

AGRICULTURAL INNOVATIONS AND DEVELOPMENT – A CASE STUDY OF COMMUNICATIONS ABOUT CONSERVATION FARMING IN KATETE DISTRICT

BY

JOYCE PHIRI

Thesis
M. CD
Ph
C 41
C 1

**A Report submitted to the University of Zambia in Partial Fulfilment of the
requirements for the award of the Degree of Master of Communication for
Development**

THE UNIVERSITY OF ZAMBIA

2011



DECLARATION

I Joyce Phiri declare that this report:

- a) Represents my own work;
- b) Has not been previously been submitted for a degree at this or any other University; and
- c) Does not incorporate any published work or material from another report.

Signed: [Signature]

Date:..... 04.03.11

All rights reserved. No part of this report may be reproduced or stored in any form or by means without prior permission in writing from the author or the University of Zambia.

APPROVAL

This report ofJoyce Phiri..... is approved as fulfilling the partial requirements for the degree of Masters of Communication for Development by the University of Zambia.

Signed:

Date:

...KENKY MAKUNGU.

07-03-11.....

Plummer

.....

.....

.....

.....

.....

ABSTRACT

Zambia like other countries in the Southern Africa is faced with problems of food security due to decline in soil fertility, fodder shortage especially in the dry season, continuous cultivation without application of fertilizer or manure, increased soil erosion, soil exhaustion and low inherent soil fertility (Kwesiga and Beniast, 1998).

In the subsistence agricultural region of Eastern Zambia, less than 10% of the households have adequate supply of maize the staple food, throughout the year. A major constraint to increasing crop production in the area is poor fertility status of the soil. In order to address this problem, conservation farming was introduced as a technology for improving soil fertility. Farmers have been using this technology for a number of years now in the study area. This report has been undertaken to find out if farmers have improved crop yield in Kagoro/ Kafumbwe camps.

The rationale of the study is to analyze the effectiveness of communication strategies used in Conservation Farming. This problem is worth studying because there has never been such a study about Conservation Farming in Katete District. Therefore, this study will contribute to the body of knowledge on the importance of Conservation Farming in areas where there are declining agricultural production. It will also provide a forum for the farmers to express their views on the project in the study area and illustrate their expectations and frustrations as they adopt the alternative strategy to increase their productivity. The results will help Ministry of Agriculture and the extension workers on the communication strategies to use as innovations are being introduced.

For data collection, 100 questionnaires were prepared and distributed to the targeted audience. The respondents themselves filled in the questionnaires but for those that could not to read and write, the researcher read out and translated in the local vernacular while the researcher filled in the questionnaire as the respondent answered the questions. The researcher also used Focus Group Discussion, In-depth Interview and Observation.

The main aim of this study is to evaluate the impact of communication regarding Conservation Farming technology in increasing maize production in Kagoro village n Katete District. The specific objectives are to: evaluate the perceptions of farmers regarding the effectiveness to the communication strategies used by Agricultural Officers on the farming techniques, Find out the impact of adoption of Conservation Farming techniques in Kagoro village, determine the agricultural Officer's communication strategies for reaching the targeted groups, Find out the problems farmers face that contribute to low crop yield, Examine the communication channels used by Extension Officers.

The main benefit of CF in Kagoro/Kafumbwe farmers is increased yield of crops especially maize. The study found that there is information flow between the farmers and the agricultural extension service providers. 64% of the respondents were visited frequently by the Extension officers, 31% were visited very frequently and 5% said were rarely visited. This means that the farmers had access to information that is relevant and useful to them from the Extension officers. The Agricultural Extension Officers are using a number of channels and approaches to disseminate information to Kagoro/Kafumbwe farmers.

For data collection, 100 questionnaires were prepared and distributed to the targeted audience. The respondents themselves filled in the questionnaires but for those that could not to read and write, the researcher read out and translated in the local vernacular while the researcher filled in the questionnaire as the respondent answered the questions. The researcher also used Focus Group Discussion, In-depth Interview and Observation.

The main aim of this study is to evaluate the impact of communication regarding Conservation Farming technology in increasing maize production in Kagoro village n Katete District. The specific objectives are to: evaluate the perceptions of farmers regarding the effectiveness to the communication strategies used by Agricultural Officers on the farming techniques, Find out the impact of adoption of Conservation Farming techniques in Kagoro village, determine the Agricultural Officer's communication strategies for reaching the targeted groups, Find out the problems farmers face that contribute to low crop yield, Examine the communication channels used by Extension Officers.

The main benefit of CF in Kagoro/Kafumbwe farmers is increased yield of crops especially maize. The study found that there is information flow between the farmers and the agricultural extension service providers. 64% of the respondents were visited frequently by the Extension Officers, 31% were visited very frequently and 5% said were rarely visited. This means that the farmers had access to information that is relevant and useful to them from the Extension Officers. The Agricultural Extension Officers are using a number of channels and approaches to disseminate information to Kagoro/Kafumbwe farmers.

TO MY LATE FATHER AND MOTHER

I dedicate this report to my late father Mr. Aaron Phiri and mother Mrs. Mary Phiri for bringing me up and their support towards my education to enable me have access to the higher level of education in the long run. May their Souls rest in Internal Peace.

I also dedicate it to my husband Herbert Mwiinga for allowing me further my education and the support he gave me during my time of study.

I also dedicate my work to my beloved children; Jacob, Herbert Jr, Betty and Nchimunya for the love they showed during this difficult time when I was undertaking my studies.

ACKNOWLEDGEMENT

The success of this dissertation was a result of the support and encouragement from various people to whom I feel greatly indebted. Many thanks for their contributions and encouragements.

First and foremost, I would like to give special thanks to my Research Supervisor Mr. Kenny Makungu for his consistent, effective and efficient checks on my work throughout the research process and indeed for his guidance. May the almighty God bless him and his family.

In addition, I pay great honour and respect to all my Lecturers; Mr. Fidelis Muzyamba who lectured me in research methods, Mrs. Carole Chibbonta and Dr. Elijah Bwalya for their commitment and effective lecturing.

I thank the following members of staff in the Ministry of Agriculture and Co-operatives based at the District Offices in Katete for their support in the research process. These are Dr. Edward Chanda- the District Agricultural Co-ordinator (DACO) of Katete District, Mr. Victor Siame - Senior Agricultural Officer (SAO), Mrs. Rhoda Kumwenda and Mr. Golden Kasawanya.

I also pay gratitude to the Block Officer for Southern Block- Mr. Isaac Banda who is also the Camp Officer for Kagoro the Headquarters of Southern Block, Mr. Simon Mwale – Camp Officer for Kafumbwe who played a major role in organizing the farmers in the research areas.

I also thank Headman Bizaliyele- Mr. Patrick Mwale, Mr. Josias Lungu Conservation Farming Unit (CFU) Co-ordinator, Kagoro Camp Chairperson – Mr. Mangani Phiri, Mr. Tembo – Contact Farmer in Kafumbwe Camp and Mrs. Cecilia Phiri – Contact Farmer in Kagoro Camp for helping me organizing Field Days/Demonstration Days, and necessary data for my research.

I would also wish to give thanks to my late sister Daisy Phiri who passed on the time I was labouring for the MCD Programme. She encouraged me to further my studies. May her Soul rest in Peace.

I wish to convey special Gratitude to Mr. John Daka – Head teacher of Mambwe High School for encouraging me to take up the challenging Programme.

I would also like to thank all my classmates in the masters of Communication for Development Programme in the year 2009/2010 for their encouragements during my study.

Finally, I wish to thank everyone who helped me in one way or another to the success of this dissertation. May the good Lord bless you all.

0281793

TABLE OF CONTENT

Title of the report

Declaration i

Copyright ii

Approval iii

Abstract iv

Dedication v

Acknowledgements vi

Table of contents vii

List of tables viii

CHAPTER 1: INTRODUCTION AND BACKGROUND		PAGE
1.0	Introduction	1
1.1	Historical Background of the study	3
1.1.2	Farming is the First, Second and the third Republics	4
1.1.3	Role of Agriculture in Zambia’s Economy	6
1.1.4	Land Issue	7
1.2	Profile of Zambia	7
1.3	Profile of Eastern Province	8
1.4	Profile of Katete District	8
1.4.1	Demography	8
1.4.2	Population	8

1.4.3	Population Density	9
1.4.4	Agriculture.....	9
1.5.1	Location of the District	9
1.5.2	Size of the District	9
1.5.3	Location of the study	9
1.6	Climate	11
1.6.1	Rainfall	11
1.6.2	Temperature.....	11
1.7	Vegetation	11
1.7.1	Soils	11
1.8	Background of the Study	12
1.9	Problem Statement	14
1.10	Rationale	15
1.11	Objective of the Study	16
1.11.1	Specific Objectives	16

CHAPTER 2: METHODOLOGY

2.0	Introduction	17
2.1	Research Question	17
2.2	Research Methods	17
2.3	Quantitative Methods	18
2.4	Qualitative Methods	18
2.4.1	Focus Group Discussion	19
2.4.2	In-depth Interviews	19
2.4.3	Observation	19
2.5	Sampling Procedures	20

2.6	Data Gathering Techniques	20
2.7	Data Analysis and Interpretation	21
2.8	Limitation of the Study	21

CHAPTER 3: THEORETICAL AND CONCEPTUAL FRAMEWORK

3.0	Conceptual and Operational Definitions	22
3.1	Definition of Terms	22
3.1.1	Communication	22
3.1.2	Mass Communication	23
3.1.3	Strategy	23
3.1.4	Communication for Development	23
3.1.5	Participatory Communication	24
3.1.6	Development	24
3.1.7	Opinion Leaders	24
3.1.8	Conservation Farming	25
3.1.9	Sustainable Agriculture.....	25
3.1.10	Land Tenure	25
3.1.11	Innovation/Technology	26
3.1.12	Improved Tree Fallows	26
3.1.13	Tillage	26
3.1.14	Household	27
3.1.15	Agricultural Extension	27
3.2	Theoretical Framework	27
3.2.1	Activation Theory of Information Exposure	27
3.2.2	Diffusion of Innovation Theory	28

3.2.3	Agenda Setting Theory	34
-------	-----------------------------	----

CHAPTER 4: LITERATURE REVIEW

4.0	INTRODUCTION	35
4.1	Communication and Campaign Systems about Agriculture	35
4.2	History of Agricultural Extension Services	40
4.3	Extension Systems in Zambia	42
4.4	Background to the Development of Agriculture in Zambia	44
4.4.1	Agricultural Policy and Vision	45
4.5	Colonial Agricultural Systems before 1945	45
4.6	Agricultural Development in the period 1945 – 1964	46
4.7	Agricultural Development in the post Independence period – 1964 to present.....	46
4.8	Background to the Development of Conservation Farming.....	47
4.8.1	Importance of Crop Rotation	49
4.8.2	The main Benefit of Conservation Farming [CF] System	50
4.9	Agricultural Developmental Project	57
4.10	Land Degradation	59

CHAPTER 5: RESEARCH FINDINGS AND INTERPRETATION OF RESULTS

5.0	INTRODUCTION	60
5.1	Findings	61
5.1.1	Age	61
5.1.2	Marital Status	62
5.1.3	Education levels	62

5.1.4	Gender	63
5.1.5	Household size	64
5.1.6	Length of stay in Kagoro/Kamfumbwe Camps by respondent....	65
5.1.7	Land Tenure	66
5.1.8	Visits by Extension Officers	66
5.1.9	Impact of the Adoption of CF Technology on maize Production	67
5.1.10	Benefits seen since the Adoption of Conservation Farming as a Soil conservation technique	68
5.1.11	Maize Production increase due to CF farming technology	69
5.2	Other Crops normally grown in Kagoro/Kafumwe	70
5.2.1	Sources of latest Agricultural Information	71
5.2.2	Problems affecting effective listening to radios	71
5.2.2.1	Suggestion to reduce these problems regarding Radio presentations.....	72
5.2.3	Challenges encountered in farming activities	73
5.2.4	Perception of respondents regarding the effectiveness of Agricultural programmes	75
5.2.0	Focus Group Discussions	75
5.2.1	How the people of Kagoro/Kafumbwe learnt about CF	77
5.2.2	Problems causing low crop yield	78
5.2.2.1	How they can be overcome	78
5.2.3	Respondents benefits on CF	79
5.2.4	Benefits from Extension Officers' visits	81
5.2.5	NGOs helping in adoption of CF	81

5.2.6	What Government should do to help improve CF.....	81
	In-depth interview with Agricultural Officers	
5.3.0	Description	82
5.3.1	Communication Strategies used by Extension Officers	82
5.3.2	Challenges faced by farmers	83
5.3.3	Other Channels of Communication	84

CHAPTER 6: DISCUSSION OF THE RESULTS

6.0	INTRODUCTION	85
6.1	Visits by Extension Officers	85
6.2	Importance of Agricultural Broadcast Programmes	87
6.3	Applicability of Extension Communication Strategies	89
6.4	Barriers to Effective Listening to radios	90
6.5	Maize Production increase due to Conservation Farming	91
6.6	Land Ownership	91
6.7	Challenges encountered in farming activities	92
6.8	Problems Extension Officers face.....	94
6.9	Education level	95
6.10	Gender imbalances in Agriculture.....	96
6.11	Household Size	98

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.0	Introduction	99
7.1	Recommendations	100

7.2	Communication and Effective Reception	101
7.3	Supervision Visits	102
7.4	Improvement of Infrastructure in rural areas	102
CHAPTER 8: REFERENCES		104
CHAPTER 9: APPENDICES		
9.1	Appendix 1: Questionnaire for farmers	108
9.2	Appendix 2: In-depth guide for respondents	117
9.3	Appendix 3: In-depth guide for Extension Officers	118
9.4	Appendix 4: A guide for Focus Group Discussion	119

LIST OF TABLES

Table 1: Guide to planting dates for different crops	51
Table 2: Maize production increase between 2006-2010	69
Table 3: Sex in relation to listening to Agricultural programmes.....	89
Table 4: Land ownership in relation to adoption of CF	92
Table 5: Education levels in relation to adoption of CF	95
Table 6: Sex in relation to adoption of CF	97

LIST OF PICTURES

Picture 1: Chaka hoe	52
Picture 2: Cassava plant	54
Picture 3: Musangu trees in maize field	56.
Picture 4: Jatropher trees	57
Picture 5: Lead farmer on Demonstration day	78
Picture 6: Lead farmer practicing Agroforestry	79

LIST OF FIGURES

Figure 1: Map of Zambia(Eastern Province, Katete District-Kagoro/Kafumbwe Camps).....	10
Figure 2: Age	61
Figure 3: Marital Status	62
Figure 4: Education Level	63
Figure 5: Gender	64
Figure 6: Household size	65
Figure 7: Length of stay at Kagoro/Kafumbwe	65
Figure 8: Land Tenure	66
Figure 9: Visits by Extension Officers	67
Figure 10: Other benefits seen since adoption of CF	68
Figure 11: Impact of adoption of CF Maize production	69
Figure 12: Other crops normally grown	70
Figure 13: Sources of Agricultural Information	71
Figure 14: Problems affecting listening to radios	72
Figure 14: Suggestions to reduce problems	73
Figure 15: Challenges encountered in farming activities	74
Figure 16: Perception regarding effectiveness of radio programmes	75

ACRONYMS

ASP	Agriculture Support Programme
CF	Conservation Farming
CFU	Conservation Farming Unit
GART	Golden Valley Agricultural Research Trust
DACO	District Agricultural Coordinator
DC	District Commissioner
FAO	Food and Agricultural Organization
FSP	Fertilizer Support Programme
GDP	Gross Domestic Product
USAID	US Government Humanitarian Agency
TV	Television
MMD	Movement for Multiparty Democracy
UNIP	United National Independence Party
FRA	Food Reserve Agency
ZNBC	Zambia National Broadcast Corporation
SPSS	Statistical Package for Social Sciences
NGO	Non-Governmental Organisation

FAO	Food and Agricultural Organisation
DACO	District Agricultural Coordinator
MACO	Ministry of Agriculture and Co-operatives

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.0 Introduction

Zambia like any other country in Southern Africa faces problems of food security due to a decline in soil fertility, fodder shortage especially in the dry season, continuous cultivation without application of fertilizers or manure, increased soil erosion, soil exhaustion and low inherent soil fertility (Kwesiga and Beniast, 1998). It is for this reason that this report looks at communication strategies used by extension officers on agricultural innovations on conservation farming in Kagoro Camp in Katete District.

