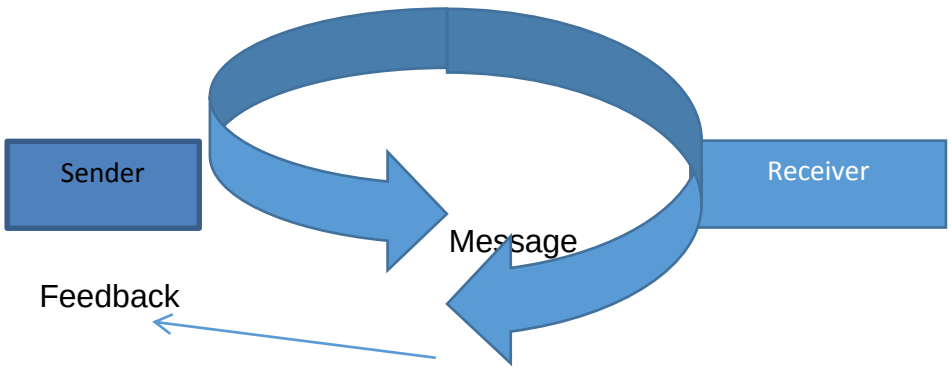

Figure 2.2: Interactional model of communication

Although this model reflects effective communication it has other shortcomings insofar depiction of human communication is concerned. According to Hebel (2013), this model did not address the importance of non-verbal messages sent with the verbal messages. West et al., 2006 further gave an insight detailed by indicating that perhaps a professor is working one-on-one with a student and a student looks around or become silence, then the professor will read the student's non-verbal communication as inattentive or assign any meaning to the student's action or non-action which could either be true or false, therefore this models proved to be lacking some truth in it.

- **Transactional model of communication**

Contemporary theory and communication models (Wenburg & Wilmot (1973), Berko, et al., (1990) etc. emphasize the transactional nature of communication where parties in the communication process are both senders and receivers of messages concurrently and not merely, sender or receiver. Wenburg & Wilmot (1973) infinity model (Fig 2.3) depicts communication as a continuous process of encoding and decoding in which past and present experiences affect the communication that occurs in the future. During the simultaneous process of transmitting ideas, individuals perceive the messages differently because of 'noise'. Noise is defined as any factor that interferes with the effectiveness of the communication process. Noise intervenes from several dimensions in the process.

The Wenburg and Wilmot model (1973) is applicable to all situations, small group situations, interpersonal and mass communication and thus has implications for extension work. It also accommodates the environment in which communication occurs as well as verbal and non-verbal cues. The model therefore, provides a good theoretical backing for exploring extension agents' communication of agricultural innovation to farmers as in this study.

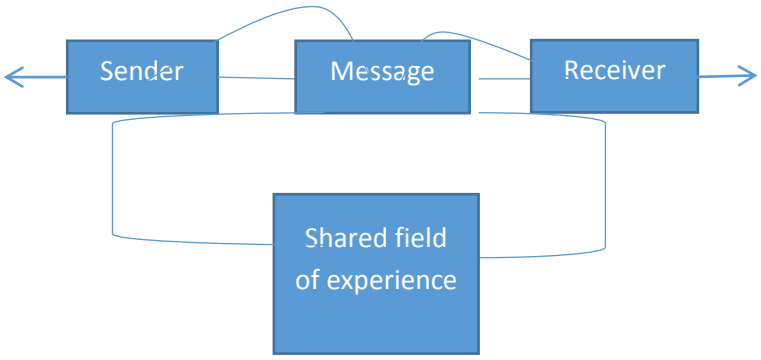

Figure 2.3: Transactional model

The effectiveness of this type of a model of communication is that it involves maximum level of cooperation between the sender and the receiver. This explains that both the sender and the receiver are available to share the same experience and that all parties involved in the communication process are affected. According to Barnlund, (1970), Watzlawick, et al., (1967), both the senders and receivers were responsible for communication effectiveness as they build shared meaning and share a field of experience. This means that perhaps as an extension officer is presenting some information to the farmers, farmers have the advantage of asking further questions or clarity where they did not understand and likewise the presenter is able to give detailed explanation on the subject simply because they are all sharing the experience. Hebel (2013) stated that shared meaning was found through both verbal and nonverbal behaviours in the transactional model. For this reason, there is a level of satisfaction reached between the communicators. The transactional view as exemplified by the Infinity Model, thus takes a holistic view of the communication process as a complex, dynamic, interactional and continuous transactional process of encoding and decoding messages between two or more entities who become simultaneously senders and receivers of messages considering the environment in which it takes place.

The various, current theoretical traditions and models of communication have the following basic elements in the communication process, namely, communicator, message, channel and receiver.

2.2.3 Elements of communication

There are four elements of communication (Food and Agricultural Organisation, 2013).

- **Source communicator**

The source is the producer of the message (Sharma, 1967).

Information source may be a researcher, the extension agent etc. in the case of agricultural extension.

- **Message**

The message is the content of the information discussed or shared. What should the content be? A balance must be achieved between what the receiver wants to know what and what the source feels the receiver ought to know. What form should the message take? In order words, how can the message be put into the words, pictures or symbols that the receiver will understand and take notice of? The message is the backbone of communication; it is in fact what communication is all about (Wood, 1998)

- **Channel**

Channel is defined as the medium through which communication between communicators takes place. This topic will be developed further under innovation diffusion theory since it is pivot around which this study revolves.

- **Receiver**

That person or the group of people to whom the message is sent, is called the receiver or sometimes the audience. In the communication process as the sender is necessary so as the receiver is also very important if there is not available any one of them, the communication process is not possible. The receiver must have the keen desire, ambition and interest for adopting the new knowledge and also must have the confidence or belief in the communication sources. As well as he should have the capacity to watch and hear (Chauhan, 2007).

2.3 INNOVATION DIFFUSION MODELS

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication, in that the messages are concerned with new ideas (Rogers, 2003).

Beginning in the field of rural sociology, researchers were pre-occupied on trying to understand why producers do not adopt what seem to be “good” ideas that will benefit them and what factors trigger the adoption of farm management innovations. The earliest investigations into these adoption issues were that by Ryan and Gross (1943).

- **The Classical Adoption Process Model**

Diffusion of innovations research was pioneered by Ryan & Gross (1943) of Iowa State University. This theory traces the process by which a new idea or practice is communicated through certain channels over time among members of a social system. The model describes the factors that influence people's thoughts and actions and the process of adopting a new technology or idea. The model conceived of the stages of the adoption as a linear process of five stages consisting of awareness, interest, evaluation, trial and adoption. This came to be known as classical adoption process model (The North Central Rural Sociology Committee, 1961).

This model has faced many criticisms. Some of these came from Albrecht (1964) and Rogers and Shoemaker (1971). These include assumption that the adoption process always begins with awareness of an innovation which could produce a psychological discomfort, referred to as “cognitive dissonance”. This point is made against the backdrop of the fact that the process may also start with awareness of a problem (Campbell 1966; Rogers 1983). Another criticism is the disregard for non-rational decision making in the adoption decision making process (Campbell, 1966).

- **Innovation Decision-Making Model**

To improve upon the Ryan & Gross (1943) adoption model, Rogers and Shoemaker (1971) introduced the innovation decision-making model which was later revised by Rogers (1983) and currently as Rogers (2003) to consider later developments in information and communication technology (Figure 2.4).

The Innovation-decision process is essentially an information-seeking and information-processing activity in which the individual is motivated to reduce uncertainty about the advantages and disadvantages of the innovation (Rogers, 1983).

The innovation decision theory includes conceptual generalizations about (1) the role of channels in the communication process, (2) innovation attributes, (3) the characteristics of adopters and the (4) decision process that leads to adoption (or non-adoption) in an atmosphere of uncertainty, and finally, the effects of adopting the innovation as well as the environment in which it occurs (Rogers 1995). “The essence of the diffusion process is the information exchange through which one individual communicates a new idea to one or several others” (Rogers 1995). Four main element of the diffusion process are the innovation, channels, time and the social system.

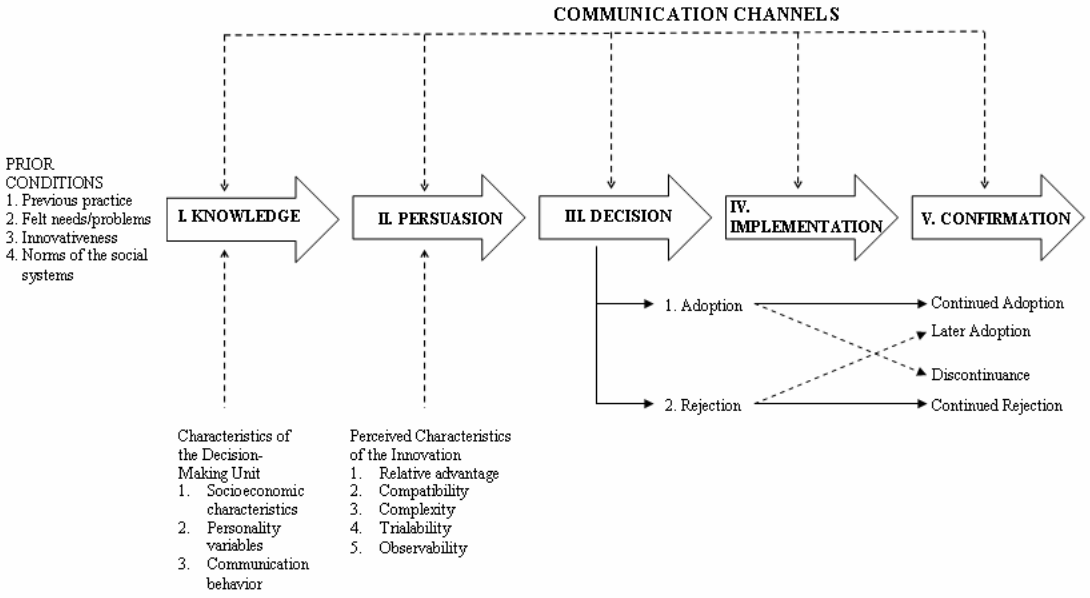

Figure 2.4. The innovation Decision Process, Rogers, 1983

- **The Bass diffusion model**

The Bass model (1969) recognises two sources of technological innovations and deals with the adoption process at the population level. Two critical components of the model are the adoption of new ideas through external and internal factors. When these ideas are applied to agricultural extension, the former component would be the adoption of innovations initiated outside the farming community. An example is by extension agents or mass media promotion. The latter component would represent adoption of a new idea resulting from inter-personal communication between farmers.

The use of this model in agricultural extension is justified by the assumption that the launch of a new product on a market can be compared with the launch of an innovation in a farming community adoption process at the population level.