This report is divided into seven chapters.

Chapter 1 provides the background of the study and covers a brief introduction on the background of Farming in Zambia from the colonial period to date. This chapter covers three sub areas namely; a brief background about farming in the First, Second and Third Republics of Zambia, The role of agriculture in the Zambia's economy, the profile of Katete District, problem statement and objectives of the study.

Chapter 2 is about methodology where both qualitative and quantitative methods will be discussed. It gives an outline of methods used to carry out this study. These are primary data collection process, target population and then secondary data collection process.

Chapter 3 is about conceptual framework, which discusses theories that are relevant to this study.

Chapter 4 is literature review on background to the development of Agriculture in Zambia, Colonial Agricultural systems before 1945 and Agriculture Development in the period 1945-1964. The chapter also looks at Agricultural Development in the Post Independence to date, Communication and Campaign Systems about Agriculture and Extension Systems in Zambia and lastly the Development of Conservation Farming Innovations in general, available in Zambia's Eastern Province and in particular Kagoro/Kafumbwe Camps in the Southern Block in Katete District.

Chapter 5 is the presentation of the research findings and interpretations.

Chapter 6 is a discussion of these findings as they relate to the objectives of the study as outlined in Chapter 1, starting with the perceptions of farmers regarding effectiveness of communication strategies used by Agricultural Officers on the farming techniques.

The second part is about the adoption part of Conservation Farming Technique in Kagoro Camp. The third part looks at communication strategies the Agricultural Officers use for reaching the targeted farmers. Then the fourth part looks at the problems farmers face leading to low crop yields and then examine the communication channels used by the Extension Officers.

Chapter 7 is the last and deals with the conclusions the author draws from the research findings and the recommendations that have been derived from the study for policy makers and implementers on the future prospects of Conservation Farming in the study area.

Farmers in the past took care of the problems of declining soil fertility by practicing shifting cultivation (using natural vegetation and grass fallowing). However, Zambian population is

growing at a faster rate. The United Nations Economic Commission for Africa estimated Zambia's population at 9,133,000 in 2000, a notable rise from the 1995 level of 8,081,000. In 2000, the birth rate was at 41.9 births per 1000. <http://www.nationsencyclopedia.com/economies/Africa/Zambia.html>

This has increased pressure on the limited amount of land available for agricultural production because most of it is infertile. This has made it impossible to maintain the traditional long-term natural fallows. The fallow periods in most plateau areas of Zambia range from one to five years (Kwesiga: 1998). This is insufficient time to allow for full regeneration of the soils and forests.

Farmers in Katete District have resorted to cultivating the same piece of land season after season, often growing the same type of crop. This has of course negatively affected the crop yield and household food security.

1.1 Historical Background of the study

In Eastern Zambia and other areas like those along the line of rail and some parts of Northern Province, soil degradation was worsened by the creation of Native Reserves in the 1920s (Kay : 1965). The reserves were established to create room for European Settler Farmers and this caused overcrowding in the Native Reserve, which led to environmental degradation in these Reserves.

By 1930s, the cycle of degradation or degenerative changes on the land were clearly visible as Chidumayo (1995) points out in the Annual Report of the Provincial Commissioner for Eastern Province. He indicated that there was congestion in the reserves, which resulted in

rapid denuding of the land of timber, and that erosion was a serious problem that was impairing Agricultural production.

Land provision for Africans through Reserves was clearly inadequate because those allocating the land often failed to understand the dynamism of the African Traditional farming systems and their need for bush-fallow land and the prospects of African population increase and increased cultivation in response to market opportunities that arose with the opening of copper mines in the 1920s and 1930s.

With this background of environmental degradation and overcrowding in the former Reserves and its consequences of declining agricultural productivity in the view of expanding population, there is need to look at alternatives such as Conservation Farming technique to improve on the declining agricultural productivity.

1.1.2 Farming in the First, Second and the Third Republics

Zambia is characterized by three Republics namely the First, Second and Third Republics. The First Republic was formed from independence in 1964 to 1972, the Second Republic was from 1972 to 1990 under President Dr Kenneth Kaunda under UNIP, and the Third Republic was from 1991 to 2001 under President Fredrick Chiluba from 2001 to 2008 under President Mwanawasa and from 2008 to date under President Banda.

Agriculture's role in the First Republic was to aid in diversifying the economy, to increase personal incomes and employment especially in rural areas, to decrease dependence on food imports, to increase purchasing power in rural areas and to provide an expanded market for the industrial sector.

rapid denuding of the land of timber, and that erosion was a serious problem that was impairing Agricultural production.

Land provision for Africans through Reserves was clearly inadequate because those allocating the land often failed to understand the dynamism of the African Traditional farming systems and their need for bush-fallow land and the prospects of African population increase and increased cultivation in response to market opportunities that arose with the opening of copper mines in the 1920s and 1930s.

With this background of environmental degradation and overcrowding in the former Reserves and its consequences of declining agricultural productivity in the view of expanding population, there is need to look at alternatives such as Conservation Farming technique to improve on the declining agricultural productivity.

1.1.2 Farming in the First, Second and the Third Republics

Zambia is characterized by three Republics namely the First, Second and Third Republics. The First Republic was formed from independence in 1964 to 1972, the Second Republic was from 1972 to 1990 under President Dr Kenneth Kaunda under UNIP, and the Third Republic was from 1991 to 2001 under President Fredrick Chiluba from 2001 to 2008 under President Mwanawasa and from 2008 to date under President Banda.

Agriculture's role in the First Republic was to aid in diversifying the economy, to increase personal incomes and employment especially in rural areas, to decrease dependence on food imports, to increase purchasing power in rural areas and to provide an expanded market for the industrial sector.

A number of policy initiatives defined agricultural development during this period in the First and Second Republics. Some of these policy initiatives were producer cooperatives in the early 1960s, Rural Reconstruction Centres in the 1970s, Zambia National Service (ZNS) production camps after 1975, tractor mechanization units, Credit Organizations for small-scale farmers, Lima Programme, and the Operation Food Programme in the 1980s and Resettlement Schemes in the 1990s.

The government put much effort and money into marketing services. The main Marketing Board operational in Zambia then was The National Agricultural and Marketing Board (NAMBOARD). The Provincial Cooperative Marketing Unions were also involved in the marketing of agricultural produce. This meant ready market for farmers. Farmers got loans through Agricultural Finance Company (AFC).

Zambia's economy was dominated by export of mineral resources and was urban centered. The overriding objective of state agricultural policy was to secure a flow of cheap food (through consumer subsidy) to urban areas and thereby reduce the level of inflation directly and indirectly by reducing wage demands. Subsidized urban food prices caused increasingly obvious problems for farmers' output, food imports and government budgets (TNDP, 2003).

Zambia's presently policy of liberalization, which came into existence in 1991 under the MMD in the Third Republic, is correct for revitalizing agriculture. The Third Republic was from 1991 to date. The MMD Party under President Chiluba had taken over from UNIP. The government's pricing and marketing policies in agricultural sector during the 1991 to date failed to provide sufficient incentives for increased output by farmers, and also discouraged private sector-led agricultural development especially in the input and output markets.

The removal of subsidies on farming input such as fertilizer, maize seeds, collapse of agricultural credit programs and parastatal marketing system in the Third Republic marked a major turning point in farmers' socio-economic environment and their capacity to afford chemical fertilizers. Private sector did not fill the gap left when government withdrew its interventions in the fertilizer and markets as was originally assumed by the Structural Adjustment Programme (SAP). The provincial cooperative marketing unions, NAMBOARD was abolished and this meant farmers losing markets. Though the government has introduced Fertilizer Support Programme, not all farmers could afford to find cash needed for fertilizer. Those with money are benefiting because they usually buy in bulky by giving money to those who do not have to buy for them.

1.1.3 Role of Agriculture in Zambia's Economy

The Economy of Zambia depended on mining but agriculture played an important role in the development of the economy too. According to ILO, about 75% of the total population living in rural areas is engaged in a wide range of agricultural activities. The agricultural sector plays a very important role in the economy of the country accounting for 18-20% of total GDP. Agriculture is the single largest contributor to income and employment generation and a vital element in the country's challenge to achieve self-sufficiency in the food production to reduce rural poverty and foster sustainable economic development. This has therefore, accorded high priority to this sector to enable the country to meet these challenges and make this sector commercially profitable.

1.1.4 Land Tenure

Zambia has a historical heritage of land uses and systems. With a total land area of 752,000 square kilometres, several issues affect land resources management. Some of these are land tenure, ecological Zones and land use.

Most of Zambia's land falls under the customary land tenure system. This is traditional system of land management and administration. The underlying principle of this system is that the community holds land in common ownership in perpetuity. Land is transferable following family/community traits. The other category of the land is that which is held under leasehold tenure system. Under this category, title to land is given to the applicant for a period not exceeding 99 years after which the lease has to apply for renewal of the title. [http://www.zamlil.ac.zm/acts/land 95.htm](http://www.zamlil.ac.zm/acts/land%2095.htm)

The current land Act recognizes traditional land as eligible for state registration and thus people owning land under customary tenure can convert it to leasehold title. This in effect converts customary land to leasehold land.

1.2 Profile of Zambia

Zambia is a landlocked country in the South Central Africa with its surface area of 752,615 square kilometres. The country shares its boundary with eight countries and these are; Tanzania in the north-east, Angola in the west, Malawi in the west, Democratic Republic of Congo (DRC)in the north, Zimbabwe to the south then Namibia and Botswana to the south west. The country has four main rivers namely: Luangwa, Zambezi, Kafue and Luapula. The

country has also four main lakes and these are; Mweru, Tanganyika, Bangweulu and a man-made lake called Kariba.

1.3 Profile of Eastern Province

Eastern Province is one of the nine provinces of Zambia situated in the eastern part of the country. It covers an area of 69,106 square kilometres. The Province has eight administrative Districts namely Petauke, Chama, Lundazi, Chadiza, Katete, Nyimba, Mambwe and Chipata which is the Provincial Headquarters of the Province.

1.4 Profile of Katete District

Katete District is a small town in the Eastern Province of Zambia. It is one of the eight (8) districts of Eastern province. The town is at the foot of rocky hills, which lie to its east, including Mphangwe Hill and Kangarema Hill, which rise to 1 600 meters and are, surrounded by cultivated fields. It lies on the Great East Road about 90 km South-West of the Provincial Capital, Chipata. In the town is a major road junction with a surfaced road branching off, running 50 km to the Mozambican border, and connecting with Tete on the Zambezi 339 km to the south – east.

1.4.1 Demography

1.4.2 Population

The population of Katete according to the 2000 census of population and housing was 226,606 comprising of 115,331 females and 111,475 males. The district has a total area of 3989 square kilometres and has 33,108 households.

1.4.3 Population Density

The average population of the district is 12.2 persons per square kilometre. Katete district has the highest population density of 45.1 persons per square kilometre. The main population density of the rural part of the District is 24.2 persons per square kilometre while that of the valley is 2.8 per square kilometre.

1.4.4 Agriculture

The District has a total number of 146,761 Ha of farmland and only 75,484 Ha is the cultivated area. Agriculturally, Katete district is divided into five blocks, namely: Northern, Southern, Western, Eastern and Central Blocks.

1.5.1 Location of the District

It is situated between longitudes 31.450 and 32.300 East and Latitudes 13.800 and 14.450 South. Katete District Shares an international Boundary with the Republic of Mozambique in the South, Chadiza in the Southeast, Chipata District in the northeast, Mambwe in the north and Petauke in the Southwest.

1.5.2 Size of the District

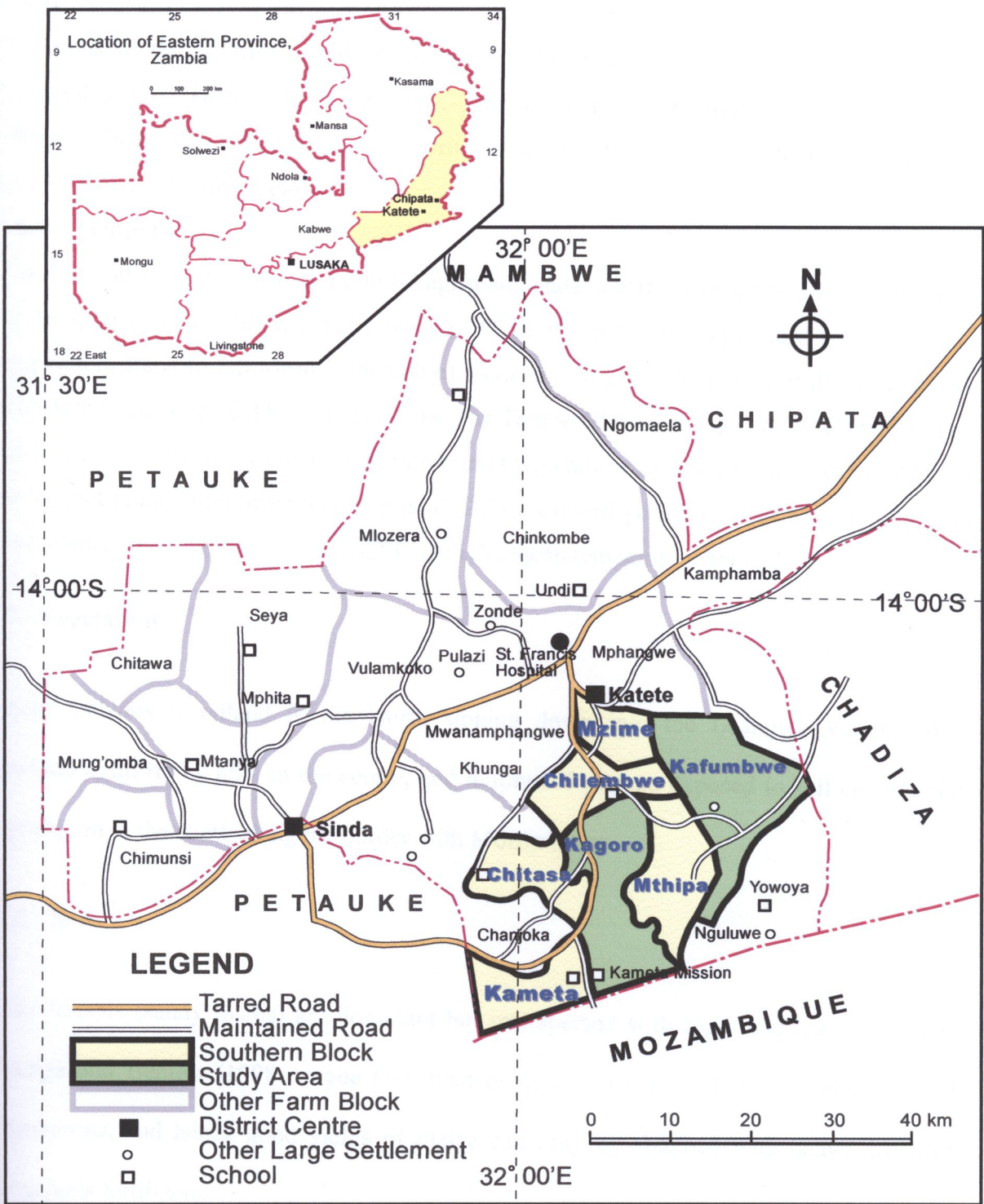
The District covers a land area of about 3,877 square kilometres approximately 5.0 % of the total land of Eastern Province (Area: 77,300 square Kilometres). The Administrative Centre is approximately 500 Km away from Lusaka the Capital City of Zambia and 90 Km away from Chipata the Provincial Headquarters of the Eastern Province of Zambia.

<http://en.wikipedia.org/wiki/Katete>

1.5.3 Location of the study area

The Agricultural Southern Block is 30km away from Katete town. It is found in the Milanzi Constituency of Katete District in Eastern Province under Chief Kawaza area.

Figure 1: Location of Kagoro/Kafumbwe Agricultural Camps in the Southern Block, Katete



Source: Ministry of Education, Katete.

1.6 Climate

1.6.1 Rainfall

The rains in the District usually start towards the end of October with highest rainfall recorded around December to February. The mean annual rainfall ranges from 700 to 900mm. The rainfall ends in March or April and the southern part of the District receives low rainfall than the Northern part.

1.6.2 Temperature

The Hot and Dry Season starts in mid-August and ends in early November. During this time, the temperatures are usually high with 35⁰C as the highest temperature recorded. The temperature starts to fall towards the end of October and early November at the onset of the rain season Characterized by light showers. The Temperature range is from 10⁰C to 35⁰C. The hottest month is usually October with minimum temperatures ranging from 30⁰C to 33⁰C and the highest temperature ever recorded is 35⁰C. The Coolest period is from May to July with temperatures ranging from 10⁰C to 22⁰C with the mean temperature being 21⁰C.

1.7 Vegetation

Katete includes woodland in the North sloping down into the Luangwa Valley, good farmland amid rocky hills in the centre, and deforested plateau exposed to soil erosion and degradation in the south along the border with Mozambique.

1.7.1 Soils

Ferric lixisols (sandy loams) are dominant but interspersed with clays and loamy luvisols. Kwesiga and Beniast (1998), argue that most of these soils are deficient in nitrogen and phosphorous, and hence good yields of maize can only be obtained with heavy doses of nitrogenous fertilizers.

This clearly indicates that small-scale farmers cultivating hybrid maize continuously in the study area without manure or fertilizers are not likely to have good yields.

1.8 Background of the study

Farming in Zambia had many problems since 1990s. Some of the problems are lack of farming inputs such as fertilizer, hybrid seed, environmental degradation, lack of ready market and declining Agricultural Productivity in view of population increase. Katete is one such an area facing same challenges.

Maize is a major food crop in Zambia and is a major staple for well over 90% of the Zambians. However, the national average yield of the crop is still low, ranging between 1 to 2 tons per hectare. In the 2007/08, season the Early Warning Unit (EWU) reported an average yield of 1.1 tons per hectare. One of the major reasons for low maize yield in the country is poor soil fertility and inadequate application of inorganic fertilizer by smallholder's farmers.

Fertilizer prices have in the past years become almost unaffordable by the majority of the smallholder farmers (CFU, 2009). Despite the Government subsidies on fertilizer for smallholder farmers, yields and production of the crop do not seem to improve. This is because subsidized fertilizers normally fail to meet the requirement of all the smallholder farmers, leaving large areas unfertilized or inadequately fertilized.

During 2008/09 season the price was as high as K250 000 per 50Kg bag. Most smallholder farmers are unable to purchase fertilizers in order to maintain better crop yields. On the other hand, many of these farmers cannot access the Government subsidized fertilizers due to

limitations in the quantity of fertilizers supplied to areas of production. The insufficient or non-utilization of fertilizers has since led to generally low maize yields per hectare (1-2 tones) or even less.

Conservation Farming system which includes minimum tillage, rotation of cereals with legume crops, maintenance of soil cover and integration of *Faidherbia albida* in the crop fields can help mitigate the dependence on the purchased inorganic fertilizers (CFU:2009).

Conservation Farmers use Conservation Tillage methods (which is the work that a farmer does to prepare land for planting) to establish their crops but they also grow legumes in rotation with their other crops. Legumes, depending on the varieties grown, fix nitrogen, improve fertility, break soil pans and are an excellent source of protein for the family. Conservation farmers recognize the value of trees and live in harmony with the land rather than destroying it (CFU, 2009).

Zambia's small-scale farming community established conservation Farming Unit of the Zambia National Farmers Union in 1995 to develop and promote the adoption of Conservation Agriculture (CA) practices. Since 1996, a growing coalition of stakeholders from the private sector, government and donor communities have promoted a new package of agronomic practices for smallholders in Zambia.

In 1999, the Government of Zambia endorsed the promotion of Conservation Farming as a National Extension Policy. The overall policy of the ministry of Agricultural and Co-operatives is to facilitate and support the development of a sustainable and competitive agricultural sector that assures food security at national and household levels and maximizes

11

limitations in the quantity of fertilizers supplied to areas of production. The insufficient or non-utilization of fertilizers has since led to generally low maize yields per hectare (1-2 tones) or even less.

Conservation Farming system which includes minimum tillage, rotation of cereals with legume crops, maintenance of soil cover and integration of *Faidherbia albida* in the crop fields can help mitigate the dependence on the purchased inorganic fertilizers (CFU:2009).

Conservation Farmers use Conservation Tillage methods (which is the work that a farmer does to prepare land for planting) to establish their crops but they also grow legumes in rotation with their other crops. Legumes, depending on the varieties grown, fix nitrogen, improve fertility, break soil pans and are an excellent source of protein for the family. Conservation farmers recognize the value of trees and live in harmony with the land rather than destroying it (CFU, 2009).

Zambia's small-scale farming community established conservation Farming Unit of the Zambia National Farmers Union in 1995 to develop and promote the adoption of Conservation Agriculture (CA) practices. Since 1996, a growing coalition of stakeholders from the private sector, government and donor communities have promoted a new package of agronomic practices for smallholders in Zambia.

In 1999, the Government of Zambia endorsed the promotion of Conservation Farming as a National Extension Policy. The overall policy of the ministry of Agricultural and Co-operatives is to facilitate and support the development of a sustainable and competitive agricultural sector that assures food security at national and household levels and maximizes

the sector's contribution to Gross Domestic Product (GDP). The vision is to promote development of an efficient, competitive and sustainable agricultural sector, which assures food security and increased income. It recognizes the need to strengthen and expand the emerging opportunities and deal with the challenges facing the agricultural sector. This vision also strives to contribute to the overall poverty reduction and economic growth (MACO, 2004). The need to promote more productive and sustainable farming systems arose from a consensus in Zambia and the region as a whole that small-scale agriculture was in crisis. Conventional small-scale farming practices are unsustainable and have contributed to:

- I. Declining yield and productivity
- II. Chronic and transitory food insecurity and inadequate nutrition
- III. Excessive dependence on food aid
- IV. Land degradation
- V. Migration of farming communities, encroachment of virgin woodland and deforestation.

<http://www.ifpri.org/sites/default/files/publications/eptdp>

1.9 Problem Statement

The problem in Katete District and other areas of the Eastern plateau of Zambia is clearly that of declining of agricultural productivity and decreasing household food security. In the past, farmers used to have abundant land for cultivation, but with the increase in population, this is no longer the case. This has resulted in shorter fallow periods which impact negatively on soil productivity.

In 1991, subsidies of fertilizer and hybrid maize seed were removed; this meant that even the smaller number of small-scale farmers who used to afford a few bags of fertilizer could no longer do as prices have increased. This has resulted in poor harvests and consequently decreased household food security in the study area. This study therefore is an effort to analyze the effectiveness of these communication strategies, which involve the adoption of conservation farming technologies to address the problem of household food security in Katete District.

1.10 Rationale

The rationale of the study is to analyze the effectiveness of communication strategies used in Conservation Farming. This problem is worth studying because there has never been such a study about Conservation Farming in Katete District before. Therefore, this study will contribute to the body of knowledge on the importance of Conservation Farming Innovations as soil improvement techniques in areas where there are declining agricultural production.

The study will also provide a forum for the farmers to express their views on the project in the study area and illustrate their expectations and frustrations as they adopt the alternative strategy to increase their productivity. The results of the study will help the government, non-governmental and other stakeholders as they plan start-up of similar projects in other areas of the country with identical needs or problems. This study will help Ministry of Agriculture and the extension workers on the communication strategies to use as innovations are being introduced.

1.11 Objectives of the study

The main aim of this study is to evaluate the impact of communication regarding Conservation Farming technology in increasing maize production in Kagoro village n Katete District.

1.11.1 Specific Objectives

The specific Objectives are to:

1. Evaluate the perceptions of farmers regarding the effectiveness to the communication strategies used by Agricultural Officers on the farming techniques.
1. Find out the impact of adoption of Conservation Farming techniques in Kagoro/Kafumbwe Aricultural Camps.
2. Determine the Agricultural Officer's communication strategies for reaching the targeted groups.
3. Find out the problems farmers face that contribute to low crop yield.
4. Examine the communication channels used by Extension Officers.

1.11 Objectives of the study

The main aim of this study is to evaluate the impact of communication regarding Conservation Farming technology in increasing maize production in Kagoro village n Katete District.

1.11.1 Specific Objectives

The specific Objectives are to:

1. Evaluate the perceptions of farmers regarding the effectiveness to the communication strategies used by Agricultural Officers on the farming techniques.
1. Find out the impact of adoption of Conservation Farming techniques in Kagoro/Kafumbwe Aricultural Camps.
2. Determine the Agricultural Officer's communication strategies for reaching the targeted groups.
3. Find out the problems farmers face that contribute to low crop yield.
4. Examine the communication channels used by Extension Officers.

CHAPTER 2: METHODOLOGY

2.0 Introduction

In this study, the researcher used triangulation approach. According to Yin (1994) triangulation is the application and combination of several research methodologies in the study of the same phenomena. He further said that triangulation is good in that; it can be employed in both quantitative and qualitative studies, it is an appropriate strategy of founding the credibility of qualitative analysis, it becomes an alternative to “traditional criteria like reliability and validity,” and it is the preferred line in the Social Sciences.

2.1 Research questions

- I. What communication strategies are used by Agricultural Officers to disseminate information on conservation farming in Katete District?
- II. How is the adoption rate of conservation farming in Kagoro in Katete District?
- III. How do farmers perceive the effectiveness of communication strategies used by the Extension officers?
- IV. What are the problems the farmers face that contribute to low crop yield?
- V. Examine the communication channels used by the Extension Officers effective?

2.2 Research Methods

The researcher used a variety of methods in order to gather sufficient data representative of the situation. These are:

1. Quantitative Survey.

2. Focus Group Discussions.
3. In-depth interviews with some purposively selected respondents for detailed information gathering.
4. Observations.

2.3 Quantitative Methods

The questionnaire was constructed and pre-tested on 10 farmers in Kagoro camp in the Southern block in the month of June 2010. This was to find the suitability of the questions to be asked and the responses elicited. Based on the pre-test the questions were revised before the questionnaires were administered to the respondents in the field in the month of June 2010. Then 100 questionnaires were prepared and distributed to the targeted audience. The questionnaires were filled in by the respondents themselves but for those that could not to read and write, the researcher read out and translated in the local vernacular while the researcher filled in the questionnaire as the respondent answered the questions.

70 questionnaires were distributed to Kagoro Camp and all of them were collected. Then 30 were distributed to Kafumbwe Camp and all were collected. 100 questionnaires were filled in and collected.

2.4 Qualitative Methods

In Qualitative methodology, the researcher used the following methods: Focus Group Discussion, In-depth Interview and Observation.

2.4.1 Focus Group Discussion

To determine the extent to which information used by Extension Officers was accepted and perceived by the community, the Focused Group Discussion FGD, with identified respondents in both Kagoro and Kafumbwe was used. The researcher used purposive sampling with the help of Extension Officers and other key persons such as the headmen of Kagoro and Kafumbwe on which people would participate in the FGD. This helped the researcher to pick the right people in the sample. The researcher used random sampling as well. The researcher managed to do two FGD, one in Kagoro and another in Kafumbwe in the Southern Agricultural Block. Each group had 12 respondents who participated actively.

2.4.2 In-depth Interviews

To consolidate the study, the researcher also conducted In-depth Interviews with selected individuals and key persons such as the headmen of the village, the ward counsellor and others. The Extension Officers for both Kagoro and Kafumbwe were also interviewed to find out what communication strategies they use and other ways used to help the people in adopting conservation farming techniques.

2.4.3 Observation

The researcher observed both the Extension Officers and the farmers. On the farmers, the crop yield was observed since it was after harvest while on the Extension Officers, the researcher observed the communication strategies they use and how often they visited the farmers.

2.5 Sampling Procedures

As for the sampling procedure with regard to the survey, the researcher used Simple Random Sampling to select the 100 households that were interviewed to ensure representation of the targeted audience. From the seven (7) camps in the southern block, the researcher did the research in two (2) camps namely Kagoro and Kafumbwe. A table of random numbers was used to assign numbers to all the adopting households in both Kagoro and Kafumbwe. From the list of assigned random numbers, the researcher picked at random any number from the lists until 100 households that constituted the sample were selected.

2.6 Data gathering Techniques

In terms of collecting actual data, the researcher was on the site. This was to ensure that the research instruments were administered accordingly. All the questionnaires and the interview guide were coded and pre-tested to ensure that the questions were relevant and useful to the study.

The researcher utilized five (5) data collection procedures and these are: (1) use of open-ended and closed questions, that is, administered 100 hundred questionnaires; (2) observation method so as to capture extra information that might not be got through questions, (3) reviewed records kept at the camp station and the district agricultural office, (4) conducted focus group discussions which comprised 10 to 12 farmers, (5) in-depth interviews held on two provincial agricultural staff, three district agricultural staff, three block extension officers and four camp extension officers.

2.7 Data Analysis and Interpretation

The analysis and interpretation of the collected data was made at several stages. The first one involved quantitative data from the survey and content analysis using the Statistical Package for the Social Sciences (SPSS). In this case, the researcher analyzed data using tables, frequencies, percentages, graphs, charts and other data summarizing tools. The second level was qualitatively done.

2.7 Limitation of the study

The researcher did not carry research in all the camps in the Southern Block because of distance to be covered and financial constraints that could not permit a large sample. Nevertheless, scientific sampling procedures were followed in selecting respondents.

CHAPTER 3: THEORETICAL AND CONCEPTUAL FRAMEWORK

3.0 Conceptual and Operational Definitions

This section focuses on the conceptual and theoretical framework as used and applied in this research study. It also states the main theories and their applicability to this study.

A conceptual framework states the distinctive characteristics of what is being defined (Ng'andu, 2001). On the other hand, a theoretical framework is easily testable or observable. Under the conceptual and operation framework, the researcher defined key words and phrases and how they were used in the study such as:-

3.1 Definition of terms

3.1.1 Communication

The term comes from a Latin word, communies that means common. Communication is said to have taken place when the sender of the message succeed to pass to the receiver. Mody (1991: 240) Says communication has occurred when the message of the sender is isomorphic with the meaning the audience receive.

Communication is the articulation of social relations among people. It is the act of people coming together to decide who they are, what they want and how they will obtain what they want. In a way, that can be considered of the ability of communication to bring positive change in the lives of the people. This definition was adopted in the study as it focused on the importance of the people's participation in planning and adoption of new technologies.

3.1.2 Mass communication

This communication process, which takes place to a large group, which is diverse in nature and this kind of communication, can be made possible by using media like television, radio, magazine, newspapers and many others.

3.1.3 Strategy

This is a systematic, well-planned series of actions, combining different methods, techniques and tools, to achieve an intended change or objective utilizing the resources with a specific period (PCSD, 2004).

The purpose of designing a communication strategy is to address and solve problems at the grassroots level utilizing Participatory Communication Strategy Design (PCSD) findings, communication methods, techniques and media. The Extension Officers who need to plan their communication strategies to meet the demands of the grassroots should use this.

3.1.4 Communication for Development

In this study, this term is used to encompass many different media and approaches such as radio for community development, social groupings, videos, multimedia and many others (Espanola, 2005).

3.1.5 Participatory communication

In this study, this entailed how people participated in Radio Farm Forum lessons and listening to Extension Officers' messages on methods of farming.

3.1.6 Development

The term is defined differently in different contexts. In this research, it meant the uplifting of people's goals and aspirations. People aspire to reduce infant mortality, poverty, disease, hunger and illiteracy only to mention a few.

3.1.7 Opinion Leaders

An Opinion Leader is a person or agent or an expert in a certain field. In this study, these were the experts from Ministry of Agriculture thus, the District Agricultural Officers, the extension Officers.

These are the people holding positions within the community affording them special competence in their particular function. According to Katz et al (1995), opinion leaders generally have contact with the relevant information sources from outside their immediate circle and receive relevant amount of their external information from media appropriate to their role. Opinion leaders tend to be subject oriented. This implies that one person that is an opinion leader in one field may be a follower in another field.

3.1.8 Conservation Farming(CF)

CF is an approach to farming that uses a whole raft of ideas that together can increase long-term profitability, reducing cultivation to maintain soil, water storage, retaining stubble to reduce erosion and increase soil organic matter and reducing across the paddock to avoid compaction.

This focuses on the people to adopt this new method of farming in order to improve their crop yield as they improve soil fertility.

3.1.9 Sustainable Agriculture.

Refers to a situation where agricultural productivity is maintained or increased without reducing the ability of the resource base to continue producing to meet present and future needs.

This definition was adopted in this study and it focuses on the farmers to safeguard their land by using sustainable agriculture, which does not only base on the minimum tillage but also on usage of legume cover crops that enhances soil fertility and moisture conservation for crop productivity.