McRoberts and Frank (n.d.) indicated that in view of the fact that the model deals with adoption at the population level it neglects several important factors determining the adoption rate of innovations and therefore, reflect the pro-innovation bias. McRoberts and Frank further mentioned the following issues which make the use of the model in diffusion studies at the farm level inappropriate, as in this study. These included the assumption that market potential of new products/innovations remains constant over time; that the

nature of the innovation does not change over time; that the diffusion of new innovations is independent of other innovations; and that the diffusion process is not influenced by marketing/promotion strategies, such as changing product prices, changes in advertisements, etc.

With the mechanics of diffusion of innovations, communication theory and models explained, this study has a basis for considering what efforts are most successful in encouraging the spread of an innovation. The focus is on the role of the channels in speeding the innovation decision process of farmers seeking climate variability innovations to enhance farm management decisions.

- **Communication channels in adoption decision**

Brunswik's (1943) definition of perception simply boils down to a complex process by which we select, organize and interpret sensory stimuli into a meaningful and coherent picture of the world. Numerous studies have shown that perception is a precursor to behaviour (Msuya, 2007, Afful 2012). Perception studies and farmers' preferred communication channels have received attention since the 1990s to date (Tweeten, 2014). These studies cut across many disciplines: health, education, agriculture, business (Khoshnodifar et al., 2014). Much work has been done in the area of perceptions and their effects on farmers' choice or use of communication channels (Tucker & Napier, 2002; Danahe& Rossiter , 2009; Okwu & Daudu, 2011; and Afful , et al., 2014).

Farmers use communication channels because they want to receive information for their farming businesses. The five stages in the innovation-decision process (Rogers, 2003) are important in helping our understanding of the role of different communication channels in the process. Mass media and interpersonal communication are two communication channels. While mass media channels include a mass medium such as television (TV), radio, or newspaper, interpersonal channels consist of a two-way communication between two or more individuals. To these channels, two groups of channels can be added group channels such as farmers' days, meetings etc.

Communication channels also can be categorized as localite channels and cosmopolite channels that communicate between an individual of the social system and outside sources. While interpersonal channels can be local or cosmopolite, almost all mass media

channels are cosmopolite. Because of these communication channels' characteristics, mass media channels and cosmopolite channels are more significant at the knowledge stage and localite channels and interpersonal channels are more important at the persuasion stage of the innovation-decision process (Rogers, 2003).

Communication channels also include online dissemination as latest addition to mode of information transmission available to extension communicators. When a communication channel is inappropriate to a given stage in the innovation-decision process, it has the negative effect of slowing down the adoption process or even causing non-adoption.

2.4 CONCEPTUAL FRAMEWORK FOR STUDY

The literature review has highlighted that in the area of agricultural extension work, many studies have been done regarding farmers' perceptions of communication channels and adoption of innovations. What seems not to be receiving research attention is farmers' use of communication channels in relation to the stage in which they are with respect to the innovation adoption decision process. This is a gap in the recent literature of innovation adoption studies. It is for this reason that this study looks at the communication channel(s) a farmer would use in relation to where he or she is in the adoption decision-making process (whether the farmer is seeking an innovation for a climate variability-related farm management problem that he or she has). This was achieved in this study by making use of innovation decision-making model (Rogers, 1983) as the theoretical framework and guided by communication theory.

The development of the questionnaire for this study was therefore, guided by the innovation-decision process (Rogers 1983) of subsistence farmers' use of communication channels for receiving climate variability information for the management of their farming enterprises.

2.4 SUMMARY

The review of literature in the communication science underscored the current communication models and essential elements in human communication. These provided a theoretical background and how these communication elements link with the innovation decision model, which was chosen as a conceptual framework for the study. The literature reviewed shows that much research has been done in the area of communication

channels preferred by farmers. However, the literature review indicated that not much study has been conducted about the stage in which a farmer is regarding adoption an innovation in the relation to preferred communication channels (s) for receiving farm management information.

The next chapter presents the methodology used to conduct the study.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter describes the methods followed during the study. It starts by exploring the areas in which they study were done, the nature of the research (research design), populations, sampling issues and the method in which data was collected and finally, how the data was analysed.

3.2 STUDY AREA

The study took place in two service centres (Fig. 3.1) namely, Mankweng and Tshebela in Polokwane Local Municipality under Capricorn District Municipality, Limpopo province. Tshebela service centre is situated in Seshego, Polokwane.

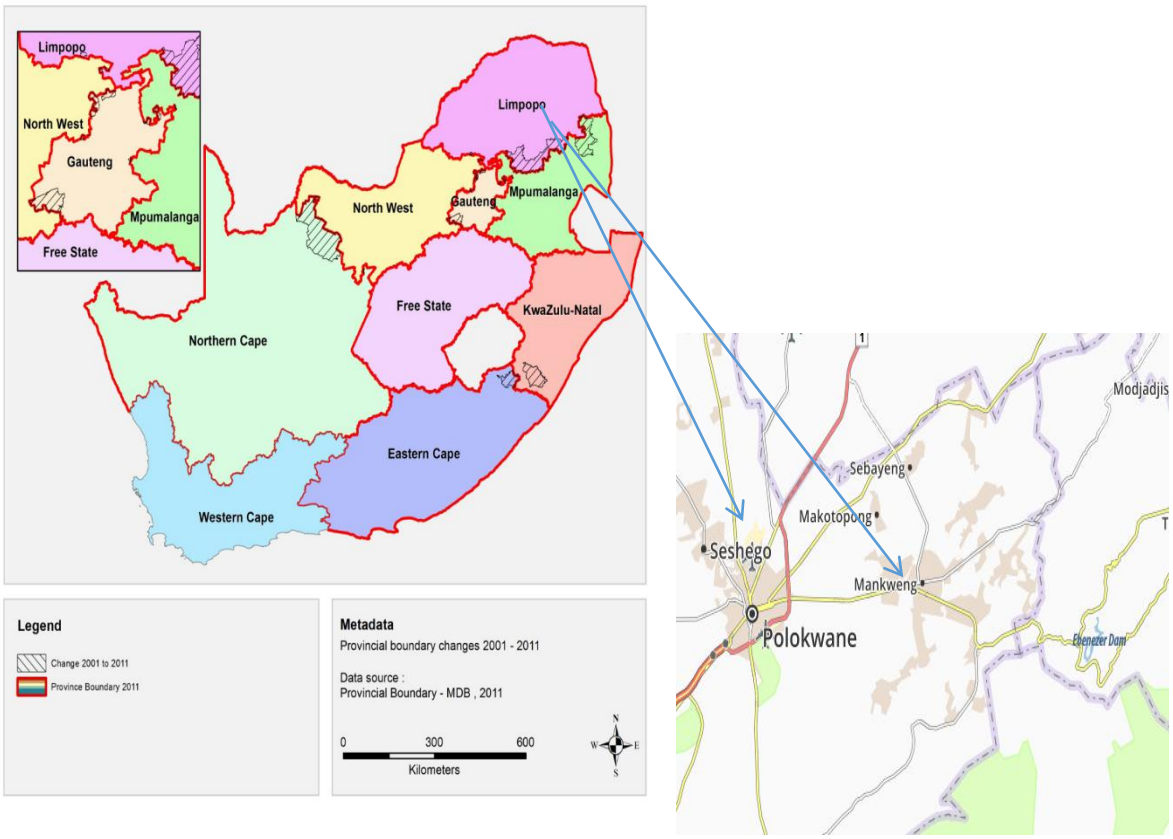

Figure 3.1: Map showing Polokwane Local municipalty, Mankweng and Tshebela service centres. (Source: Google maps, 2019)

3.3 RESEARCH DESIGN

The study used a cross-sectional survey design in which both qualitative and quantitative data were collected from respondents at a specific point in time. According to Chambers (1996), the most common method of formal rural research is the questionnaire survey.

3.4 Population

Polokwane Local municipality has a population of 2098 subsistence maize farmers. The target population of 623 maize farmers (sampling frame) in the study area comprises subsistence farmers in Mankweng & Tshebela service centres (Limpopo Department of Agriculture and Rural and development, 2015). The sampling frame consisted of 372 farmers from Mankweng and 251 from Tshebela service centres which were used for the study.

3.5 Sampling issues

A total of 85 maize farmers (sample size) were used following Stephan & William (1981) & Smith (1993) at 10% precision for a total target population of 623 for Mankweng and Tshebela service centres. The number, 623 lies between a population size of 500 and 1000 with corresponding sample sizes of 83 and 91 respectively (Stephan & William (1981) & Smith (1993). This informed the choice of 85 as the sample size. In terms of their proportions in the target population, 51 respondents were selected from Mankweng and 34 from Tshebela. Stratified sampling procedure was followed to select the farmers for interviews considering gender and their proportions in each service centre. This produced 372 respondents from Mankweng (males: 10; females: 41) and 251 from Tshebela (males: 10; females: 24). Random sampling was then used to practically select 10 males and 41 females from the Mankweng population of 372 farmers; similarly, 10 males and 24 females were selected from the Tshebela population of 251 farmers.

3.6 Data collection issues

Data was collected from 85 individual respondents from 10 projects in 10 villages by means of personal interviews. The data collection tool was a semi-structured questionnaire (Appendix D). The questionnaire was tested in the nearest village to the university which helped to rectify mistakes in the questionnaire and unnecessary questions were deleted. This exercise helped to improve the quality of the questionnaire.

3.7 Data analysis

Data were subjected to both descriptive and inferential analyses. Descriptive analysis was used to describe respondents based on their socio-economic characteristics to address research questions I and iii. This included the use of means, percentages and charts of selected variables.

The logit and the probit models are the two most common functional forms used in adoption studies. The advantage of these models is that the probabilities of the models are bounded between 0 and 1 giving the advantage of a choice between two levels of dichotomous dependent variable. Moreover, they compel the disturbance terms to be homoscedastic because the forms of probability functions depend on the distribution of the difference between the error terms associated with one particular choice and another. Usually a choice has to be made between logit and probit models, although the statistical similarities between the logit and probit models make such a choice difficult (Amemiya, 1981). Gujarati (1995) also illustrated that the logistic and probit formulations are quite comparable; the chief difference being that the former has slightly fatter tails, that is, the normal curve approaches the axes more quickly than the logistic curve. In essence, practically, there are usually no strong reasons to choose one model over the other. The researcher therefore, selected the logit model on the grounds of ease to compute and estimate. It was used to determine the influence of selected independent variables on respondents' preference of particular channel types measured on two levels (1= group channels; 0= interpersonal and/or mass channels) to address research question 2.3.2.

Credibility of channel information source was determined by means of credibility index based on means and standard deviation values. Data was analysed using the Statistical Package for the Social Sciences (SPSS) programme.

- **Model specification**

The general binary logistic regression equation assumes that the natural log of the odds p/(1-p) is a linear function of the regressors is be specified as:

$$\mathrm{In(ODDS)} = \mathrm{In}\left(\frac{\hat{Y}}{1-\hat{Y}}\right) = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_nX_n + \varepsilon$$

Where:

$\hat{Y}$ = Predicted probability indicated as 1 when respondent has preference for group channels, rather than, 1-$\hat{Y}$ indicated as 0 where a respondent has a preference for mass or interpersonal channels;

(X) are explanatory variables and b are coefficients.

The specific binary logistic regression equation for the use of a particular communication channel was be specified as:

$$\text{In}(\text{ODDS}) = \text{In}\left(\frac{\hat{Y}}{1-\hat{Y}}\right) = a + b_1X_{FE} + b_2X_{CI} + b_3X_{CP} + b_4X_{CG} + b_5X_{CM} + b_6X_{FA} + \varepsilon$$

Where,

The dependent variable was defined in terms of preferred channel for receiving farm management information including climate variability, as 0= use of interpersonal or mass channels; 1= use of group channels.

In order to avoid including irrelevant independent variables in the model, which leads to missing theoretically interesting findings, violating the parsimony rule (Occam's Razor), wasting degrees of freedom, making estimates imprecise, the following explanatory variables (X), guided by literature, were included in the study:

X_1 = Farming experience (FE) (years)

X_2 = Type of climate variability information needed for farm management (1= seeking innovation for a farm management problem, 0 = not seeking innovation for a farm management problem) (CI)

X_3= Cost (R) of buying or using interpersonal communication channel (1= Affordable; 0= Not affordable) (CP)

X_4 = Cost (R) of buying or using group communication channel (1= Affordable; 0= Not affordable) (CG)

X_5= Cost (R) of buying or using mass communication channel (1= Affordable; 0= Not affordable) (CM)

X_6 = Farming association membership (1= yes; 0= otherwise) (FA)

ε = the error term corresponding to all variables that could affect the dependent variable but not included in the model.

Table 3.1: The empirical representation of the logit model and hypothesized relationships		
Dependent Variable	Description	Hypothesized sign(coefficients)
Preferred channel	Dummy variable 1= preference for group channels 0 = otherwise.	Dependent variable
Independent Variable		
Farming experience	Number of years	Positive
Type of climate variability information needed for farm management	Dummy variable 1= seeking innovation for a farm management problem 0= otherwise	Negative
Cost (R) of buying or using interpersonal communication channel	Dummy variable 1= Affordable 0= otherwise	Positive
Cost (R) of buying or using group communication channel	Dummy variable 1= Affordable 0= otherwise	Negative
Cost (R) of buying or using mass	Dummy variable 1= Affordable 0= otherwise	Positive

communication channel		
Membership of farmers' association	Dummy variable = 1 if farmer belong to a farmers' association and 0 otherwise	Positive or negative

3.8 ETHICAL CONSIDERATION

3.8.1 PERMISSION

Permission to carry out the study was sought from the Turfloop Research Ethics Committee (TREC) prior its commencement (Appendix A).

3.8.2 INFORM CONSENT

The researcher informed the interviewees that the participation is voluntary and that they are free to withdraw from participation at any time if they don't feel comfortable. The interviewees were asked to sign a consent form to show that they agreed to partake in the study.

3.8.3 CONFIDENTIALITY AND ANONYMITY

In this study confidentiality and anonymity of the participants was taken into consideration. The participant's real names will not be mentioned in the study and the information provided will only be used for research or study purposes. The researcher informed the participants before agreeing to participate in the study.

3.8.4 PROTECTION FROM HARM

The researcher protected the identities and privacy of the participants through anonymity.

3.8.5 RESPECT

The researcher will therefore respect all participants. Indigenous health practitioners' secrets traits were also respected in the process.

Furthermore, the researcher wrote a memorandum to the LDARD to inform the Department and communities alike of the extent, aims and methods of the research as well as the benefits of the study to them. The memorandum highlighted the researcher's commitment to protect participants' rights and their voluntary participation in the study. The LDARD extension agents then discussed all this information with the identified

communities and asked for their cooperation to participate in the study. The memo sought approval from LDARD to approach individual community members to participate in the study. The approval from LDARD is attached to this report (Appendix B).

3.9 SUMMARY

This chapter provided a description of the methodology used to this study. It began with the research design and describes the study site. It also described the sampling method used, as well as the instrument for data collection. Ethical considerations related to data collection are also described. Finally, the analysis of data is described and the statistical method employed. The research results are presented and discussed next.

CHAPTER 4

DISCUSSION OF FINDINGS

4.1 INTRODUCTION

The main purpose of this study was to examine farmer's use of public agricultural extension communication channels for receiving farm management information in Polokwane Local municipality in Limpopo province. The chapter presents the research results of the data analysis as indicated in the methodology section of this write-up in relation to the study objectives and literature review. The chapter ends with a summary of the study findings.

4.2 SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENTS.

In reporting on respondents' demographic information, a summary of some continuous variables related to all 85 respondents in the study is presented in (Table 4.1). All three characteristics in the table indicated positive skewness. This explains that few farmers were older, had more years of schooling and had more years of farming experience than the average.

Table 4.1: Descriptive statistics of respondents (N=85)

Variable	Number of respondents	Minimum	Maximum	Median	Mean	Skewness
Age	85	26	81	-	54.6 12.369*	.020
Number of years of schooling	85	0	39	9	-	3.530
Number of years farming	85	2	58	18	-	1.125

Standard deviation*

- **Age of the respondents**

Agriculture is keeping 1.1 billion Africans fed but those who produce food are not young, well-resourced and technologically savvy (New Age, 2015). The anecdotal evidence suggests that average age of farmers in Africa is over 60. In this study, farmers were asked their age, data was recorded and the results are summarised in (Table 4.2). The findings indicate that just over half of the respondents were 40 years and over but less than 60. The findings of this study are similar to that of Annor-Frempong (2013) who found that most farmers in Lesotho and South Africa were above 40 years of age. Similar finding was made 18 years ago in the in the Eastern Cape Province by Tieku (2000) that most farmer respondents fell between the age bracket of 40-60 years. There is thus a clear indication from our findings and even that of others that the youth are not involved in agriculture in South Africa.

Table 4.2: Age of the respondents (N=85)

Age (Years)	Frequency	%
20-39	8	9
40-59	45	52.9
60-79	29	34.1
80 and more	3	3.5
Total	85	100

- **Number of years of schooling**

The majority of respondents (75%) in the study had about 7-14 number of years of schooling; this means that some of them have secondary level of education (Table 4.3). A small number (22%) however, had no schooling or had up to six years of schooling. This finding is close that by Mmbengeni and Moroka (2002) in Limpopo province, who found that regarding the level of literacy of farmers studied 33% had progressed to senior secondary level (grade 10-12) and only 16% had received no schooling at all. Annor-Frempong (2013) made similar findings that all respondents interviewed in both South Africa and Lesotho could read and write.

Farmers' ability to read and write bodes well for extension communication with this type of respondents. This is good; it makes the extension work with the farmers easy and adoption of innovation among such farmers tends to be high. Inability to read and write creates loss of opportunity to expand in the field of agriculture

Table 4.3: Respondent's number of years of schooling (N=85)

Years of schooling	Frequency	%
0-6	19	22.4
7-13	64	75.3
14-20	02	2.3
21 or more	01	1.2
Total	85	100

- **Number of years of farming**

According to the findings of this study, (Table 4.4), the majority of farmers (93%) interviewed had a good number of years of farming experience (5-37). According to the results of this study is that most of the farmers about 21% had about 15-20 years of farming. The median number of years of farming(18) recorded in this study (Table 4.1) is similar to the findings of Annor-Frempong (2013) who indicated that most farmers in South Africa and Lesotho have over 10 years farming experience. This is because since 1994, many farmers have had the chance to get their land back (Cronje, 2015).

Table 4.4: Respondent's number of years of farming (N=85)

Years of farming	Frequency	%
Less than 5	1	1.2
5-15	33	38.8
16-26	32	37.6
27-37	13	15.9
38 or more	6	7.1
Total	85	100

These findings are not too different from average farming experiences of smallholder farmers and homestead food gardeners in the Eastern Cape Province which were approximately 11 years and 13 years respectively (Kibirige, 2013).

- **Gender of the respondents**

From the interviews held, 24% of respondents were males and 76% females (Figure 4.1). This supports literature by Hart & Aliber (2012) that women far exceed men when farming is done to produce household food whether in male or female-headed households. According to Statistics South Africa (2014), women comprise majority (52.4%) of rural farmers. Men usually go to urban areas to work and therefore, women are left behind and spend their time in farming. Although women dominate men in farming, Asfaw & Admassie (2004) found that more men easily adopt new technologies than women. A lack of resource availability to women could preclude them from adopting agricultural innovations (GIZ, 2013). Furthermore, another reason for female dominance in crop production maybe the fact than men and women has different roles in farming. Men according to Stats SA (2014) in Limpopo province traditionally keep cattle, goats and sheep (53.3%) while women are more involved in crop farming.

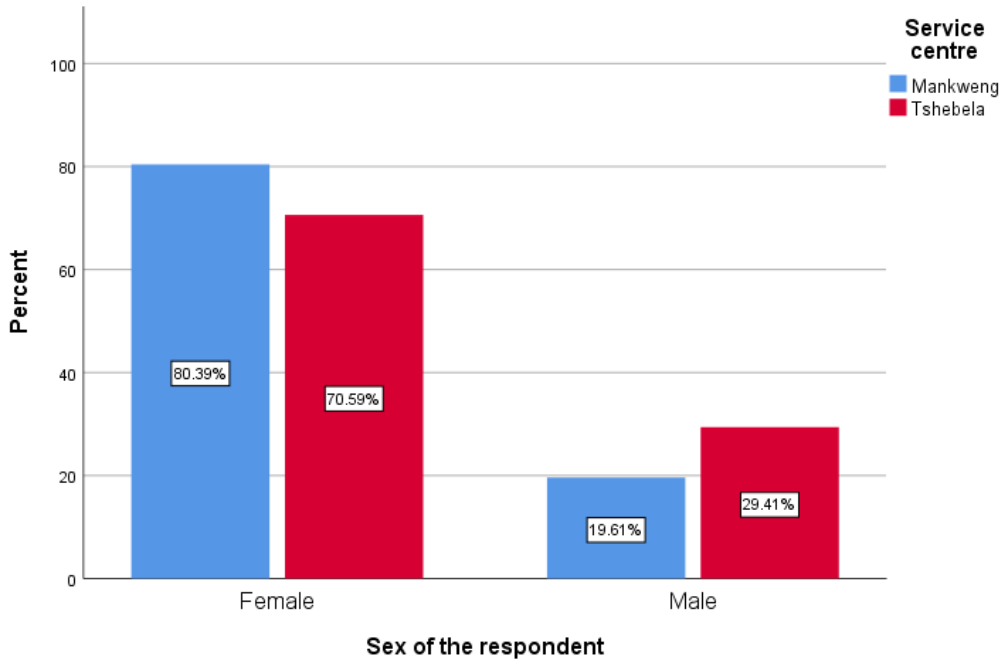

Figure 4.1: Sex of the respondents (N=85)

4. 3 CHANNELS THROUGH WHICH RESPONDENTS RECEIVE FARM MANAGEMENT INFORMATION INCLUDING CLIMATE VARIABILITY

When to use a particular or combination of communication channel relates to the stage in which a farmer is in the adoption process so as to achieve the desired effect. This process relates to decisions and actions which an individual has to take and adopt an innovation as it is recommended to him, adapt it to suit his situation or reject it completely. Different channels are therefore, important at different stages in the process of adoption/innovation decision process (Israel & Wilson, 2006 citing Rogers 2003). According Rogers (2003), mass media channels such as radio and television have a major influence on the public's awareness of innovations. They also tend to provide information of a general nature to a large audience with considerable speed and efficiency (Schramm, 1973). Interpersonal channels such farm visits however, are typically viewed as more effective in reducing uncertainty because they provide social support, enhancing confidence in suggested outcomes (Albrecht & Adelman, 1987). They are also better suited to handle special individual needs and questions due to the channel characteristics of immediate feedback and the situation specificity of their communication (Schramm, 1973).