3.1.10 Land Tenure

The legal position, under which land is held, associated with this meaning are the methods by which a person acquires, holds, transfers, inherits or abandons land.

The people at grassroot level have a right to own land as the current land act recognizes traditional land as eligible for state registration and that people owning land under customary tenure can convert it to leasehold title.

3.1.11 Innovation/ Technology

A practice perceived to be new in a sense that people in an area have not yet developed favourable or unfavourable towards it.

This was adopted in this study, as CF is an innovation that needs to be adopted by the farmers of Kagoro/Kafumbwe in order to increase their crop yields.

3.1.12 Improved Tree Fallows

The practice of planting fast-growing plant species that are (usually) nitrogen fixing, and produce decomposable biomass easily. They are adapted to the climatic and edaphic conditions of the miombo woodland ecology of Southern Africa.

This is important as it focuses on the farmers to practice the planting of improved tree fallows to retain the lost soil fertility.

3.1.13 Tillage

This is the work the farmer does to prepare his land for planting. That is, all the operations undertaken to prepare a seed bed so the seeds can germinate properly.

3.1.14 Household

Consists of members of a family who live together in one house or closely related premises and take their meals from the same kitchen (draw their food from one basket or storage shade). It may consist of one member.

3.1.15 Agricultural Extension

The process through which agricultural development communication messages are disseminated to the farmers so as to provide information for decision making to facilitate acceptance or rejection of innovation.

3.2 Theoretical Framework

3.2.1 Activation Theory of Information Exposure

Lewis Donohew, Phillip Palmgreen and Duncan (1980) propounded the Activation Theory of Information Exposure. The Theory states that an individual will seek to satisfy their need for stimulation and information when attending to a message before they seek to fulfil their need for information alone. The Theory explains how individuals seek messages that fulfil their cognitive need for information as well as their need to be entertained.

The ideas and implications for this study could be that the theory is helpful to those in advertising and persuasion, as they develop messages for their audience, it is important to meet the cognitive and emotional needs of their audiences. Agricultural Offices and Extension Officers have to advertise their strategies to persuade all the villagers get involved

in CF Technology instead of letting them rely on fertilizer, which they cannot afford as prices keep on increasing every farming season.

3.2.2 Diffusion of Innovation Theory

One of the greatest pains to human nature is the pain of a new idea (Water, 2006). It makes you think your favourite notions may be wrong and your firmest beliefs ill founded. Naturally, human beings may hate a new idea and may be disposed more or less to ill-treat the original person who brings it.

Roger (1983) describes diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. This definition highlights some important features and these are innovation, time, communication and a dynamic process happening in a social context with the adoption or rejection of the innovation by members of the social system. Diffusion of Innovation Theory analyses as well as helps explain the adaptation of innovation.

There are four elements in the diffusion of new ideas: the innovation, communication channels, time and the social system. The characteristics of an innovation as perceived by the members of a social system, determine its rate of adoption.

1. Innovation

An innovation is an idea perceived as new by an individual. It is an idea, practice, or object that is perceived as new by an individual or other unit of adoption (Roger, 1983).

2. Communication

Communication is a process by which participants create and share information with one another in order to reach a mutual understanding. A communication channel is the means by which messages get from one individual to another. Mass media channels are more effective in creating knowledge of innovations as they teach people whereas interpersonal channels are more effective in forming and changing attitudes towards a new idea, thus influencing the decision to adopt or reject a new idea. Most individuals evaluate an innovation not based on scientific research by experts but through the subjective evaluations near-peer who have adopted the innovations. [http://www.edu/lima/thesis/documents/diffusion of innovation](http://www.edu/lima/thesis/documents/diffusion%20of%20innovation)

3. Time

The time dimension is involved in diffusion in three ways. The first one is the innovation-decision process, which is a mental process through which an individual passes through first knowledge of an innovation to forming an attitude towards the innovation, to a decision to adopt or reject, to implementing of the new idea and to confirmation of this decision.

There are five steps an individual go through the innovation-decision process in order to decrease uncertainty about an innovation's expected consequences. These are:

- I. **Knowledge** - a person becomes aware of an innovation and has some ideas of how it functions.
- II. **Persuasion** - a person forms a favourable or unfavourable attitude toward the innovation.

- III. **Decision** - a person engages in activities that lead to a choice to adopt or reject the innovation.
- IV. **Implementation** - a person puts an innovation into use.
- V. **Confirmation** - a person evaluates the results of an innovation-decision already made.

The second way in which time is involved in diffusion is in the innovativeness of an individual or other unit of adoption. Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system.

4. The social system

The fourth main element in the adoption of new ideas is the social system. A social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal.

Categories of Adopters

There are five adopter categories and these are Innovators, Early adopters, early majority, late majority and Laggards. Rodgers (1995) identified five characteristics for each adopter category, which are also of significance to advertisers interested in creating an integrated marketing plan targeting specific audiences.

1. Innovators

Innovators are the first 2.5 percent of the individuals in a system to adopt an innovation. These are characterized by their more cosmopolite and higher socio-economic status than late adopters are (Ibid). They require a shorter adoption period than any other categories. They have the control of substantial financial resources to absorb possible loss from an unprofitable innovation. They also have the ability to understand and apply complex technical knowledge. Thus, they play a gate-keeping role in the flow of new ideas into a system.

1. Early Adopters

These are the greatest degree of opinion leadership in most systems. They are social leaders, popular and educated. They are the role model for the others in the society and they are respected by peers and are generally successful. They account for 13.5 percent of the individuals in the system to adopt an innovation. Whereas the innovators are cosmopolites, early adopters are localities. The Early Adopters decreases uncertainty about a new idea by adopting it, and then conveying a subjective evaluation of the innovation to near-peers through interpersonal networks.

2. Early Majority

These are the next 34 percent of the individuals in a system to adopt an innovation. They interact frequently with the peers, but seldom hold positions of opinion leadership in a system. They provide interconnectedness in the system's interpersonal networks.

3. Late Majority

Like the early majority, the late majority make up 34 percent of the members of the society. They adopt new ideas just after the average members of the system. They have an economic necessity, sceptical, traditional, cautious and of lower socio-economic status (ibid).

4. Laggards

These are the last 16 percent of the individuals in a system to adopt an innovation. They possess no opinion leadership. They are isolates and have a point of reference in the past. They are usually suspicious of innovations and the change agents. Their resources are limited and fear debts. They take neighbours as their main source of information.

The Adoption Process

According to Rodgers (1994), the adoption process is the mental process through which an individual passes from first hearing about an innovation to final adoption. Some Innovations spread more quickly than others do and the critical question is why they spread more quickly. Therefore, an innovation to spread and be adopted, Rodgers broke the adoption process down into five stages and these are:

- I. **Awareness** – At this stage, the individual is exposed to the innovation but lacks complete information about it.
- II. **Interest** – the individual becomes interested in the new idea and seeks additional information about it.

- III. **Evaluation** – At this stage, the individual applies mentally the innovation to the present condition and future situation and decides whether to try it or not.
- IV. **Trial** - the individual makes full use of the innovation.
- V. **Adoption** - At this stage, the individual decides to continue the full use of the innovation.

How is the Adoption Process of any relevance to agricultural communication extension? The relevance of this theory is that Conservation Farming is an innovation and so there is need for the Kagoro/Kafumbwe people to accept it as a new method of farming to increase crop yield without the use of fertilizer. This can either be adopted or rejected so there is need for the extension officers to enhance communication strategies to the farmers through the opinion leaders.

Extension workers will be able to identify and make use of the social groups in the area for dissemination of the agricultural messages. For persuasion of farmers and dissemination of farmers' agricultural messages, the extension worker has to identify the progressive farmers to convince them to adopt the new technique. Once they have been persuaded and have adopted the innovations, it will be easy for them to convince the other farmers in the community. The concept applied in the research for a purpose of determining how agricultural information diffuses through the social system to influence change in farmers' behaviour.

Rejection and Discontinuance

Roger and Shoemaker (1971) points out that an innovation may be rejected during any stage of the adoption process. Rogers defines rejection as a decision not to adopt an innovation while discontinuance is a rejection that occurs after adoption of the innovation.

3.2.3 Agenda Setting Theory

The theory of agenda falls within the realm of powerful media effects (McCombs, 1977). Agenda setting describes a very powerful influence of the media. According to (Green, 2000), this theory is based on how mass media puts an impact to society through the transfer of news items. It asserts that although the mass media does not tell us what to think, it however, tells us what to think about through framing and priming. **Framing** is when the media brings to our attention some aspects of reality while ignoring others, which might cause the recipients of the message have different reactions. **Priming** on the other hand is when the media puts a lot of emphasis on a certain issue to increase its importance and bring up old memories.

Some farmers in Kagoro/Kafumbwe have their own radios. Despite the arguments about the effects of the mass media, the farmers can learn a lot from the agro messages, which they receive from the agricultural extension officers to mass media such as radio, which is easily accessible for them. This will help them change their focus on agricultural methods of farming especially conservation farming to improve their crop yield.

CHAPTER FOUR- LITERATURE REVIEW

4.0 Introduction

In providing more background to this study, it is important to review information on related research studies that have been conducted by other researchers from a global, regional and local country perspective. It is an attempt to find out what other scholars have researched on communication systems in Zambia and see where the need for alternative strategies for agricultural production comes in especially conservation farming techniques.

The first part is about the Communication/Extension systems, and campaigns about agriculture. The background to the development of agriculture in Zambia will be the second. The third part deals with colonial agriculture. Then the fourth part will look at agricultural development in the period 1945 to 1964 and the post independence period 1964. The background will follow this to the development of conservation farming as a soil improvement technology in Zambia and Katete District in Eastern Province.

4.1 Communication and Campaign Systems about Agriculture

According to FAO (1999a), developing countries particularly Asia and Africa, which together constitute almost three quarters of the world's population and where nearly 70% live in the countryside, the idea of using communication for a variety of rural development projects agricultural improvement in particular, grew out of relatively consistent research findings. The research found that audience-oriented communication strategies could play a catalytic role in accelerating the rate of technology transfer through providing relevant information, changing attitude and skills training. Small media were mainly used (radio,

video, flip charts illustrated pamphlets, village theatre) to a given community, province or region.

Strategies ranged from multi-media campaigns to support group meetings conducted by extension agents, and materials to strengthen interpersonal communication. Overtime, participatory methods were refined to bring in the views of the intended beneficiaries from the start in designing project goals and selecting appropriate communication and adult learning appropriate support implementation.

FAO (ibid), observed the need for knowledge and improved skills to increase food production were clear and present. Current statistics show that more than 65% low-income developing countries (90% in Asia and the Sub-Sahara Africa) suffer from inadequate food security, with about 790 million people living in hunger.

FAO further indicates that the 1996 World Food Summit set a goal of reducing by half the number of hungry people in the developing world of about 400 million people by the year 2015. The progress was achieved much during the 1990s though makes this goal appear to be a daunting task. In the 1990/92 period, for example, out of 96 developing countries, the number of undernourished was estimated 830 million people overall, a seemingly positive result. A closer look at the data revealed those 37 countries, or 39% of the original 96, had actually reduced the number of undernourished by about 100 million people combined overall. Almost two thirds of the developing world, the aggregate number of undernourished actually increased by 60 million, resulting in a total net reduction of only 8 million per year for five-year period.

These sobering results dramatically suggest that unless more solutions that are effective are found for increasing production among the hungry and most vulnerable, and better distribution of it, the goal of the 1996 World Food Summit may never be realized. As Sen. (1998) notes, *"the contemporary age is not short of terrible and nasty happenings, but the persistence of extensive hunger in the world of unprecedented prosperity is surely the worst"* (1998:204).

The challenge in assisting farmers to produce more food implies the need for new technologies, new skills, changed attitudes and practices, new ways to collaborate (Crowd, 2000). This requires farmers having access to relevant information and knowledge (Ibid).

In recognizing that rural people are the heart of development, participatory communication has become what many consider the key link between farmers, extension, and research for planning and implementing consensus-based development initiatives. Too often, however, it has been a missing link and many projects have failed. Norrish says, *"What comes through clearly from the literature and discussions with those working in rural communities is the overwhelming need to focus on people not technologies, on what people do with technology and on training."* (1998:v111).

Farmers are the ones who must control the learning and are able to access information according to specific needs, times and means. Previously, technologies were typically finalized in research before farmers have to see them, essentially leaving them three choices: adoption, adaptation and rejection. Rogers (1992) indicated that when farmers make choices about technologies needed, and the knowledge and skills required to use, there is, a critical reflection on experience, and the role of research and extension are dramatically changed.

Servaes and Arnst (1992), argue that under the new paradigm, the assertion of knowledge gap of a disparity between experts and local people is wrong.

The role of extension officers in the participatory learning process thus becomes one of facilitating problems definition and prioritising technology solutions among farmers, through critical reflection of experiences and then designing and using training packages for presentation back to them. This has prompted a rethinking of the training of extension workers to ensure that more control of the extension process, knowledge sharing, and technology transfer requests will be mainly derived through farmer inputs. As Roger (1996) suggests, this is easier to achieve through in-service training where staff can reflect on actual practice.

Along with the leasing of extension services to match farmer demands, the shift from teaching to learning with them through practical application has assumed vital importance. Rolling and Pretty (1997) say, it is important to recognize that local people are always involved in active learning, in inventing technologies, in adopting their farming systems and livelihood strategies.

Communication is very important when it comes to dissemination of information about development especially to the grassroots, as they are the centre of development. Campaigns can be another way of communicating with the audience especially when it is about an innovation on agricultural farming methods. The OHR Office of the High Representative and EU Special Representative produced an example of a campaign on 31 October 2003. The aim of the campaign was to enable farmers to move from Subsistence Agriculture to Commercial Agriculture. The campaign was produced in cooperation with World Division in BiH. It consisted six (6), 25 minutes radio and TV programmes detailing the experiences of small-

scale farmers and offering practical advice on farming, a booklet covering the same themes and listening to domestic and international agencies that currently assist farmers.

[Htt://www.ohr.inr/ohr-dept/rrtf/pics/agriculture-campaign](http://www.ohr.inr/ohr-dept/rrtf/pics/agriculture-campaign)

The “Agriculture and Profit” TV and Radio series are aired also. Agriculture and Profit are distributed through farmers’ associations, extension services, NGOs and around TV and radio stations involve the campaign. The Campaign encourages farmers in rural areas to consider agriculture as a way of sustaining their return and support the efforts of the agricultural Bulldozer Initiative in creating a favourable environment for Agricultural Development. [Htt://www.ohr.inr/ohr-dept/rrtf/pics/agriculture-campaign](http://www.ohr.inr/ohr-dept/rrtf/pics/agriculture-campaign)

During the June, 2009 Agriculture Show in Katete District, a campaign was carried out about CF. The District Commission (DC) encouraged farmers to use CF in order to counteract the effect of climatic changes. The DC of Katete District, Eleman Mwanza said Conservation Agriculture would help preserve land for sustainable use both for the present and the future generation.

He further said there was need for farmers to use appropriate agricultural technologies to scale up diversification in agricultural products as a means of cushioning the impact of climate change. Speaking at the Agricultural show whose theme was “*Challenge of Change*,” the DC further urged farmers to start preparing for the farming season before the rains start in order to have good harvest. <http://busines.globaltimes.cn/world/2009/444310.htm>

Another campaign carried in Katete District was by Every Home for Christ (EHC). EHC-Australia and USAID spearheaded the project on CF, providing training for agriculture.

Food Support Programme (FSP) was implemented in four wards by EHC to help small-scale farmers in CF methods.

In the past, farmers were resistant to accept new farming techniques that aimed at increasing yield. They favoured their traditional methods of farming. After two years of intensive training programme in CF by EHC, many small-scale farmers are prepared to do away with their traditional way of farming. About 45,000 subsistence farmers in Chief Mbang'ombe's area have been receiving training in CF, health, and Food and Nutrition.

The District Agricultural Coordinator (DACO), Dr Edward Chanda said his office corroborated well with EHC to ensure that many people receive basic training in agriculture. He further said, *"Our role is to provide extension services and also work with NGOs operating in the District. We give technique advice and monitor their work."*

<http://business.globaltimes.cn/world/2009/444310.htm>

Another organization collaborating with EHC is the Conservation Farming Unit (CFU) of the Zambia National Farmers Union (ZNFU). They encourage farmers to reduce on burning their crop residues. Once they burn their crop residues, they prevent decomposition. Farmers are also encouraged to practice crop rotation to avoid multiplication of diseases and pests. They are encouraged to use organic materials so that farmers can retain soil fertility.