This section presents the findings on the various channels through which respondents currently receive farm management information including climate variability (Table 4.5) as well as their preferred channels (Table 4.6).

4.3.1 Current channels

- **Radio**

The rationale for using radio in extension and advisory services has come from the 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 (AFRRI, 2007). However, the variables on the side of recipients of radio broadcasts are critical to the success of the radio broadcasts.

The role of information sources and communication channels in farm practice adoption, developed largely in the United States, may not have cross-cultural validity. In particular, hypotheses about the role of mass media in the farm practice adoption process were not supported by the findings of a study by Sharma and Leagans in India (1968).

Just like in the study by Sharma and Leagans (1968) in India where mass media (radio) were used by relatively small percentages of about (2%) of respondents, our study also showed only 44% of respondents received farm information through the radio (Table 4.5) with the median number of times they received such information in the last five years being eight (Table 4.5). The rest (56%) of the respondents did not receive information through this channel The low percentage of respondents in our interviews who received farm management information including climate variability, through the radio, seems to corroborate the observation by Stat SA (2015) that the use of radio to communicate farming information to farmers does to seem to be very common in South Africa. These findings about the percentage of users are however, contrary to those by Cecchini, (2002) who mentioned that in other developing countries such as Kenya, the majority of farmers (77.3%) use traditional technologies like radio. Similar findings were obtained in Nigeria by Okwu & Daudu (2011) where most farmers (81%) mentioned the radio as the medium for accessing agricultural information. Studies in Malawi also show that one of the major findings of the African Farm Radio Research Initiative (AFRRI) project was that the use of radio in extension and advisory services is very effective in increasing farmers' knowledge, encouraging the adoption of agricultural improvements, and fostering a general change in attitude about making future changes (AFRRI, 2010).

These different findings about the use of the radio perhaps, might be because of a lack of particular attention to ensure that women are not disadvantaged and that the radio content and broadcast timing are gender-responsive. This is because women's participation in smallholder and subsistence farming generally, tend to be more than men. Time of the radio broadcast may be a barrier preventing farmers from receiving farm management information through this channel. This is in line with the findings by the FAO (2014), that although radio may seem to be a useful tool to access agricultural information, it is not the case.

There are however, a number of limitations to the use of radio in extension work such as high cost of batteries which are often difficult to obtain in rural areas ("The state", 2005).Farmers who want to use radio as a channel to receive agricultural information are mostly, farmers who are in the rural areas. Time of broadcast may not meet their needs (Bardon et al., 2007). To make the matter worse, there are no pre-advertisements made prior to the actual presentation to alert the farmers that there will be such a programme on that particular day.

Table 4.5: Distribution of channels through which respondents currently receive farm management information including climate change

Channel	Response	Frequency	%	Number of times respondents received information through channel (Median)	Skewness
Radio N= 85	Yes No	37 48	44 56	8.00	1.887
Television N= 85	Yes No	42 43	49 51	8.00	4.182
Leaflets (N= 85)	Yes No	36 56	34 66	6.00	4.182
Newspaper (N= 85)	Yes No	23 62	27 73	4.50	.548
Agent visit (N= 85)	Yes No	38 49	42 58	9.00	1.746
Training classes (N=85	Yes No	33 52	39 61	9.00	1.560
Group Discussion	Yes No	45 40	53 47	12.00	3.154

(N= 85)					
Farmers' days (N=85)	Yes No	30 55	35 65	9.00	1.069
Lectures (N= 85)	Yes No	18 64	21 79	4.00	2.633
Method demonstration (N= 85)	Yes No	18 67	21 79	6.00	1.505
Result demonstration (N= 84)	Yes No	16 69	19 81	6.00	.178

- **Television**

The findings of this study (Table 4.5) show that about 49% of respondents received farm management information through TV and the median number of times in the last five years was eight (Table 4.5); the rest (51%) of respondents did not. Similar findings about the percentage of users have been shared by (Okwu & Daudu, 2011; Litcht & Martin, 2007). Litcht and Martin (2007), for example, indicated that farmers (38%) received agricultural information through television and 53% did not. According to Sabbie (2012), response to the use of television may depend on the type of a village, because in remote rural areas the use of television may not be common.

Hebel (2013) also found similar results on the percentage of use in his study which showed that only 21% of farmers were receiving farm management information through television. He reported that television sets are expensive to buy and repair and program production costs are also high. Most farmers in Nigeria do not use television as an effective channel to receive farm management and climate variability information because they are not connected to the channels which deal with agriculture (Oyekholome, 2013). This may be caused greatly by the fact that majority farmers are over 40 years and are not so educated.

- **Leaflet**

Leaflet or flier is defined as a brief, concise printed information focused on a specific subject designed to create or enhance awareness (Richardson, & Jenkins, 1999).
This is a very rare channel through which to distribute agricultural farm management information; it is not popular in the rural areas (Nsemwa, 2005). Most farmers have never actually seen them and the few that have, it was only by chance whereby they visited the nearest agricultural extension service centre (Hoyle, 2016).

In this study, only 34% of farmers have previously received farm management information including climate variability through leaflets (Table 4.5) and the median number of times in the last five years was six (Table 4.5). Twice as many farmers in this study did not receive farm management information through this channel as those who did. These results on the percentage of users are similar to the findings of Obidike (2011), who indicated in his findings that only 23% of farmers were found to be receiving agriculture information through the use of leaflets and the rest were not even aware of it. The Gauteng Department of Agriculture and Rural Development (2013) however, strongly stressed that leaflets should be greatly distributed because they are quick means of spreading information.

According to literature, leaflets and other printed materials are often neglected because they do not serve the intended purpose as majority of the farmers are old and illiterate; as a result, farmers are not self-motivated to read them (Siyao, 2012).
Another major reason for the low use of this channel may be due to the fact the department of agriculture does not distribute these leaflets on time, they always come late and they are inappropriate to their farm management information needs (Agbamu, 2000). Jakes (2015) pointed out a remarkable fact that leaflets are not so effective because they do not even explain everything, after going through a leaflet there is a possibility that it leaves you confused and with a lot of questions that may be very difficult for the reader to get answers to. Written information does not give 100% information than verbal communication. It is therefore, possible that the LDARD might not be using leaflets for this reason.

- **Newspaper**

The dissemination of the latest agricultural information among the farmers is very important in agricultural development. Newspapers therefore, are designed to serve this very purpose in agriculture (FAO, 2014). The vital practical objective of successful extension worker is to teach the farmers how they could improve their land and other agricultural practices; the newspaper can play that role (Bajwa, 2004). The findings in thus study (Table 4.5) were contrary to literature; instead, 73% of respondents compared with 27% did not use newspapers for information with a median number of uses of this channel to receive farm management information including climate variability of 5 in the last five years (Table 4.5). Okwu & Daudu (2011) made a similar finding on the percentage of use in Nigeria where 87% of farmers do not receive agricultural information through the newspapers compare with only 23% that do.

- **Farm visit.**

Farm visits are the most common form of personal contact between farmers and extension officers. Extension officers visit the farmers on their farms; interact with them directly by giving them information and showing them some skills when introducing new technologies and enhancing adoption. In this study, the findings show that only 42% of respondents received farm management information including climate variability with a median number of 9 visits in the last five years (Table 4.5).

This is in agreement with the study findings by Maoba (2016), who found that only 24% of farmers are visited very often (fortnightly), 42% are visited once a month and 33% of farmers in the study area are visited occasionally. Afful (2012) however, found that 58% of farmers interviewed in the Free State province of South Africa received extension visits with the maximum number of visits in the last twelve months preceding the survey being two. However, irregular farm visits can lead to farmers' complaints about invisibility of agricultural advisors and could impact negatively on extension activities.

The provision of more extension visits leads to the request for such services (Dinar, 1989). The frequency of visits by an extension officer to a farming project is related to the availability of resources, staff and the nature of agricultural activity (Jacobs, 2003). Lack of capacity appears to be the main factor affecting the frequency of extension visits to projects in South Africa (Jacobs, 2003).

- **Training classes**

Group channels or methods such as farmers' days, lectures, training classes, workshops, demonstrations etc. have been found to have a higher index of effectiveness (111) than individual methods (86) although lower than mass methods (177) (Wilson & Gallip, 1955). It is also more cost-effective than individual methods (''the state", 2005). Only 39% of respondents in this study received agricultural information through training class (Table 4.5) with a median number of 9 classes in the last five years of the study (Table 4.5). Afful (2012) however, found training classes as one of two important channels through which farmers in the Free State, South Africa received farm production, marketing, financial and environmental information. Training classes are important and are needed to improve the skills of farmers. According to Kebede (2010), in Ethiopia, training classes is one of the major tools to increase production and productivity and it has been adopted and actively used by 71% of smallholder farmers.

Training classes may seem to be an effective way to increase farmers' knowledge and experience in farming but there are other issues that hinder its effectiveness. These include HIV/AIDS, gender, communication skills, lack of facilities, inappropriate time of training, lack of demonstrations (Kristi et al., 2009). Another factor that inhibits its use is farmers do not have money to pay for registrations and courses. The training organisation ''Farmers win'' (2011) indicated that they are not funded by any company or government, as a result farmers need to pay for the training so that the organisation can buy more facilities and pay rent for the venues where training is held.

- **Group discussion**

Just over half of the respondents in this study (53%) received agricultural information through group discussion (Table 4.5) with the most median number (12) of all channels investigated in this study in the last five years of the study (Table 4.5). This finding is contrary to Afful's (2012) study in the Free State of South Africa, which showed that less than 3% of smallholder farmers receive farm management information through group discussions. Maoba (2016) in his study also obtained similar findings that majority of farmers (79%) found group discussion to be the most effective channel for agricultural development and received farm information management through this channel as well.

Obidike (2011) supports these findings that group methods have made a positive impact on farmers. During group discussions, farmers acquire agricultural information from fellow farmers. This becomes a better source of information especially since the information being disseminated comes from those who might have had experiences with the potential technologies that other farmers seek to adopt. More experienced farmers become the best discussion partners for other farmers (Place et al., 2005)

As a group, farmers assess agricultural technologies and their suitability to their farming conditions since most of them are usually neighbours (Minjanet, Kruger et al., 2004). Fellow farmers may be used to complement the extension agents due to their easy reach. The efficiency of this utilization may however be limited by lack of trust amongst farmers.

- **Farmers' day**

Farmers' days are usually opportunities to hold method or result demonstrations. They are often used to introduce a new idea and a new crop and to make more farmers interested in the new idea or practice ("The state", 2005). Since farmers' days are not regular occasions, they only take place annually in most places where farming is practiced. It is not guaranteed that all farmers will take part in the activities on that day. The findings of this study show that many farmers (65%) did not receive farm management information including climate variability through farmers' days activities compared with only 35% that did (Table 4.5) and a median number of nine farmers' days held in the last five years of the study (Table 4.5). These findings show very low percentage of respondents who did receive climate information during farmers' day. A controversial issue was found by Maree (2015) who had a very positive encounter with this channel and good results were obtained as she mentioned that ''farmers' day provided them with wealth of information which added much knowledge to their farming''. These different findings might be due to different levels of agricultural development in countries.

- **Lecture**

The findings here are similar to other group channels investigated in this study. Only a small proportion of respondents (21%) received farm management information including climate variability through this channel (Table 4.5). This channel had the least median number (4) of all the channels investigated in this study (Table 4.5). For many years in Kenya, college instructors used lecture method to develop their farmers to be able to

solve farming problems (Dawson, 2009). An evaluation of the method in comparison with practical training indicated its many limitations. Hebel (2013) mentioned that farmers are usually old people. Old people prefer practice than lecture because their minds cannot grasp theory. They can easily be tired during lectures (Hawkins, 2013). This might account for the lack of popularity of this channel for communicating farm management information including climate variability as found in this study.

- **Method demonstration**

Method demonstrations enable farmers to explore the subject demonstrated. Farmers see step-by-step how a thing is done practically. Farmers see how the new idea works. This method is particularly helpful in the adoption decision process during the implementation and confirmation stages to reinforce the idea to prevent rejection of the idea or practice. This is not a common channel used by extension agents in the Limpopo province (Baloyi, 2012). In this study, only a small proportion of respondents (21%) received farm management information including climate variability through method demonstration (Table 4.5) with a median number of nine method demonstrations in the last five years of the study (Table 4.5). This finding is similar to that of Seeman (2016) who found that only 3% of farmers received agricultural information though method demonstration.

- **Result demonstration**

The main purpose of result demonstration is to show local farmers that a particular new recommendation is practicable, under their local conditions (Mpumalanga Department of Agriculture, Fishers and Forestry 2013), Almost throughout the world, result demonstration is not a popular way or channel used in agriculture mainly because it requires a lot of resources, crops take a long time to mature. Furthermore, should the new practice fail (such as due to lack of rain), it could lead to serious undesirable consequences (FAO, 2013). Hence it is regarded as ineffective because also in this study, only 21% of respondents received farm management information including climate variability through this channel with a median number of nine result demonstrations in the last five years of the study (Table 4.5). Hussen (2011) found similar results of about 34% of respondents who were familiar with the channel and 56% of respondents who were not.

The Gauteng Department of Agriculture and Rural Development (2013) highlighted that this channel is not commonly used because it costs a lot of money; this financial constraint is likely to be a barrier to its widespread use. Farmers learn much better though discussion; this was indicated in the study by Bogue (2013), who indicated that farmers respond positively to this kind of channel because it increases farmer involvement in the learning exercise. According to Rogers (2003) farmers do not like passive education, as majority of them are old; they prefer and learn best under active participation.

- **Respondents preferred channels for receiving climate variability information for farm management**

Depending on the type of farm management problem a farmer has, he or she will prefer a channel that best satisfies the need. The research question was of a general nature that required respondents to indicate channels through which they prefer to receive climate variability information for your farm management compared to what is currently made avaialbe to them by the public extension service.

Findings on respondents' most preferred chanels for receiving climate variability information for farm management are recorded in Table 4.6. Respondents' most preferred channel type for receivng climate varaibility information was group channels. This channel choice by about half of the respondents (47%) seems to indicate that these respondents are either in the decision-making or persuaion stages of the innovation-decision process regarding the adoption of climate variability technologies. It could also mean that these respondents are still in the awareness-knowledge stage and need information on climate variability information or technologies that will satisfy their particular farm management needs. Even though the mass media would be the most suitable channel for this need, respondents' socio-economic circumstances perhaps preclude their choice for this channel, hence television and radio are relegated to second and third choices behind group discussions. The finding is consistent with respondents' choice of preferred particular channels in the various channel types. Of the particular channels investigated in our study among the 85 respondents and according to the percentage of nominations, group discussion was the most preferred channel (54%) and again the first choice by close to half of the respondent (44%) compared to other group channels investigated.

This was followed by television broadcast (41%) and then farm visits (38%) among the 85 respondents in the survey. Within the individual channel type, farm visits was the most preferred channel as mentioned by 78% among 32 respondents. In the mass channel type, training classes was the most preferred (56%) among 27 respondents followed by radio which was mentioned by 50% among 30 respondents.

These results in our study corroborate the findings by Nahfess et al., (2015) who found that group methods are highly preferred by farmers (53%), followed by interpersonal channels (32%) and lastly (18%). However, Stan (2012) found controversial results that interpersonal channel was the first preference by 65% in Botswana. Research in agriculture suggests that learning in groups is effective for the majority of farmers Kirkpatrick (2004). This was confirmed in the literature by the work of Vanclay & Lawrence (1995) that group methods facilitate unity, provide interaction with experts (that is, facilitators, trainers and fellow farmers) and lead to more rapid spread of information and change of attitudes than could be achieved by few isolated persons (Bunyisa & Rogers, 2010).

Table 4.6: Respondents' preferred channels for receiving farm management information including climate variability

Channel type			Respondents (%) who chose a channel type (N= 85)		
			Frequency	%	
Interpersonal channels			25	29	
Group channel			40	47	
Mass channels			20	24	
Preferred individual channel			Respondents' (%) order of preferred channel		
			First	Second	Third
Interpersonal channels	Frequency	%	78	22	0
Farm visits N= 85	32	38			
Mass Channels	35	41	12	54	34
Television N= 85					
Leaflets N= 85	15	18	0	6	94
Newspaper N= 85	19	22	11	26	63
Radio N= 85	30	35	50	37	13
Training class N= 85	27	32	56	33	11

Group Channels	46	54	44	28	28
Group discussion N= 85					
Farmers' day N= 85	17	20	6	53	41
Lectures N= 85	11	13	27	18	55
Method demonstration N= 85	12	14	0	58	42
Result demonstration	11	13	0	18	82

4.3.2 Constraints faced by respondents in receiving farm management information including climate variability through communication channels

Findings about the constraints respondents face in receiving or accessing farm management information including climate variability are summarised in table 4.7.

- **Time of the meeting**

Time of the meeting was found to be the first most serious challenge faced by the majority of respondents (79%). This is because farmers, especially, female farmers, have a lot of work to do at home. Of the 85 farmers interviewed for this study, 76% were female and 24% were male. This finding is supported by GDARD (2013) that majority of farmers are women, therefore they have a lot of duties besides farming such as home chores, looking after their grandchildren, attending clinics, society and funerals. That, as a result affects the time available to them for attending the meetings. According to FAO (2015), time of planting is very crucial too; winter is a season where a lot of preparation is done for summer crops; therefore, women fail to attend meetings with extension officers because of time constraints. This was supported by the study MPAFF (2010).

Table 4.7: Constraints farmers face in receiving farm management information Including climate change

Order of importance*	Number of respondents who chose a constraint ** in order of importance (N= 85)		
	Time (n=42)	Money (n= 40)	Availability of extension agent (n=17)
First	33	11	7
Second	5	15	4
Third	4	14	6

- Weighting: First=5; Second= 3; Third= 1 ** Respondents could mention more than one constraint.

The mean ratings of the three constraints (time. money and availability of extension agent) mentioned by respondents provide an indication of the seriousness with which respondents view these constraints (Table 4.7). Time is by far the most serious constraint to respondents receiving farm management information including climate variability. Our finding is supported by the FAO (1998) assertion that women cannot attend meetings as a result of their increased workload. In view of the fact that there were more women than men in this study, it is therefore not difficult to see why time was seen as the most serious constraint. The latter which can be associated with participation in group discussions since it was the most preferred channel.

4.4 INFLUENCE OF RESPONDENTS' SOCIO-ECONOMIC CHARACTERISTICS AND TYPE OF CLIMATE VARIABILITY INFORMATION NEEDED ON FARMERS' PREFERENCE OF PARTICULAR COMMUNICATION CHANNELS

The hypothesis that respondents' socio-economic characteristics and the adoption decision stage in which the respondent is regarding the search for climate variability information needed to manage their farms do not have any significant influence on farmers' choice of particular communication channels was tested. This was done by predicting the logit, that is, the natural log of the odds of respondents making one decision (preference of group channels) or the other (preference of interpersonal or mass channels) for receiving farm management information including climate variability issues.

In order to avoid including irrelevant independent variables in the model, which lead to missing theoretically interesting findings, violating the parsimony rule (Occam's Razor), wasting degrees of freedom, making estimates imprecise, six explanatory variables (X), guided by literature, were included the analysis. The binary logistic regression model contained six independent variables (farming experience, type of climate variability information needed for farm management, cost of buying or using interpersonal communication channel, cost of using group communication channel, cost of buying or using mass communication channel and farming association membership). The analysis was done using Binary logistic procedure in SPSS version 24. The full model containing all predictor variables was statistically significant, χ^2 (6, N= 85) = 14.186, p= .028. The model passed the Goodness-of-fit test (Hosmer & Lemeshow, Wald= 4.512; df= 8, p=.718). This indicates that the model was able to distinguish between respondents who prefer and did not prefer group channels as their number one channel for receiving farm management information including climate variability. The model as a whole explained between 15% (Cox and Sell R square) and 21% (Nagelkerke R square) of the variance in the use of group channels of communication. It correctly classified 66% of all cases and also correctly classified 52.1% of the respondent who preferred group channels for receiving farm management information including climate variability. As shown in Table 4.6, three of the six explanatory variables made a unique statistically significant contribution to the model (farming experience, affordability of interpersonal channels and seeking innovation for a farm management problem including climate variability). The

strongest predictor of reporting preference of group channels communication was seeking innovation for a farm management problem in relation to climate variability, recording an odds ratio of .318. This indicated that respondents who reported preference of group channels of communication were over 3 times more likely to use these channels than those who did not, controlling for all others factors in the model. According to the model, the log of the odds of a respondent preferring group channels of communication was negatively related to affordability of interpersonal and group channels as well as the type of farm management information being sought; it was however, positively related to farming experience, affordability of mass communication channels as well as being a member of a farming association ($p < .05$; Table 4.8).