4.2 History of Agricultural Extension Services

Agricultural Extension Services have been considered as one of the reliable and surest methods of delivering agricultural information to rural farmers especially those that have no access to radio or television (Suzuki and Atsushi, 2002).

The history of Extension Services in the world has its original in Britain in the 1840s when “William Sewell” made submission suggesting for the extension of the University and college of Oxford Education Services. The first practical steps were taken in 1867-1868 when James Stuart, fellow of Trinity College- Cambridge gave a lecture to women’s associations and working men’s club in the North of England on Extension development services. Stuart is therefore considered as the founding father of University Extension. By 1980s, the word “Extension Movement” was adopted and used in other sectors such as agriculture.

Agricultural extension began from the industrialized countries of Western Europe where America had taken an active role to expand the growth and development of agricultural extension. The term extension in agriculture has been associated to the transfer and dissemination of agricultural information and knowledge from research to farmers and vice-versa.

The purpose was to teach farmers new techniques of farming and learn how to solve their own problems. It was believed that the development of agricultural sector would improve the economy of the country in a more sustainable way. The assumption had been that the development of agricultural sector would provide raw materials for development of manufacturing industries, increase income for rural people whose livelihood had depended on agriculture and ensure food security.

4.3 Extension Systems in Zambia

Extension services in Zambia has evolved over a period of time from a 'Military and Approach', Individual Farm Visits Approach, Training and Visit (T and V), and these characterized to greater or lesser extent by a Top Down Planning System to a more people focused, Bottom Up Participatory Extension Approach.

Several Extension approaches in Zambia have been used with influence from external agencies, and are sometimes dominated by government policies that favour urban consumers instead of assisting farm households to improve their productivity and standard of living.

Extension Services can also be incorporated within the mass media. That is, radio and television can be used to disseminate information to rural areas especially when the extension field workers are very few and cannot reach all the farmers. Radio is much more accessible and farmers can listen to programs such as 'Lima Time', 'Rural Notebook' or 'Farm Magazine'. This function is executed by MACO through NAIS (Suzuki and Atsushi, 2002).

In the late 1950s and 1960s, the United States Agency for International Development (USAID) was a major external supporter of extension, pursuing a broad-based educational approach, patterned in part after the land-grant University system of the United States of America. In retrospect, these systems were developed at a time when improved technology was not widely available in most developing countries (FAO, 1990). These systems were established within ministries of agriculture rather than being attached to agricultural universities, which were weak or non-existent in many countries. This structural arrangement

resulted in weak linkage with research; the consequence was that many of the newly emerging extension systems had little impact on agricultural productivity and development.

During the 1970s, most international donors supported integrated approaches to agricultural extension and rural development. The approach was built on the premise that farmers needed an integrated package of services including extension, input supply, credit and marketing services to increase their productivity. This approach also had limited impact. These systems were difficult to administer because of poor communications and inadequate managerial capacity at field level. Credit and input supply were used largely for marginal technologies and productivity gains were frequently insufficient to cover input costs. Consequently, many of these systems were not self-sustaining because of high overhead costs, system inefficiencies and low levels of loan repayment by farmers.

FAO further notes that the agricultural extension in the 1980s and 1990s was dominated by the Training and Visit (T and V) approach to extension promoted by the World Bank. T and V was an effort to reform the general agricultural extension organizations by improving system management and narrowing the focus of extension, mostly to technology transfer. The assumption was that new technology was now available for most food crops due to the work of the International Agricultural Research Centres (IARCs) working in cooperation with National Research Programmes.

Initial results of T and V extension in irrigated areas were quite encouraging, particularly where the high yielding varieties of the Green Revolution varieties and accompanying inputs were available.

When T and V was expanded into rain-fed areas, where technical was more limited and farmer risk higher, it faltered due to limited impact on productivity. In addition, T and V was criticized as being rigid, too much of top-down in orientate, costly to operate because of high recurrent personnel costs, and too heavily focused on technology transfer at the expense of human resource development (FAO, 1990).

4.4 Background to the Development of Agriculture in Zambia

Before coming of European settlers and the introduction of commercial agriculture in Zambia in the 1890s, most of the agricultural systems used were traditional: based on a wild range of cultural and physical microenvironments. The generally poor sandveld and ferrallitic soils and the low rural population densities that predominated throughout much of the country gave rise to cultures based on pastoralism or shifting cultivation with long fallow rotations.

“The cropping patterns used various combination of the main staple cereal crops i.e., maize, finger millet, bulrush millet, sorghum and the root crop cassava” (Siddle, 1971:58)

The traditional agricultural systems were defined in relation to two major factors; the staple food crops and the degree of sophisticated of the farming practice. Using this system of clarification, Saddle (1971), defines three broad categories of traditional agricultural systems. These are:

- Bush-fallow-ash- cultures
- Traditional ash-cultures and
- Hoe- and – Plough cultures

All these agricultural systems were geared towards subsistence production to meet the food needs of the local communities.

4.4.1 Agricultural Policy and Vision

The overall Policy of the Ministry of Agricultural and Co-operatives is to facilitate and support the development of a sustainable and competitive agriculture sector that assures food security at National and at Household levels and maximizes the sectors' contribution to Gross Domestic Product (GDP). This Vision is to promote development of an efficient, competitive and sustainable agricultural sector, which assures food security and increased income. It recognizes the need to strengthen and expand the emerging opportunities and deal with the challenges facing the agricultural sector. This vision also strives to contribute to the overall poverty reduction and economic growth (MACO, 2004).

4.5 Colonial Agricultural systems before 1945

“With the coming colonialism in the 1890s, the pre-colonial traditional societies lost their influence and their agricultural systems were undermined by the military conquest and colonial economic policies such as taxation and the labour migration” (Kajoba, 1988:15)

Between 1894 and 1924 Northern Rhodesia was administered by the British South Africa Company (BSA co.) and during this period attention was first paid to the exploration of minerals on the Copper belt and agriculture was given a second role. To obtain the labour required to work in the mines, hut tax was imposed and this forced large numbers of Africans in the territory to seek wage employment to pay tax (Hellen, 1973).

Between 1924 and 1929, Native Reserve Commissions under the first British Governor of Northern Rhodesia Sir Herbert Stanley, led to the land alienation and creation of Native Reserves in Eastern Province, then along the line of rail and Northern Province. The purpose of this act was to set aside land for exclusive European settlement and agriculture to support the mining industry.

4.6 Agricultural Development in the period 1945-1964

In the 1945 period, the colonial state became concerned with the deterioration of resources in many reserves due to population pressure, soil erosion and overgrazing. Mitigating measures were made to modernize African agriculture through a number of schemes. First among these were the Peasant Farming Schemes, which started along the line of rail in the 1930s and were extended to Eastern Province in 1964 (Kay, 1965). The Peasant Farming Schemes were eventually spread to other areas of the country. The main objective of these schemes was to facilitate the development of commercial farming and the enhancing rural prosperity by creating a nucleus of proficient African Peasant farmers.

4.7 Agricultural Development in the Post Independence Period -1964 to present

The Agricultural Sector contributes to GDP averaged 18 percent over the decade. About 75 percent of Zambian population is engaged in Agriculture, largely subsistence farming which remains vulnerable to weather fluctuations (PRSP, 2002-2004). The real growth rate in Agricultural sector has fluctuated significantly mainly due to the sector's high dependence on seasonal rainfall, reduced investments and failure to *strategically position the sector* according to its comparative advantage (PRSP, 2004).

Agriculture along the line of rail and parts of Eastern Province has been geared towards commercial production and had been given all the necessary support in infrastructure and incentives: whereas in the outlying areas agriculture is still at a subsistence level. This scenario has produced what has been termed as the dual nature of the Zambian agricultural sector and economy (Dodge, 1977; Klapper, 1979; Wood, et al.1990)

4.8 Background to the Development of Conservation Farming

Too often, the need to farm profitably and the need to farm well are seen as being in conflict. As cropping intensity increases and the time spent in pasture are reduced, the risks of soil damage and erosion increase. Conservation Farming offers a way to increase cropping intensity safely and profitably without excessive soil damage (CFU, 1997).

Maize is a major crop in Zambia and is a major staple food for well over 90% of the Zambians. However, the national average yield of the crop is still low, ranging between 1 to 2 tons per hectare instead of 5 tons or more per hectare. In the 2007/08, season the Early Warning Unit: (EWU) reported an average yield of 1.1 tons per hectare. One of the major reasons for low maize yield in the country is poor soil fertility and inadequate application of inorganic fertilizer by smallholder's farmers (CFU, 2009).

Fertilizer prices have in the past years almost become unaffordable by the majority of the smallholder farmers (Ibid). Despite the Government subsidies on fertilizer for smallholder farmers, yields and production of the crop do not seem to improve. This is because subsidized fertilizers normally fail to meet the requirement of all the smallholder farmers, leaving large areas unfertilized or inadequately fertilized.

During 2008/09 season the price was as high as K250 000 per 50Kg bag (Ibid). Most smallholders' farmers are unable to purchase them in order to maintain better crop yields. On the other hand, many of these farmers cannot access the Government subsidized fertilizers due to limitations in the quantity of fertilizers supplied to areas of production. The insufficient or non-utilization of fertilizers has since led to generally low maize yields per hectare (1-2 tones) or even less.

Conservation Farming system, which includes minimum tillage, rotation of cereals with legume crops, maintenance of soil cover and integration of *Faidherbia albida* in the crop fields can help mitigate the dependence on the purchased inorganic fertilizers.

Conservation Farming is an approach to farming that uses a whole raft of ideas that together can increase long-term profitability: reducing cultivation to maintain soil structure and soil water storage, retaining stubble to reduce erosion and increase soil organic matter, and reducing traffic across the paddock to avoid compaction (CFU, 2009).

Conservation Farmers use Conservation Tillage methods to establish their crops such as crop rotation. Crop conservation is the growing of two or more different crop species in sequence on the same piece of land over a period of years. Growing of legumes in rotation with other crops is very important because they depending on the varieties grown, fix nitrogen, improve fertility, break soil pans and are an excellent source of protein for the family. Conservation farmer recognize the value of trees and live in harmony with the land rather than destroying it (CFU, 2009).

4.8.1 Importance of Crop Rotation

- i. *Efficient utilization of soil nutrients* – When shallow rooted crops are rotated with deep-rooted crops, there will be a more efficient use of soil nutrients because the crops take their nutrients from different soil layers.
- ii. *Control of crop pests and diseases* – In the field where the same crop is being cultivated over a longer period of years, diseases and pests associated with that crop will build up. This means they will become more and more each year. When you rotate the crop with another crop, which has different pests, and diseases, the pests and diseases of the first crop will disappear, because they do not find their favourite food. Other pests and diseases associated with the new crop may appear, but they need time to build up to become a big population that will harm the crop.
- iii. *Control of weeds* – Some weeds are associated with particular crops and their population will be reduced in a good rotation.
- iv. *Increase of soil nitrogen* – when legumes are included in the rotation, the nitrogen fixing capacity of the legumes will increase the soil nitrogen.

Zambia's small-scale farming community established conservation Farming Unit of the Zambia National Farmers Union in 1995 to develop and promote the adoption of Conservation Agriculture (CA) practices. Since 1996, a growing coalition of stakeholders from the private sector, government and donor communities has promoted a new package of agronomic practices for smallholders in Zambia.

In 1999, the Government of Zambia endorsed the promotion of Conservation Farming as a National Extension Policy. The need to promote more productive and sustainable farming

systems arose from a consensus in Zambia and the region as a whole that small-scale agriculture was in crisis. Conventional small-scale farming practices are unsustainable and have contributed to:

- Declining yield and productivity
- Chronic and transitory food insecurity and inadequate nutrition
- Excessive dependence on food aid
- Land degradation
- Migration of farming communities, encroachment of virgin woodland and deforestation. <http://www.ifpri.org/sites/default/files/publications/eptdp108.pdf>

4.8.2 The main Benefits of Conservation Farming (CF) system

- Dry-season land preparation using minimum tillage method (either ox-drawn rip lines or hand-hoe basins laid out in a precise grid of 15,850 basins per hectare). Farmers can begin to prepare their land as soon as they harvest. This allows for early planting at the onset of the rains, which is critical for success. Early land preparation and rapid planting permit early weeding.
- Labour requirement for land preparation is spread over several months rather than being done at once.
- No burning but rather retention of crop residue from the prior harvest improves infiltration, reduces temperatures and in time, improves soil fertility.
- Planting trees and input application in fixed planting stations
- In addition, nitrogen-fixing crop rotation reduces the requirement for artificial fertilizers. Pigeon peas and other legumes also have strong roots that break plough

pans and aerate the soil. Early maturing varieties of cowpeas and gram provide a high protein source in February when food is scarce.

- Because the inter-row is never ploughed, weed populations will decline over time as long as weeds are not allowed to seed.

Weeds are reduced with the use of crop cover, for example, growing maize as main crop then after two weeks plant pumpkin leaves or groundnuts and these will cover the weeds (CFU, 2009

Table 1: Guide to Planting Dates for different crops

<i>Crops</i>	<i>Planting Dates</i>
Cotton	Dry plant anytime after 1 st November
Maize, Sorghum, Millet	Planting immediately after heavy rains any time after 15 th November
Groundnuts, Sunflower	Plant immediately after heavy rains after cereals have been planted
Soya Beans, Cowpea, Guar, Gram	Plant immediately after heavy rains before 15 th December
Red or Black Sun hemp	Plant immediately after heavy rains anytime before 15 th December

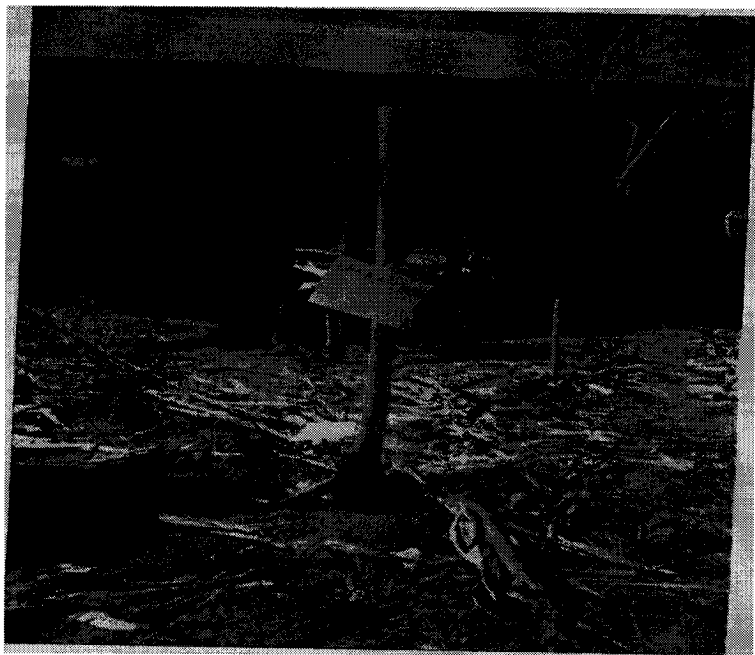
The CF system enables farmers to plant with the first rains when seeds will benefit from the initial nitrogen flush in the soil. By breaking pre-existing plough-pan barriers, the CF basins and rip lines improve water infiltration, water retention and plant root development. The

precise layout of grids and planting lines enables farmers to locate fertilizer and organic material in close proximity to the plants, where they will provide greatest benefits.

There are special equipment used in CF such as the ripper, chaka hoe and ripper tractor. The commonly used are; ripper and chaka hoe by small holders farmers. The Chaka hoe is stronger than a hoe. The ripper tool is narrow than that of the magoye ripper and this allows for deeper penetration, use of less draft force and less surface soil disturbance. The ripper is used to cut the ground to harvest water, which is used in facilitating the planting. This controls/protects soil erosion, which the soil is usually washed away by rains. The ripper cuts the lands and water will be collected in the holes. The ripper is cheaper to make and is fitted easily without bolts and nuts. The ripper cultivates a larger area as compared to the chaka hoe, which is commonly used by the farmers.

Below is the picture of Chaka hoe used on CF fields.