Binary logistic regression predicting likelihood of using group channels of communication to receive farm management information including climate variability.

Table 4.8: Binary logistic regression predicting likelihood of using group channels of communication to receive farm management information including climate variability

	B	SE	Wald	df	p	Odds ratio	95% C.I. for EXP(B)	
							Lower	Upper
Farming experience	.048	.024	4.089	1	.043	1.049	1.001	1.099
Affordability of interp-ersonal channels	-1.482	.747	3.939	1	.047	.227	.053	.982
Affordability of group channels	-.221	.779	.081	1	.776	.801	.174	3.692
Affordability of mass channels	.537	.730	.541	1	.462	1.710	.409	7.149
Seeking innovation for farm management problem	-1.146	.521	4.836	1	.028	.318	.115	.883
Farming association membership	.547	.537	1,037	1	.308	1.728	.603	4.949
Constant	.185	1.076	.030		.863	1.204		

4.5 SUMMARY

The study showed that all respondents received farm management information including climate variability through all the channels investigated. Respondents however, indicated that they preferred group channels, especially, group discussions. Of the mass channels investigated, respondents' most preferred channel was the television and farm visits as the most preferred channel for interpersonal channels.

Time was the most serious constraint identified by respondents for receiving or accessing farm management information climate variability.

The regression findings indicated that respondents' preference for group channels was positively related to farming experience, affordability of mass communication channels as well as being a member of a farming association. Farming experience, affordability of interpersonal channels and seeking innovation for a farm management problem including climate variability made unique statistically significant contribution to the model. The strongest predictor of reporting preference of group channels communication was seeking innovation for a farm management problem in relation to climate variability.

The next chapter presents the summary of study findings, conclusions and recommendations.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents final remarks on the findings of the investigated objectives and hypotheses tested in this study. The chapter organization begins with summary findings of related to the study questions, followed by concluding statements about the study research objectives, hypothesis and the implications of the findings for extension practice and theory. The chapter ends with recommendations including areas of further research.

5.2 Summary

The problem investigated in this study relates to subsistence farmers' use of the extension communication channels to receive farm management information including climate variability in relation to the stage in which a farmer is regarding the innovation-decision process.

The research questions were:

i What are the communication channels through which farmers receive farm management information including climate variability and their preferred channels for receiving such information.

ii What are the respondents' socio-economic characteristics and type of climate variability information needed for farm management that influence farmers' use of communication channels for receiving farm management information including climate variability.

iii What channel-based constraints farmers face in receiving farm management information including climate variability?

The hypothesis related to objective ii and was stated as:

Respondents' socio-economic characteristics as well as the type of farm management information including climate variability needed to manage their farms do not have any significant influence on farmers' preference of particular communication channels.

The findings regarding the research questions and the hypothesis test are as follows:

The answer to the first part of research question i, is that the study finding shows that all respondents received farm management information including climate variability from all 10 communication channels investigated. Group discussion was the only channel through which most respondents received information most of the time.

With regard to the second part of research question i, the study finding shows that of all the channels, slightly more than half of the respondents preferred group discussions. Again, of those who preferred group discussions, almost half of them preferred it as the first choice.

The hypothesis test gave the answer to the research question about the farmers' socio-economic characteristics and the type of climate variability information needed for farm management that influence farmers' use of communication channels for receiving farm management information including climate variability. The farmer characteristics that positively influence farmers' use of group communication channels were farming experience, farmer association membership and affordability of group channels. In other words, a farmer who has more farming experience and belongs to a farmers' association is more likely to choose group channels for receiving farm management information include climate variability. On the other hand, a farmer who was seeking innovation for a farm management problem including climate variability is less likely to use group channels.

The hypothesis test showed that the strongest predictor of reporting preference of group channels of communication channels was seeking innovation for a farm management problem in relation to climate variability.

About objective iii, regarding the constraints that farmers face in assessing or receiving farm management information including climate variability, lack of time was the most prominent.

5.3 Conclusions

From the findings about the problem investigated in this study, the following conclusions were drawn:

- Even though respondents currently receive farm management information including climate variability from the public extension agent through many channels, most of them will have group discussions as their first choice.
- The group discussions should however, be timed to allow respondents to attend meetings. Extension agents therefore, have to discuss the timing of such meetings with participants to arrive at times suitable to most participants.
- To relate channel or combination of channels used with the stage in which a farmer is regarding the innovation-decision process, the study findings show that a farmer who is seeking innovation for a farm management problem including climate variability was less likely to source this information through group channels.

5.4 Recommendations

The research makes the following recommendations based on the core findings of the study and which have implications for extension management:

- Farmers have their own way of learning which they know it is best suited for them (Gerforth, 1996). The study, therefore, recommends that extension agents should use more group channels, such as group discussions, to provide farm management information including climate variability to farmers.
- The timing of group activities should be properly negotiated with farmers to ensure that it is convenient for them to attend such meetings.
- For any new farming idea that is to conveyed to farmers with the potential to reach and meet the needs of those seeking such information, which is the knowledge stage of the adoption-decision process, the use of mass media, such as the television, would be the most appropriate.
- **5.5 Further Research**

  In view of the fact that respondents in the study appear to be seeking information on innovations that could help solve farm management problems including climate variability issues, further study could look into particular farm management problems

respondents have and how mass media could be employed to reach these respondents with the requisite information.

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APPENDICES

APPENDIX A: ETHICAL CLEARENCE APPROVAL

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TURFLOOP RESEARCH ETHICS
COMMITI EE CLEARANCE CERTIFICATE

MEETING:	**09 October 2018**
PROJECT NUMBER:	**TREC/154/2018:PG**
PROJECT:	
Title:	Farmers' perceptions of public agricultural extension communication channels for delivering farm management information in Polokwane local municipality, Limpopo province.
Researcher:	**NN** Mahlangu
Supervisor:	Dr DB Afful
Co-Supervisor/s:	DrTS Dlamini
School:	Agricultural and Environmental Sciences
Degree:	Master of Science in Agricultural Economics

CH 1RP SON: TURFLOOP RESEARCH ETHICS COMMITIEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:
i) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee.**
ii) The **budget for the research will be considered separately from the** protocol.
PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

Finding solutions for Africa

APPENDIX B: LIMPOPO DEPARTMENT OF AGRICULTURE APPROVAL LETTER

Confidential

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
AGRICULTURE AND RURAL DEVELOPMENT

Ref: 12R

Enquiries: Dr. SB Dikgwatlhe
015 294 3229

23 June, 2016

Ms. N N MAGHLANGU
School of Agriculture and Environmental Sciences
Department of Agricultural Extension
University of Limpopo,
Sovenga

Re: PERMISSION TO CONDUCT RESEARCH ON FARMERS' PERCEPTIONS OF PUBLIC AGRICULTURAL EXTENSION COMMUNICATION CHANNELS FOR DELIVERING FARM MANAGEMENT INFORMATION IN POLOKWANE LOCAL MUNICIPALITY, LIMPOPO PROVINCE.

1. Your presentation on the 03rd June 2016 in LDARD Research Forum in request for permission to do research has reference.

2. Kindly take note that your request to conduct Research in Limpopo Province under Capricorn District has been officially approved. You are kindly required to visit the District Office before you start with your work. The department is prepared to embark on any activity to make this research work possible in order to improve the livelihood of the communities in our province.

3. Kindly take note that you will be expected to hand over a copy of your final report to the department for record purposes as well as for reporting. Furthermore, you may also be invited to share your findings in the departmental research platforms.

4. Hoping that you will find this in order.

Kind regards

23, JUNE 2016

Dr. S.B DIKGWATLHE
ACTING DIRECTOR - RESEARCH SERVICES

Date

67/69 Biccard Street, POLOKWANE, 0700, Private Bag X9487, Polokwane, 0700
Tel: (015) 294 3135 Fax: (015) 294 4512 Website: http://www.lda.gov.za

The heartland of Southern Africa - development is about people!

APPENDIX C: FACULTY APPROVAL LETTER

01/08/2016

NAME OF STUDENT: Mahlangu NN
STUDENT NUMBER: 201000621
DEPARTMENT: Agricultural Economics and Animal Production
SCHOOL: Agricultural and Environmental Sciences
QUALIFICATION: SAXA080

Dear Mr/Ms Mahlangu

FACULTY APPROVAL OF PROPOSAL (PROPOSAL NO.18 OF 2016)

I have pleasure in informing you that your masters proposal served at the Faculty Higher Degrees Committee meeting on **06 April 2016** and your title was approved as follows:

"Farmers' perceptions of public agricultural extension communication channels for delivering farm management information in Polokwane local municipality, Limpopo Province"

Note the following: The study

Ethical Clearance	**Tick One**
Requires no ethical clearance Proceed with the study	
Requires ethical clearance (Human) (TREC) (apply online) Proceed with the study only after receipt of ethical clearance certificate	✓
Requires ethical clearance (Animal) (AREC) Proceed with the study only after receipt of ethical clearance certificate	

Yours faithfully

Prof P Masoko
Secretariat: Faculty Higher Degrees Committee

UNIVERSITY OF LIMPOPO
FACULTY OF SCIENCE AND AGRICULTURE
2016 -08- 01
TURFLOOP CAMPUS
PRIVATE BAG X1106
SOVENGA 0727

CC: Dr DB Afful
Dr JJ Hlongwana
Prof TP Mafeo

APPENDIX D: ENGLISH QUESTIONNAIRE

A DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS ***(Write the number that corresponds to your response in the box provided)***

1. Gender/Sex

Male (1) Female (0)

2. Age (at last birthday in years)

3. No of years of schooling

4. Farming experience (years)

5. Cost (R) of buying or using communication channel ***(circle your response)***

Channel	Cost (R) of buying or using communication channel	
	Affordable	Not Affordable
5. 1. Interpersonal e.g. Visit by an extension officer to your farm	1	0
5. 2. Group methods (e.g. attending a training class	1	0
5.3. Mass media (e.g. TV Radio or newspaper)	1	0

6. Do you belong to a farming association/ group? ***(Circle your response) Yes or No?***

Farmer's innovation decision stage ***(circle your response)***

7. At this point of time, what type of climate variability information do you need for your farm management?

	Yes	No
7.1 Seeking information about farm management strategies soil moisture conservation strategies you can apply on my farm?	1	0
7.2 Seeking for more information about particular climate variability strategy information you already heard about?	1	0
7.3 Seeking advice about the usefulness of a climate farm management variability strategy you heard about?	1	0

7.4 Seeking information on how to apply a particular climate variability strategy I heard about on my farm?	1	0

Section B. USE OF COMMUNICATION CHANNELS FOR CLIMATE VARIABILITY INFORMATION

8. Indicate the channel (s) through which you access climate variability information for your farm management? (**Tick as many as apply)**

Radio broadcast	**1**
Television broadcast	**2**
Leaflets	**3**
Newspaper	**4**
Agent visit to your own farm	**5**
Training classes	**6**
Group discussion	**7**
Farmer's day	**8**
Lectures	**9**
Method demonstration	**10**
Result demonstration	**11**
Other (Specify)…….	

9. How many times did you receive climate variability information last year through those channels that you have mentioned/ticked?

….Information Channels	Number of times
9.1 Radio broadcast	
9.2 Television broadcast	
9.3 Leaflets	
9.4 Newspaper	
9.5 Agent visit to your own farm	
9.6 Training classes	

9.7 Group discussion	
9.8 Farmer's day	
9.9 Lectures	
9.10 Method demonstration	
9.11 Result demonstration	
9.12 Other	

10. Mention five channels through which you prefer to receive climate variability information for your farm management?

Information Channel	**State your preference (…..1st, 2nd, 3rd) of channel**
10.1 Radio broadcast	
10.2 Television broadcast	
10.3 Leaflets	
10.4 Newspaper	
10.5 Agent visit to your own farm	
10.6 Training classes	
10.7 Group discussion	
10.8 Farmer's day	
10.9 Lecturers	
10.10 Method demonstration	
10.11 Result demonstration	

10.12 Other	

Section C OVERALL CREDIBITY OF CHANNEL'S SOURCE OF CLIMATE VARIABILTY INFORMATION

11. Consider the channel (s) that you **mentioned (in question 8)** for receiving climate variability information last year and tell me whether the **channel's source** of information is knowledgeable about climate variability issues? ***(Circle your response)***

Information Channels	Knowledge ability of **channel's source** of information
11.1. Radio broadcast	1. Knowledgeable 0. Not Knowledgeable
11.2. Television broadcast	1. Knowledgeable 0. Not Knowledgeable
11.3. etc.Leaflets	1. Knowledgeable 0. Not Knowledgeable
11.4. Newspaper	1. Knowledgeable 0. Not Knowledgeable
11.5. Agent visit to your farm	1. Knowledgeable 0. Not Knowledgeable
11.6. Training classes	1. Knowledgeable 0. Not Knowledgeable
11.7. Group discussions	1. Knowledgeable 0. Not Knowledgeable
11.8. Farmers day	1. Knowledgeable 0. Not Knowledgeable
11.9. Lecturers	1. Knowledgeable 0. Not Knowledgeable
11.10. Demonstration	1. Knowledgeable 0. Not Knowledgeable
11.11. Result demonstration	1. Knowledgeable 0. Not Knowledgeable

12. Do you think the **channel's source** of information is trustworthy (honest/sincere) about the climate variability information he/she is presenting? ***(Circle your response)***

Information Channels	18. Trustworthiness of **channel's source of information?**
12.1. Radio broadcast	1. Honest/sincere 0. Not honest/ sincere
12.2. Television broadcast	1. Honest/sincere 0. Not honest/ sincere
12.3. Leaflets	1. Honest/sincere 0. Not honest/ sincere

12.4. Newspaper	1. Honest/sincere 0. Not honest/ sincere
12.5. Agent visit to your farm	1. Honest/sincere 0. Not honest/ sincere
12.6. Training classes	1. Honest/sincere 0. Not honest/ sincere
12.7. Group discussions	1. Honest/sincere 0. Not honest/ sincere
12.8. Farmers day	1. Honest/sincere 0. Not honest/ sincere
12.9. Lecturers	1. Honest/sincere 0. Not honest/ sincere
12.10. Demonstration	1. Honest/sincere 0. Not honest/ sincere
12.11. Result demonstration	1. Honest/sincere 0. Not honest/ sincere

13. Do you think the **channel's information source** is objective (i.e. both the advantages and the disadvantages of the information) about climate variability issues presented? ***(Circle your response)***

Information Channels	Objectivity of **channel's information source**
13.1. Radio broadcast	1. Presents both sides 0. Presents only one side
13. 2. Television broadcast	1. Presents Both sides 0. Presents only one side
13.3. etc. Leaflets	1. Presents Both sides 0. Presents only one side
13.4. Newspaper	1. Presents Both sides 0. Presents only one side
13.5. Agent visit to your farm	1. Presents Both sides 0. Presents only one side
13.6. Training classes	1. Presents Both sides 0. Presents only one side
13.7. Group discussions	1. Presents Both sides 0. Presents only one side
13.8. Farmers day	1. Presents Both sides 0. Presents only one side
13.9. Lecturers	1. Presents Both sides 0. Presents only one side
13.10. Demonstration	1. Presents Both sides 0. Presents only one side
13.11. Result demonstration	1. Presents Both sides 0. Presents only one side

OVERALL UTILITY OF CHANNEL'S SOURCE OF CLIMATE VARIBILITY INFORMATION

14. Does the **channel's source** of information give you practical advice on how to apply the information on your farm? ***(Circle your response*)**

Information Channels	18. **Channel's information source** gives me practical advice on how to apply the information on my farm
14.1. Radio broadcast	1. Yes 0. No
14. 2. Television broadcast	1. Yes 0. No
14.3. etc.Leaflets	1. Yes 0. No
14.4. Newspaper	1. Yes 0. No
14.5. Agent visit to your farm	1. Yes 0. No\
14.6. Training classes	1. Yes 0. No
14.7. Group discussions	1. Yes 0. No
14.8. Farmers day	1. Yes 0. No
14.9. Lecturers	1. Yes 0. No
14.10. Demonstration	1. Yes 0. No
14.11. Result demonstration	1. Yes 0. No

15. Has the **channel** (s) through which you receive information increased your understanding of climate variability issues and how they apply to your production?

Information Channels	**Channel** (s) through which I receive information has increased my understanding of climate variability issues and/or how they apply to my production
15.1. Radio broadcast	1 Yes 0. No
15.2. Television broadcast	1. Yes 0. No
15.3 etc. Leaflets	1. Yes 0. No
15.4. Newspaper	1. Yes 0. No
15.5. Agent visit to your farm	1. Yes 0. No

15.6. Training classes	1. Yes 0. No
15.7. Group discussions	1. Yes 0. No
15.8. Farmers day	1. Yes 0. No
15.9. Lecturers	1. Yes 0. No
15.10. Demonstration	1. Yes 0. No
15.11. Result demonstration	1. Yes 0. No

16 Is the **channel's source** of information relevant for your farm's situation? ***(Circle your response)***

Information Channels	Relevance of channel's information for my farm situation
16.1. Radio broadcast	1. Yes 0. No
16. 2. Television broadcast	1. Yes 0. No
16.3. etc.Leaflets	1. Yes 0. No
16.4. Newspaper	1. Yes 0. No
16.5. Agent visit to your farm	1. Yes 0. No
16.6. Training classes	1. Yes 0. No
16.7. Group discussions	1. Yes 0. No
16.8. Farmers day	1. Yes 0. No
16. 9. Lecturers	1. Yes 0. No
16.10. Demonstration	1. Yes 0. No
16.11. Result demonstration	1. Yes 0. No

17 Does the **channel's source** of information motivate (i.e. make you want) to find out more about climate variability subject? ***(Circle your response)***

Information Channels	Channel's information source motivates me to find out more about the climate variability subject

17.1 Radio broadcast	1. Yes 0. No
17.2. Television broadcast	1. Yes 0. No
17.3. etc.Leaflets	1. Yes 0. No
17.4 Newspaper	1. Yes 0. No
17.5. Agent visit to your farm	1. Yes 0. No
17.6. Training classes	1. Yes 0. No
17.7. Group discussions	1. Yes 0. No
17.8. Farmers day	1. Yes 0. No
17. 9. Lecturers	1. Yes 0. No
17.10. Demonstration	1. Yes 0. No
17.11. Result demonstration	1. Yes 0. No

18. What are the **three** most important challenges (e.g. time of the meeting, time for broadcast etc) that you are facing in receiving climate variability information from communication channels for your farm management (List them in order of importance).

1st ……

2nd ……

3rd ……

END

THANK YOU FOR PARTICIPATING!

APPENDIX E: SEPEDI QUESTIONNAIRE

KAROLO A: Ditaba ka dipalopalo le ekonomi (ngwala nomoro ya go sepelelana le karabo ya gago mo lepokisaneng leo o le filwego)

1.Bong

Monna Mosadi

2. Mengwaga

3 Sebakasa mengwaga ye o

tsenego sekolo 4 Boitemogelo

bja tša temo

5. Boleng bja go reka goba go šomiša kanale ya poledišano go amogela ditaba ka phetogo ya leratadima

Kanale	Boleng bja go reka goba go šomiša kanale	
	fihlelego	Ga ye fihlelege
5.1 Kamano ya batho mohlala ketelo ka setsibi tshemong ya gago	1	0
5.2 Mokgwa wa sehlopha (go ya mo ba go rutago gona)	1	0
5.3 Mmeya ditaba ka bontšhi (mohlala Thelebišene goba kuranta)	1	0

6 Na ke wena wa mokgahlo goba sehlopha sa bolemi? (dira nkgokolo phetolong ya gago) ee goba aowa

Karalo ya molemiši ya go tšeya sephetho ka dikakanyo (dira nkgokolo karabong ya gago)

7.Mo nakong ye o hloka ditaba tša mohuta mang diphetogo tsa leretadima ka taolo ya tšhemo ya gago?

	Ee	Aowa
7.1 Na o hloka ditaba ka mokgwa wa go laoala tshemo	1	0
7.2 Na o hloka ditaba tše dintšhi ka mokgwa wa phetogo ya leratadima go feta ka mokgwa wo o šetšego o kwele?	1	0
7.3 Na o hloka maele ka mohola wa go laola tshemo wo o kwelego ka gona?	1	0
7.4 Na o nyaka ditaba gore o ka šomiša bjang mokgwa wa phetogo ya leratadima mo tšhemong ya gago wo o kwelego ka gona?	1	0

Section B. Ditaba ka tšhomišo ya kanale ya poledišano ka phetogo ya leratadima

KAROLO B (Tšhomišo ya ditsela tša poledišano phetogong ya maemo a boso)

8. Bontšha dikanale tšeo o fihlelelago phetogo ya leratadima ka taolo ya tšhemo ya gago? (swaya bontšhi bjo o ka bo kgonago)

Kgašo ya seyalemoya	1
Kgašo ya thelebišene	2
Dipampiri tša papatšo	3
Dikuranta	4
Ketelo ya setsibi tšhemong ya gago	5
Diphapoši txa thuto	6
Poledišano ya sehlopha	7
Letšatši la molemiši	8

Bafahloši	9
Mokgwa wa pontšho	10
Poelo ya pontšho	11
Ye nngwe(tšweletša)……..	