Picture 1: Chaka hoe



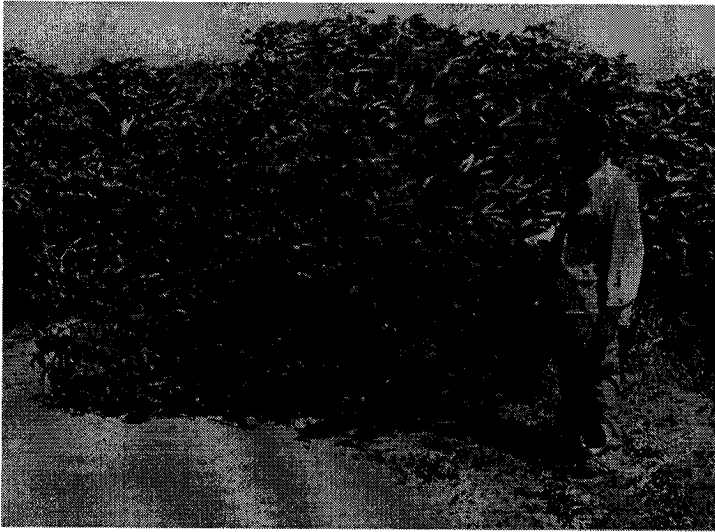
Conservation Farming is based not only on the minimum tillage but also on use of legume cover crops that enhances soil fertility and moisture conservation for crop productivity. Cowpea is one of the food legumes that should be used under this system. Cowpea has good attributes of improving food for nutrition, fixes nitrogen or soil quantity improvement and is tolerant to drought (David, 1985 and GART, 2006)

In soil fertility maintenance, need to intercrop maize with legumes has been demonstrated by Agboola and Fayeni (1972) who report that legumes were capable of fixing large amounts of nitrogen from which maize crop received 25kgN/ha. Utilization of water and nutrients by the component crops in the intercropping system is more sufficient than in sole cropping. Kurt (1984) confirmed that water use efficiency was much better in intercropping mainly due to reduced evaporation and dense rooting system that reduced leaching of nutrients.

Throughout the world these days, there is much concern about the threats of climate change. Conservation Farming provides farmers with practical solutions to minimize the effects of erratic rainfall and droughts. Farmers are encouraged to grow drought resistance crops such as cassava. Cassava is an excellent food security standby crop.

The advantages of cassava are such as; minimal cash input, highly drought tolerant and grows well on poor soils, low and flexible labour requirement, stored in the ground and harvested as needed, produces substantial staple food in the hunger periods, a perennial crop easily propagated on the farm and growing potential as a cash crop. Below is a picture of Cassava varieties.

Picture 2: Cassava – An excellent food security standby crop



4.8.3 Agro-Forestry

Agro forestry is one of the CF techniques introduced to farmers. Agro-forestry is a collective name for all land use practices and techniques in which woody perennials (trees, shrubs, palms, bamboos etc.) are deliberately either combined with crops and/or animals on the same land-management unit, at the same time on the same piece of land or alternated in time on the same piece of land.

In all systems, trees play an important role and have many functions in our lives. Some of the functions are:

- Providing fuel wood, building materials and shelter for people and animals
- Providing fodder for livestock, materials for mulching
- Providing fruits, seeds, roots, medicines
- Preventing or controlling erosion

- Improving soil fertility
- Acting as live fence
- Providing natural pesticides (neem tree)
- Acting as wind breaker
- Stabilizing the oxygen /carbon dioxide balance
- Controlling rainfall

Agro-Forest trees grown are Musangu (Faidherbia albida), Jatropha, Sesbania sesban, Gliricidia sepium and Tephrosia. The Musangu (Faidherbia albida) is a very deep rooting indigenous leguminous tree that has the unique property of shedding its leaves during rains allowing annual crops to effectively grow under its canopy without shade interference (GART, 2008).

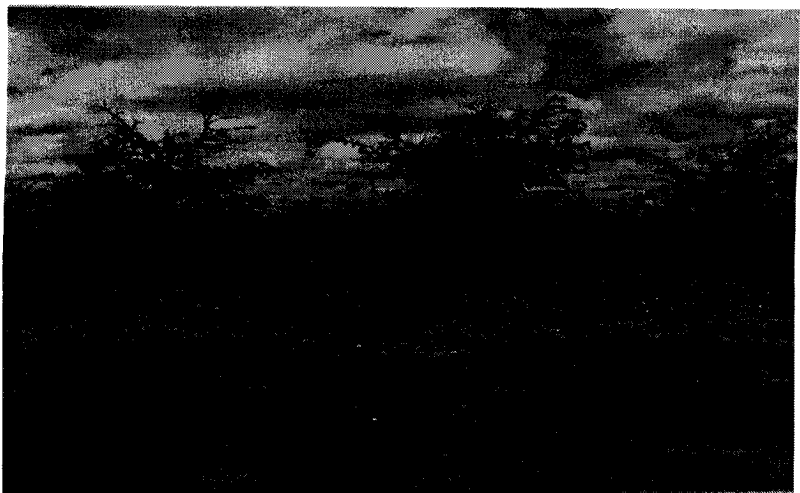
The extraordinary benefits of this tree have been known for many years and in many countries in West Africa it is an offence to cut it down and traditional leaders encourage farmers to grow it (Ibid).

In Malawi, research shows that mature trees support increased maize yields of 250% without the addition of any fertilizer. Similar yield increases for millet and sorghum and increases in cereal grain protein are reported from many countries. The Musangu tree also encourages reforestation (Ibid).

In Eastern highlands of Ethiopia an economic return analysis has indicated an income gain of 85% from cereals grown under 65 trees per hectare compared to fields without trees (ZNFU

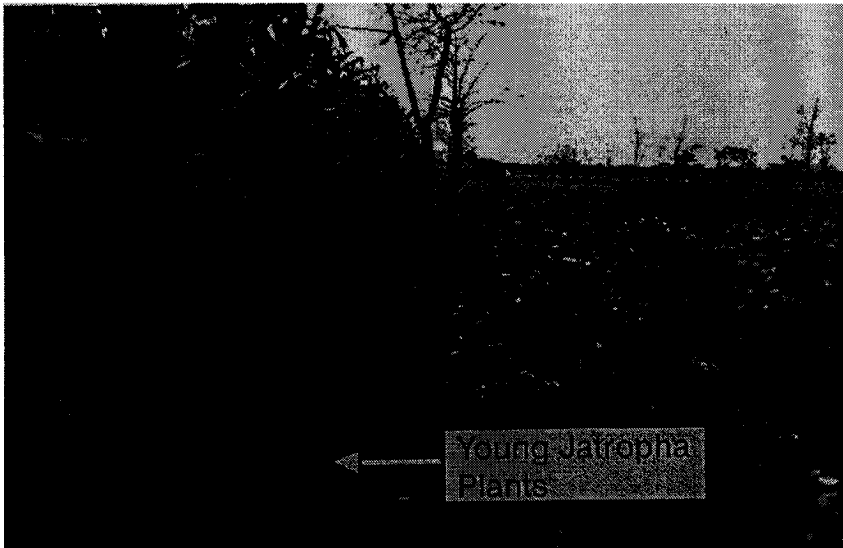
and CFU, 1998). Below is a maize field with 7-year-old Musangu trees established over CF fields at Golden Valley.

Picture 3: Musangu (*Faidherbia albida*) trees in a maize field



Another tree that farmers grow is Jatropha, which is used to hedge around the boundaries of their fields to keep out the livestock and control their land. Jatropha is an ideal live fence to protect fields. Livestock do not browse the plant and when planted together at a space of 0.25m to 0.3m spacing makes an impenetrable hedge around fields (CFU, 2009:37). After crushing, the remaining cake is rich in NPK (Nitrogen, Potassium and Sodium) and as an organic fertilizer, which is equivalent value of chicken mature. With escalating mineral oil prices, Jatropha has a promising future as a source of bio-diesel, which is made by transesterification of crude oil. The crude oil burns without emitting smoke and can be used in easily modified lamps and stoves. The diagram below is showing a live fence to protect fields at Golden Valley.

Picture 4: Jatropha trees- live fence protecting the fields



4.9 Agricultural Development Project

There are two NGO projects running in the Katete District. They are also found in Kafumbwe Camp and Kagoro Camp the Headquarters of the Southern Block. The two are Conservation Agricultural scaling up for Increased Productivity and Production (CASIPP) and Farmer Input Support Response Initiative (FISRI). These are working hand in hand with Ministry of Agriculture and Co-operatives in the District.

The Norwegian Government funds CASIPP Project and it has concentrated on 12 Camps *among which Kagoro and Kafumbwe are part.* The European Commission whose mother body is Food and Agricultural Organisation (FAO) funds FISRI and it has 12 Camps as well.

The two Projects whose Objectives are:

- i. *To seal off the Camps*

iii. To facilitate accessibility of farming inputs

The gaps are due to low productivity in the District. These gaps are as a result of the degrading environment. The degrading environment is due to poor methods of farming such as Conventional Farming, which is a traditional method. The poor methods are due to mindset of farmers. They insist on old methods of farming yet they face financial difficulties to access fertilizers and other farming inputs. This affects negatively on the crop yield.

The main aim of the Projects is to train smallholder's farmers on CF methods. They also provide On Farmer Facilitators (OFF) with inputs such as Maize, Ripper and Chaka hoe so that they use them on demonstration fields to acquire enough knowledge and confidence. They have been given bicycles each to reach out the targeted farmers. The OFFs are beneficiaries/participating Farmers who were trained on CF and these are found in every Camp. Every Camp has 28 OFFs who in turn are expected to train 15 farmers each. This means the District has 672 OFFs who in turn should train 15 farmers. The expected number of targets is 10 752 adopters after 2 years thereafter they will be an evaluation.

There are other NGOs in the District supporting CF and there are Conservation Farming Unit (CFU), Care International (agro-Dealers Project) and LWF.

4.10 Land Degradation

Many parts of the Zambia with continuous ploughing, maize mono-cropping and liberal use of acidifying fertilizers have degraded the land to a state where farming is no longer possible.

Before the 1970s, ploughing was less damaging because farmers followed rotations that included legumes; they ploughed on the contour and used less fertilizer (CFU, 2009).

In Southern Province, thousands of farmers who have destroyed their soils have migrated to other provinces where they cut down virgin forests, mine out the natural fertility and repeat the damage that forced them to move in the first place. Those who remained behind are far more susceptible to droughts than previously because their soils have become infertile and compacted and they rely too heavily on maize (Ibid).

CHAPTER FIVE- RESEARCH FINDINGS AND INTERPRETATION OF RESULTS

5.0 Introduction

This Chapter analyses the findings of the research in line with the objectives and research questions. The data was analyzed using tables of frequency and other graphics-using computer aided presentations and summaries.

The country's agricultural production is still dominated by small-scale farms cultivating landholdings of 1 to 5 hectares producing most of the crops. Presently there are only a few large commercial farmers most of who are integrated in agro-processing. Smallholder agriculture plays an important role in terms of its contribution to people's livelihoods and to economic development (Chipokolo, 2006). He further said that in Zambia's economic policies, the small-scale farmers have been left out in the cold. When the rest of the world is busy investigating in its rural areas and in agriculture and increasing its competitiveness, Zambia has been standing still and idling (Ibid).

The researcher carried out the research in the Agricultural Southern Block of Katete District (Kagoro/Kafumbwe). The researcher tried to learn how information reached the farmers, how it was utilized and/or appreciated and constraints faced in the sphere of media information delivery.

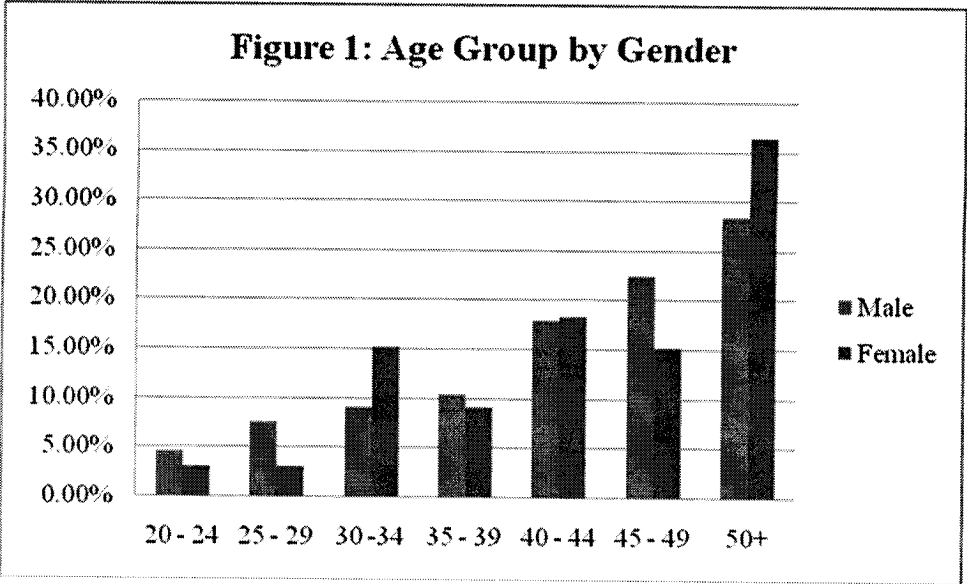
The analysis and interpretation of collected information will be made at several stages. The first one shall involve quantitative data from the survey and content analysis using the Statistical Package for the Social Sciences (SPSS). The second level will qualitatively be based on interviews.

5.1 Findings from the farmers

In this section Extension workers present the household’s specific characteristics of the sample: i.e. age, sex, marital status, educational level, household size, wealth status, farm size, household income and the number of visits. An attempt is made to relate those household- specific characteristics to the adoption or non-adoption of Conservation Farming.

5.1.1 Age

The age range of the household of the adopting farmers is from 20 to above 50 years of age.



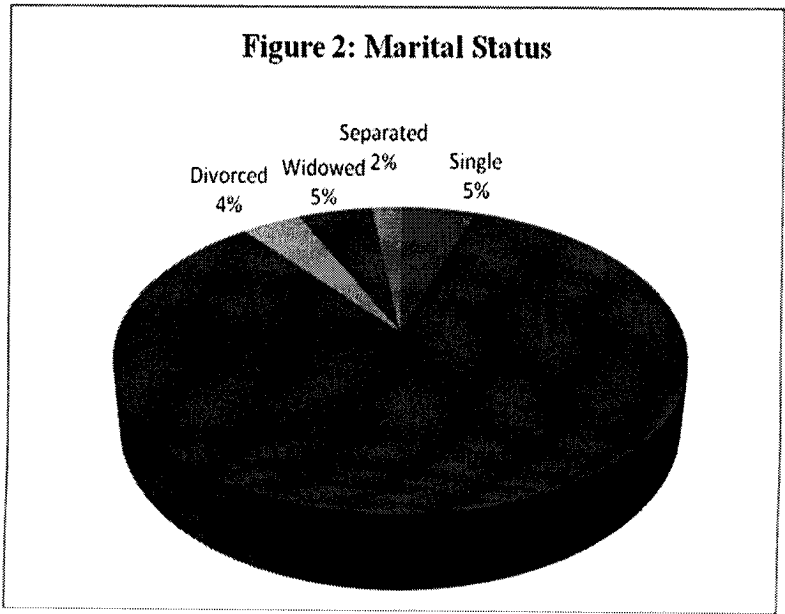
Source: Field Data

The Figure above shows that the largest number of respondents involved in farming comprises those in the range of above 50 years of age with 36% of male and 29% females followed by those between 45-49 with 22% males and 15% females then ages between 40-44 with 18% males and 17% females while the list in age range from 20-24 with 4.0% males and 3% females.

From these figures, it can be concluded that the age of the household determines the involvement of farming activities. It can be said that from ages 40 going above 50 are very much determined in farming activities than those in the ages 20 to 39 especially in conservation Farming activities.

5.1.2 Marital Status

The figure below shows the marital status of the respondents of the study area.