9. O amogetxe ditaba ga kae ka phetogo ya leratadima go tšwa go di kanale tše o di swailego?

…..ditaba ka dikanale	ga kae
9.1 Kgašo ya seyalemoya	
9.2 Kgašo ya thelebišene	
9.3 Dipampiri tša papatšo	
9.4 Kuranta	
9.5 Ketelo ya setsibi tšhemong ya gago	
9.6 Diphapoši tša boithutelo	
9.7 Poledišano ya sehlopha	
9.8 Letšatši la molemiši	
9.9 Bafahloši	
9.10 Mokgwa wa pontšho	
9.11 Poelo ya pontšho	
9.12 Ye nngwe	

10 Bolela di chanele tše hlano tše o ratago go amogela phetogo ya leratadimo ka taolo ya tšhemo ya gago?

Kanale ya ditaba	Laetša tše wena o di ratago(……. Ya mathomo, bobedi, boraro) di channel
10.1 Kgašo ya seyalemoya	
10.2 Kgašo ya thelebišene	
10.3 Dipampiri tša papatšo	
10.4 Kuranta	
10.5 Ketelo ka setsibi tšhemong ya gago	
10.6 Diphapoši tša boithutelo	
10.7 Poledišano ya sehlopha	
10.8 Letšatši la molemiši	
10.9 Bafahloši	
10.10 Mokgwa wa taetšo	
10.11 Poelo ya taetšo	
10.12 Ye nngwe	

KAROLO C: Kakaretšo ya tshepišo ka ditaba txa mo go tšwago phetogo ya leratadima

Gopola dikanale tše o di boletšego (mo potšišo 8) ka go amogela diataba txa phetogo ya leratadima ngwageng o fetilego gape o mpotše ga eba mo go tšwago ditaba tša phetogo ya leratadima ba na le tsebo? (dira nkgokolo phetolong ya gago)

kanale ya ditaba	Bokgoni bja tsebo ka channel ya mo o tšwago ditaba

11.1 Kgašo ya seyalemoya	1. go ba le tsebo 0. Go hloka tsebo
11.2 Kgašo ya thelebišene	1. go ba le tsebo 0. Go hloka tsebo
11.3 Bjalo le bjalo dipampiri tša papatšo	1. go ba le tsebo 0. Go hloka tsebo
11.4 Kuranta	1. go ba le tsebo 0. Go hloka tsebo
11.5 Ketelo ya setsibi tšhemong ya gago	1. go ba le tsebo 0. Go hloka tsebo
11.6 Phapoši ya boithutelo	1. go ba le tsebo 0. Go hloka tsebo
11.7 Poledišano ya sehlopha	1. go ba le tsebo 0. Go hloka tsebo
11.8 Letšatši la molemiši	1. go ba le tsebo 0. Go hloka tsebo
11.9 Bafahloši	1. go ba le tsebo 0. Go hloka tsebo
11.10 Taetšo	1. go ba le tsebo 0. Go hloka tsebo
11.11 Poelo ya taetšo	1. go ba le tsebo 0. Go hloka tsebo

12. Na o nagana gore kanale ye ditaba di tšwago gona ya tshapagala(e bontšha kwelobohloko) ka tsela yeo a gašago ditaba tša phetogo ya leratadima? (dira nkgokolo karabong ya gago)

Kanale ya ditaba	18 Botshephegi bja channel yeo ditaba ditšwago gona
12.1 Kgašo ya seyalemoya	1.Bonnete bja kwelobohloko 0. Ga ye na bo nnete bja kwelobohloko
12.2. Kgašo ya thelebišene	1.Bonnete bja kwelobohloko 0. Ga ye na bo nnete bja kwelobohloko
12.3. Dipampiri tša papatšo	1.Bonnete bja kwelobohloko 0. Ga ye na bo nnete bja kwelobohloko
12.4 Kuranta	1.Bonnete bja kwelobohloko 0. Ga ye na bo nnete bja kwelobohloko
12.5. Ketelo ya setsibi tšhemong	1.Bonnete bja kwelobohloko 0. Ga ye na bo nnete bja kwelobohloko
12.6. Diphapoši tša boithutelo	1.Bonnete bja kwelobohloko 0. Ga ye na bo nnete bja kwelobohloko
12.7. Poledišano ya sehlopha	1.Bonnete bja kwelobohloko 0. Ga ye na bo nnete bja kwelobohloko
12.8. Letšatši la molemiši	1.Bonnete bja kwelobohloko 0. Ga ye na bo nnete bja kwelobohloko
12.9.Bafahloši	1.Bonnete bja kwelobohloko 0. Ga ye na bo nnete bja kwelobohloko
12.10. Taetšo	1.Bonnete bja kwelobohloko 0. Ga ye na bo nnete bja kwelobohloko
12.11. Poelo ya taetšo	1. Bonnete bja kwelobohloko 0 Ga ye na bo nnete bja kwelobohloko

13. o nagana gore channel yeo ditaba ditšwago e ganana le ka tsela yeo taba ya phetogo ya leratadima e gašiwago ka gona? (dira nkgokolo karabong ya gago)

Ditaba tša kanale	
13.1 Kgašo ya seyalemoya	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee
13.2. Kgašo ya thelebišene	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee
13.3 Bjalo le bjalo dipampiri tša papatšo	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee
13.4 Kuranta	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee
13.5 Ketelo ka setsibi tšhemong ya gago	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee
13.6 Diphapoši tša boithutelo	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee
13.7 Poledišano ya sehlopha	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee
13.8. Letšatši la molemiši	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee
13.9 Bafahloši	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee
13.10 Taetšo	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee
13.11 Poelo ya taetšo	1. E gaša mahlakore a mabedi 0. Gaša lehakore le le tee

Kakaretšo ya tšhomišo ya di kanale ye mo ditaba tše ditšwago gona

14. Na kanale ye mo ditaba di tšwago gona e go fa maele a tseneletšego gore o ka šomiša bjang ditaba tšeo tšhemong ya gago? (dira nkgokolo karabong ya gago)

Kanale ya ditaba	18 kanale ye ditaba di tšwago gona e mpha maele a gore nka di diriša bjang tšhemong
14.1 Kgašo ya seyalemoya	1.Ee 0. Aowa

14.2. Kgašo ya thelebišene	1.Ee 0. Aowa
14.3. Dipampiri tša papatšo	1.Ee 0. Aowa
14.4 Kuranta	1.Ee 0. Aowa
14.5. Ketelo ya setsibi tšhemong	1.Ee 0. Aowa
14.6. Diphapoši tša boithutelo	1.Ee 0. Aowa
14.7. Poledišano ya sehlopha	1.Ee 0. Aowa
14.8. Letšatši la molemiši	1.Ee 0. Aowa
14.9.Bafahloši	1.Ee 0. Aowa
14.10. Taetšo	1.Ee 0. Aowa
14.11. Poelo ya taetšo	1.Ee 0. Aowa

Na kanale ye o amogelago ditaba e okeditše kwešišo ya gago ka ditaba tša phetogo ya leratadima le gore o ka di šomiša bjang go tšweletšo ya gago?

Kanale ya ditaba	Dikanale tše ke amogelago ditaba go tšona di okeditše kwešišo yaka ka ditaba le gore nka di Šomiša bjang tšweletšong yaka
15.1 Kgašo ya seyalemoya	1. Ee 0. Aowa
15.2. Kgašo ya thelebišene	1. Ee 0. Aowa
15.3. Dipampiri tša papatšo	1.Ee 0. Aowa
15.4 Kuranta	1.Ee 0. Aowa
15.5. Ketelo ya setsibi tšhemong	1.Ee 0. Aowa
15.6. Diphapoši tša boithutelo	1.Ee 0. Aowa
15.7. Poledišano ya sehlopha	1.Ee 0. Aowa
15.8. Letšatši la molemi	1.Ee 0. Aowa
15.9.Bafahloši	1.Ee 0. Aowa
15.10. Taetšo	1.Ee 0. Aowa
15.11. Poelo ya taetšo	1.Ee 0. Aowa

16. Na kanale ye mo ditaba di tšwago gona ke ya maleba go maemo a tšhemo ya gago? (dira nkgokolo karabong ya gago)

Kanale ya ditaba	Bomaleba bja ditaba tše ke di khumanago ka seemo sa tšhemo yaka
16.1 Kgašo ya seyalemoya	1. Ee 0. Aowa
16.2. Kgašo ya thelebišene	1. Ee 0. Aowa
16.3. Dipampiri tša papatšo	1.Ee 0. Aowa
16.4 Kuranta	1.Ee 0. Aowa
16.5. Ketelo ya setsibi tšhemong	1.Ee 0. Aowa
16.6. Diphapoši tša boithutelo	1.Ee 0. Aowa
16.7. Poledišano ya sehlopha	1.Ee 0. Aowa
16.8. Letšatši la molemi	1.Ee 0. Aowa
16.9.Bafahloši	1.Ee 0. Aowa
16.10. Taetšo	1.Ee 0. Aowa
16.11. Poelo ya taetšo	1.Ee 0. Aowa

17. Na kanale ye mo ditaba di tšwago gona ya hlohloletša (e go dira gore o nyake go tseba kudu ka taba ye ya phetogo? (dira nkgokolo karabong ya gago)

Kanale ya ditaba	kanale ye mo ditaba di tšwago e nhlohloletša gore ke nyake go tseba kudu ka sehlogo se sa phetogo ya leratadima
17.1 Kgašo ya seyalemoya	1. Ee 0. Aowa
17.2. Kgašo ya thelebišene	1. Ee 0. Aowa
17.3. Dipampiri tša papatšo	1.Ee 0. Aowa
17.4 Kuranta	1.Ee 0. Aowa
17.5. Ketelo ya setsibi tšhemong	1.Ee 0. Aowa
17.6. Diphapoši tša boithutelo	1.Ee 0. Aowa
17.7. Poledišano ya sehlopha	1.Ee 0. Aowa
17.8. Letšatši la molemi	1.Ee 0. Aowa
17.9.Bafahloši	1.Ee 0. Aowa
17.10. Taetšo	1.Ee 0. Aowa
17.11. Poelo ya taetšo	1.Ee 0. Aowa

18. Ke mathata a ma fe a mararo a bohlokwa (mohlala nako ya kopano, nako ya kgašo bjalo le bjalo) a o llebanego le gona ka go amogela ditaba ka phetogo ya leratadima go di channel tša poledišano ka taolo ya tšhemo ya gago (A tšweletše ka tatelano go ya ka bohlokwa bja gona)

Mathomo……

…….

Bobedi……

……..

Boraro……

……

Phetšo

Re leboga go tšeya karolo wa gago!