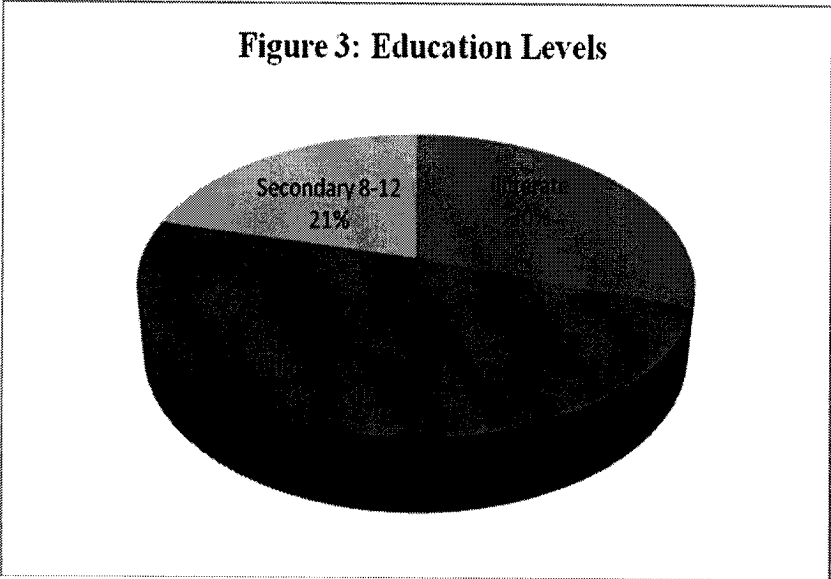
Source: Field Data

The respondents were divided into five categories by marital status thus; single, married, divorce, widowed and separated. From the findings, the highest number of respondents were married of 84%, 5% of the respondents were single, 5% were widowed, 4% were divorced and 2% were separated.

5.1.3 Education Levels

Low literacy levels in the community are a very big hindrance and barrier to adoption of innovations regardless of media used. The study investigated the literacy levels of the

respondents as this has direct relationship with the way messages are received, practically interpreted, and exchanged among respondents.



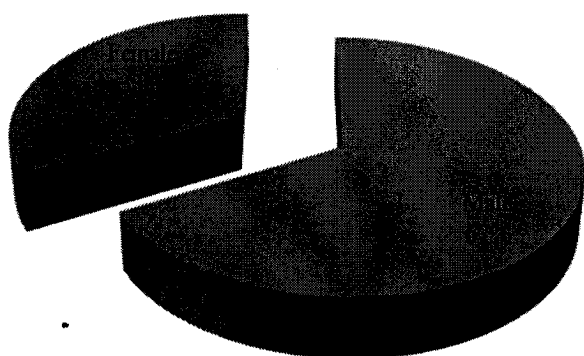
Source: Field Data

The respondents were divided into three categories according to the highest level of education attainment of the household head thus, illiterate, primary and secondary. From the findings, 30% were illiterate, 49% attained primary level of education and 21% attained secondary level of education.

5.1.4 Gender

Figure 4 gives the gender of the head of the household for adopters of CF in Kagoro/Kafumbwe camps in the Southern Block.

Figure 4: Gender



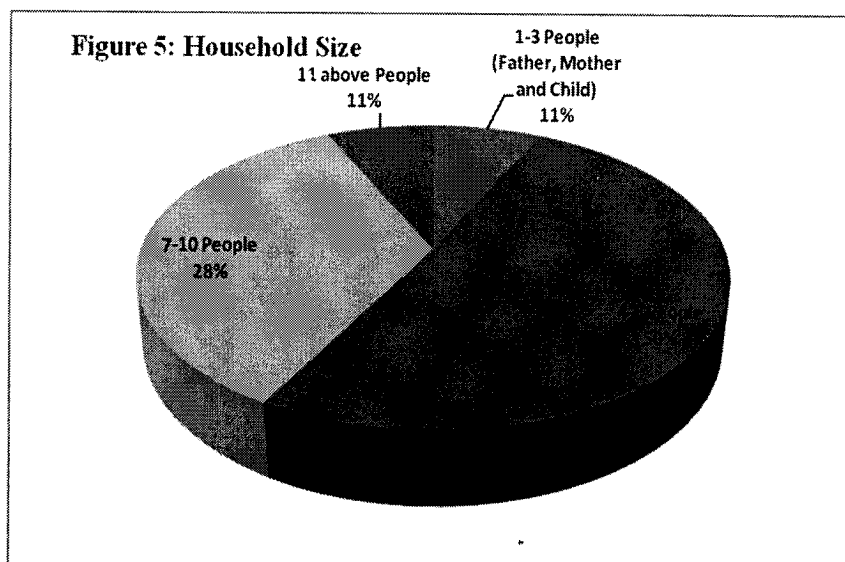
Source: Field Data

From the data presented in figure 4, 67% among the household head of the farmers are males and 33% are females.

However from the FGD and from researchers own observation in the study area, there are more men practicing CF. This could be attributed to labour constraints faced by most female-headed households especially during the planting season. In addition, because of land tenure system in the study area, women have smaller pieces of land for cultivation.

5.1.5 Household size

The size of a household has no implication on the availability of CF. One would therefore expect that households adopting CF have a higher percentage of farm labour available than non-adopting households do.

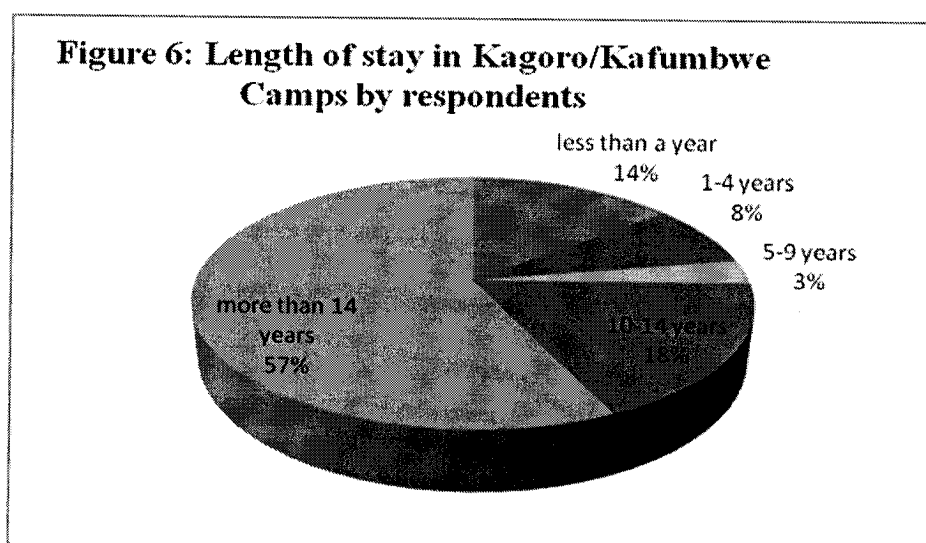


Source: field data

From the findings, a larger percentage of household size is that which has 4-6 people, which is 50% while the lowest is that which has above 11 people with 11%.

5.1.6 Length of stay in Kagoro/Kafumbwe Camps by respondents

The figure below shows the length of stay of the respondents in Kagoro/Kafumbwe.

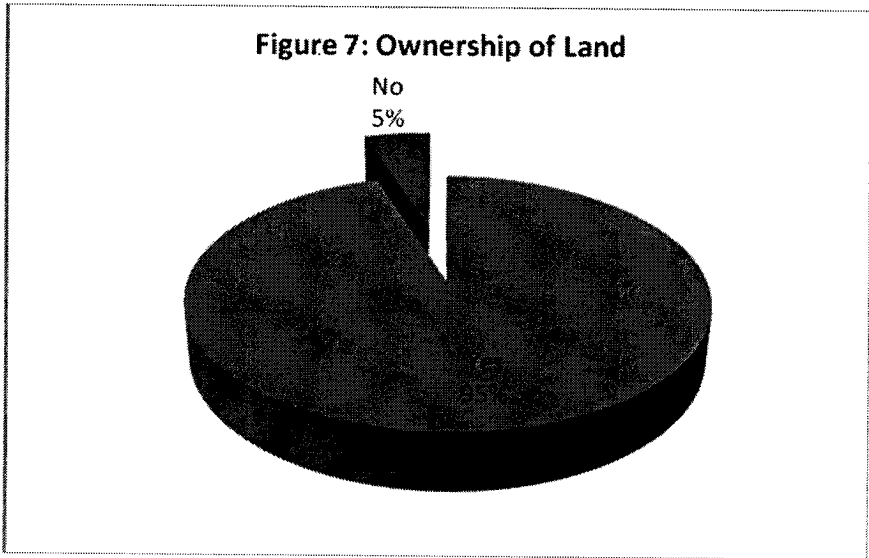


Source: Field Data

From the findings in figure 6, the largest group of households that have stayed in Kagoro/Kafumbwe are those that have stayed there for more than 14 years with 57% followed by those between 10-14 years with 18% and the least is those that have stayed there for less than a year.

5.1.7 Land Tenure

The Figure below shows the Percentage distribution of the respondents' Ownership of Land.

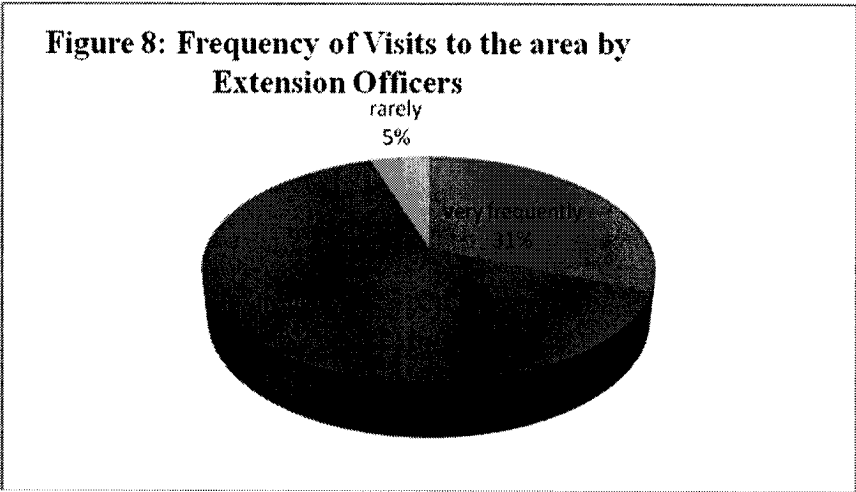


Source: Field Data

From the chart above, 95% of the respondents of Kagoro/Kafumbwe own land though most of them are men according to the study. Only 5% did not own land. This is why a lot of them have adopted CF because they can decide what to do with their land.

5.1.8 Visit by Extension Officers

The study also wanted to find out as to whether the farmers had any contact with Camp Extension Officers in discussing matters related to CF.

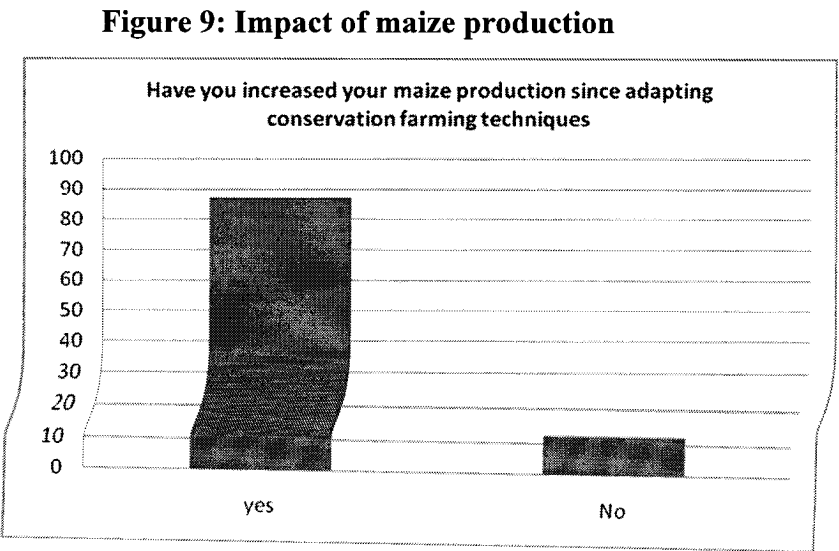


Source: field data

From the findings Extension officers do visit the farmers in the study area. This is clear by the findings thus; 64% of the farmers which is the largest number of respondents said that there were visited frequently, 31% were visited very frequently and the lowest number of those that said there rarely visited were 5%.

5.1.9 Impact of the adoption of CF technology on maize production

The researcher wanted to find out if the adoption of CF has any impact on the smallholders of Kagoro/Kafumbwe.

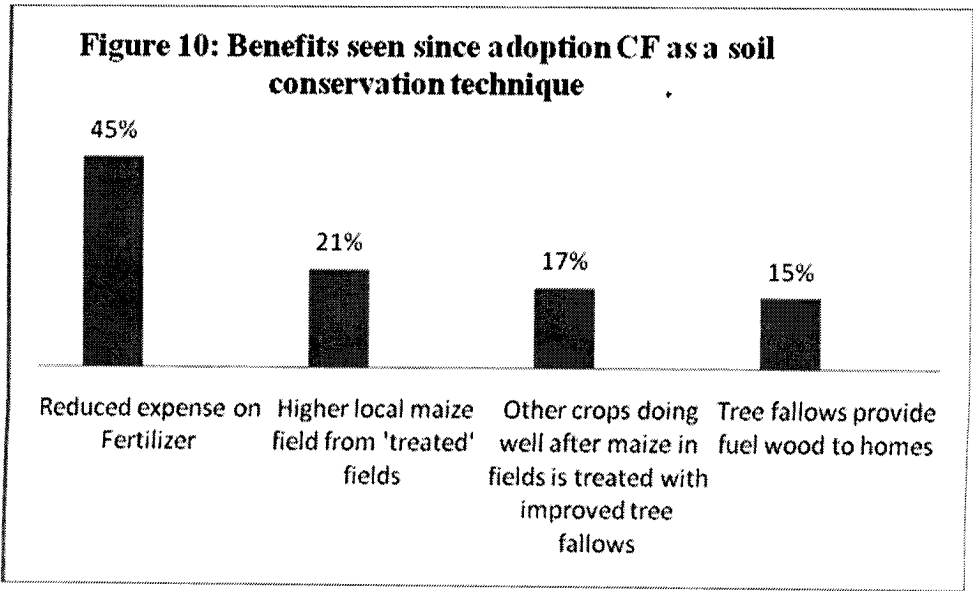


Source: Field Data

From the research findings, the table above shows that a lot the farmers with 88% in Kagoro/Kafumbwe said they have increased the maize production since the adoption of CF technique while 12% said they did not.

5.1.10 Benefits seen since the adoption of CF a soil conservation technique

The researcher wanted to find the benefits of adopting CF as a soil conservation technique.



Source: Field Data

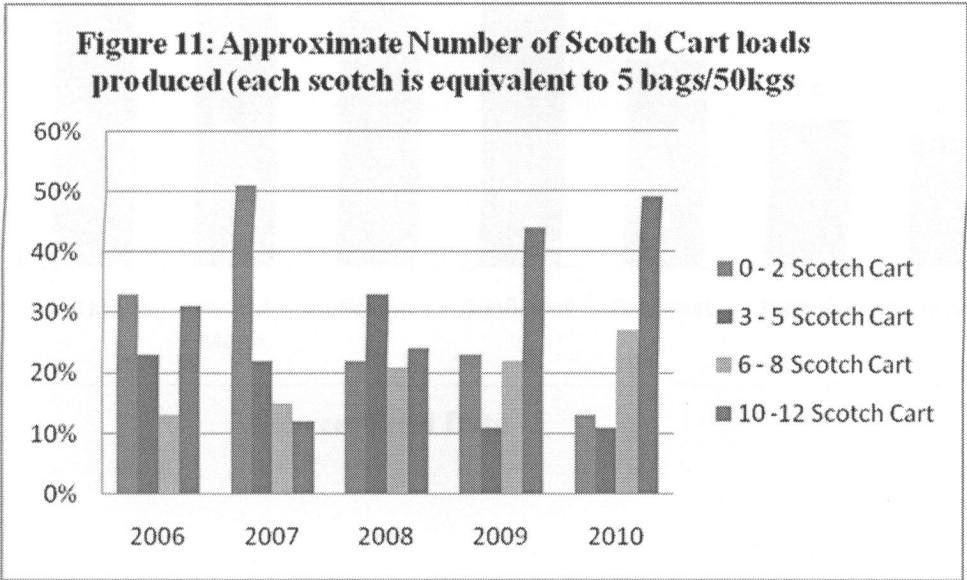
The farmers have expressed happiness since the adoption of CF. From the graph above, they have expressed different benefits. The highest number of households said the adoption of CF has reduced expenses on fertilizer with 45% then higher maize yield with 21%, higher yield of other crops with 17% and the lowest number is that which said the tree fallow provided fuel wood to their homes with 15%.

5.1.11 Maize production increase due to CF farming techniques

The researcher had difficulties in obtaining production figures beyond 2009/10 farming seasons because of poor record keeping by the farmers in the study area. There is no organized marketing agency in the area where accurate records of maize purchases from farmers could have been obtained. Therefore the researcher relied on individual farmers' recollections of how much they had produced the previous seasons.

However, from this raw data, it is clear that for the four seasons under consideration 2006/2007, 2007/8, 2008/9 and 2009/10, there is significant difference in maize production among the farmers in the study area.

Year/ Scotch Cart	2006	2007	2008	2009	2010
0 - 2 Scotch Cart	33%	51%	22%	23%	13%
3 - 5 Scotch Cart	23%	22%	33%	11%	11%
6 - 8 Scotch Cart	13%	15%	21%	22%	27%
10 -12 Scotch Cart	31%	12%	24%	44%	49%

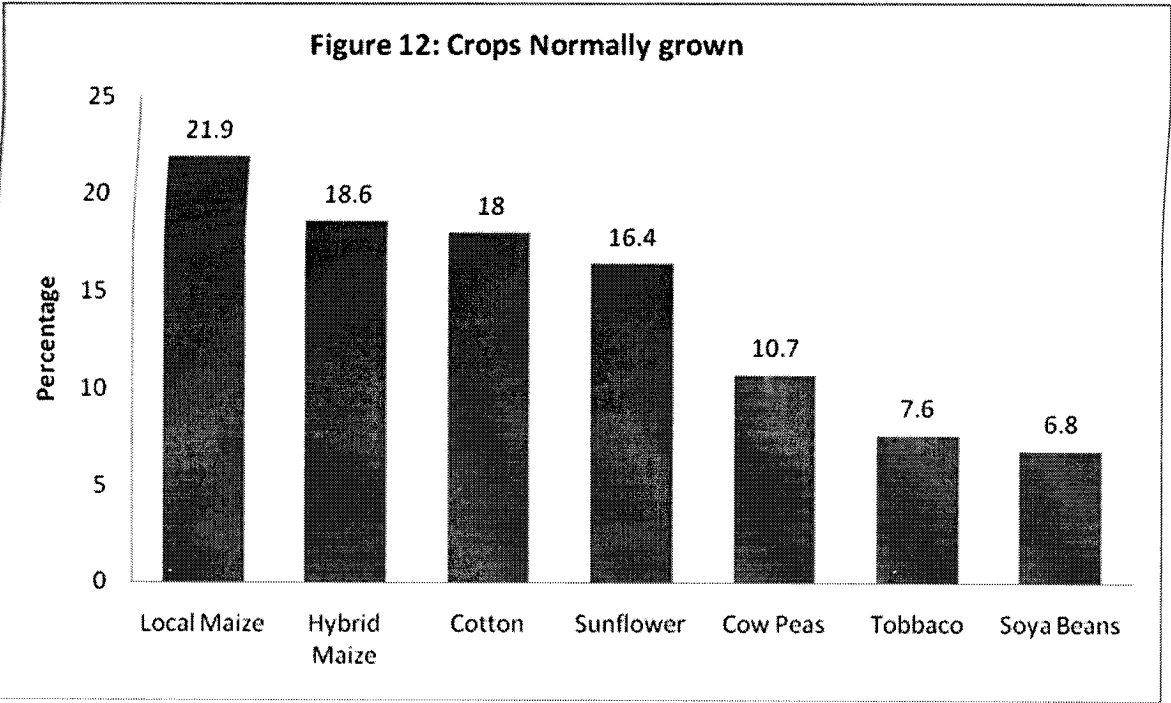


Source: field data

From the data in figure 11, there is a lot of increase in maize yield especially in 2009 and 2010 with households producing more scotch carts where the highest number produced 49% producing between 10-12 scotch carts in 2009/2010 and 44% households producing between 10-12 scotch carts in 2008/2009.

5.1.12 other crops normally grown in Kagoro/Kafumbwe

The research revealed that the respondents of Kagoro/Kafumbwe grow different types of crops with the highest number of those growing local maize with 21.9% followed by those growing hybrid with 18.6%, then 18% grow cotton, 16.4% grow sunflower, 10.7% grow cow peas, 7.6% grow tobacco and the lowest number growing 6.5% growing soya beans.

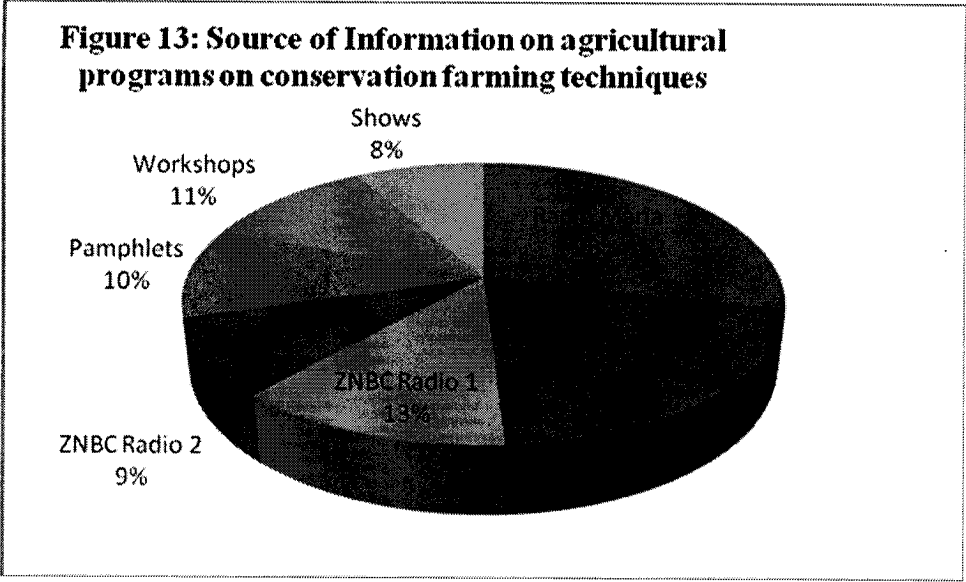


Source: Field Data

5.1.13 Sources of latest Agricultural Information

The choice on the type of media used to disseminate agricultural technical information plays a very big role in achieving positive results. This entails that the implementers of programmes should ensure that they have knowledge of patterns of access to media by the farmers.

The farmers of Kagoro/Kafumbwe with forums of other communication channels they use to source latest developments (other than from extension officers) are tabulated in the table below.



Source: Field Data

From the table above, the study revealed that 28% of the farmers sourced and obtained information on agriculture from Radio Maria, 21% from Radio Breeze, 13% from ZNBC Radio 1, 9% from Radio 2, 10% from pamphlets, 11% from Workshops and then 8% from agricultural shows.

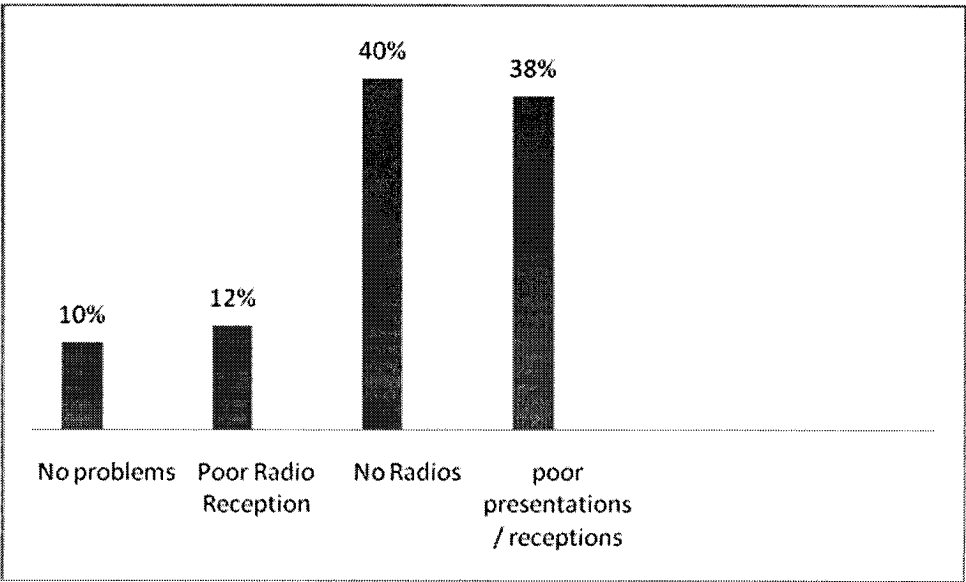
5.1.14 Problems affecting effective listening to radio

The study revealed that 90% of the farmers expressed that they experienced a lot of problems in as far as effective listening to the radio was concerned while 10% indicated that they did

not experience any problems at all. Some of the major constraints experienced by farmers of Kagoro/ Kafumbwe were:

- i. Lack of group radios and high costs of batteries.
- ii. Poor presentation and handling of agricultural subjects by presenters at times such as irrelevant inserts like music.
- iii. Poor reception as many complained about hissing sound and two stations being heard at the same time on one frequency.

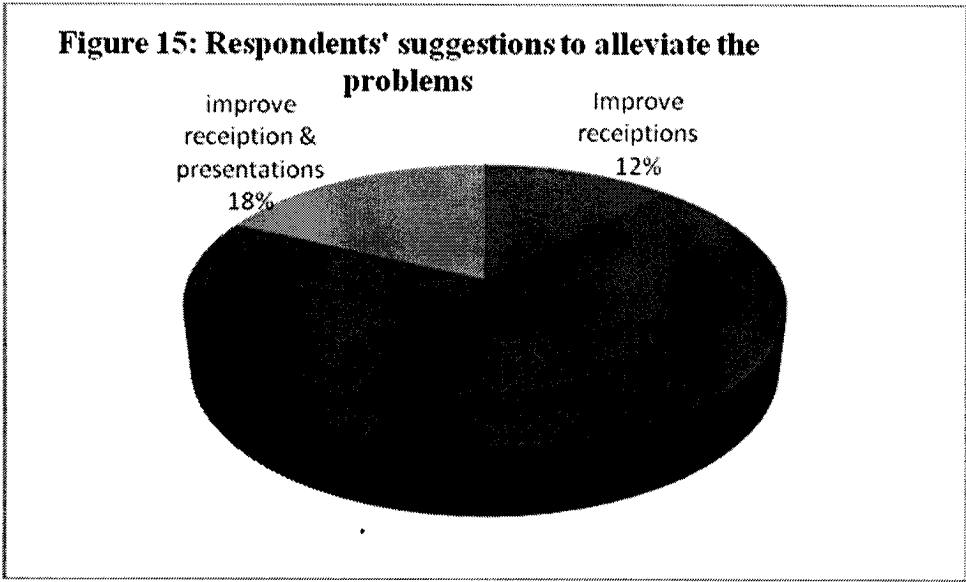
Figure 14 showing problems affecting effective listening to radios by farmers at Kagoro/Kafumbwe Camps



Source: Field Data

5.1.14.1 Suggestions to reduce these problems regarding radio presentations

The research wanted to find out what suggestions farmers had regarding problems faced on radio presentations.

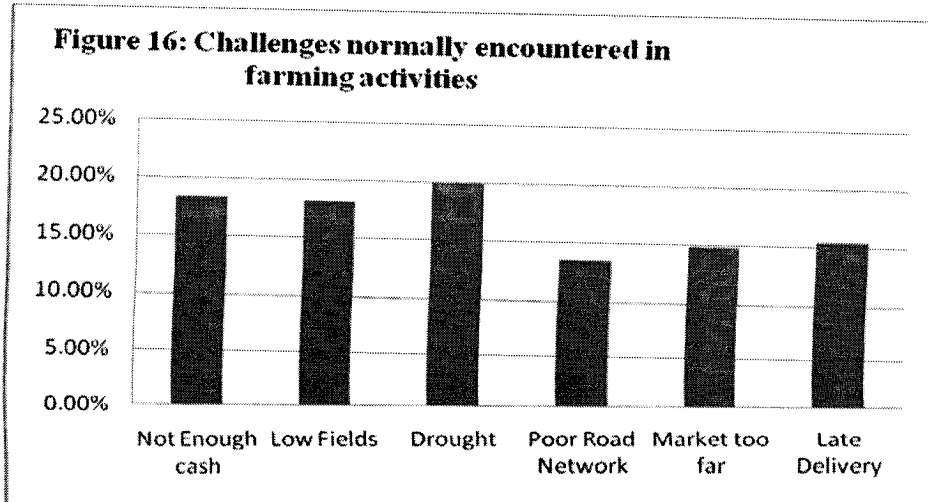


Source: Field Data

From the findings, 70% of the farmers suggested that the government supply them with wind up radios to lessen the problems of buying batteries. 18% said ZNBC should improve reception and also presentations while 12% said reception to improve especially with ZNBC Radio stations.

5.1.15 Challenges encountered in farming activities

The farmers of Kagoro/Kafumbwe face a lot of challenges regarding farming. Some of the challenges expressed are shown below.



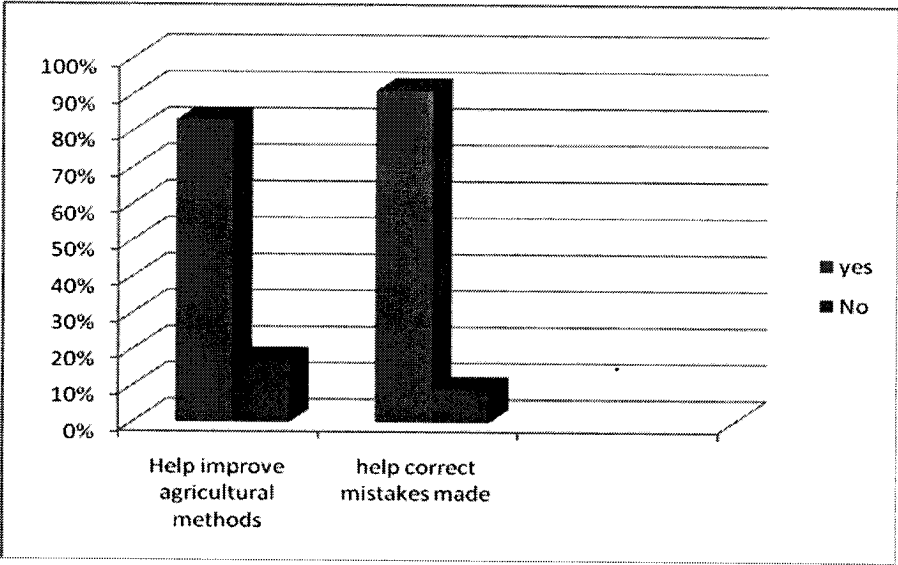
Source: Field Data

From the findings, 20% said they experienced droughts, 18% said low crop yields from their fields due to poor soils as a major problem and no enough cash to buy fertilizer as they were expensive and difficult to obtain. 15% said the markets were too far and also late delivery of farm inputs such as fertilizer and seeds. The others said the roads were so poor that makes transport problems to take their produce to markets.

5.1.16 Perception of respondents regarding the effectiveness of agricultural programmes

The research revealed that almost all the farmers very much valued the importance of agricultural programmes.

Figure 17: Perception of Respondents Regarding Effectiveness of Agricultural Programmes



Source: Field Data

From the graph above, 98%% found it beneficial to listen to agricultural programmes and they said these programmes helped them in correcting mistakes they made regarding CF technique. 80% said that the programmes helped them in improving new methods of farming introduced. 12% said they did not benefit in listening to these programmes.

Part 2: Focus Group Discussions/ In-depth Interview Guide for respondents

5.2.0 Discussions

The researcher held two focus group discussions with the farmers in two camps (Kagoro/Kafumbwe) sampled for the study. The groups comprised 10 respondents each and these were identified as key persons in the farming cycles with the help of Block and Camp Officers. A guided interview was used and it was focused on finding out issues related to conservation farming techniques used by the people of Kagoro/Kafumbwe. The findings were not very different from the in-depth discussion.

FOCUS GROUP DISCUSSION PROMPT LIST

1. As members of Kagoro/Kafumbwe, what do you like about conservation farming method?
2. Have you benefited from the Extension Officers visits?
3. What are the benefits of their visits and what would you like them to do in order to enhance conservation farming in your area?
4. Has the conservation farming technique improved the crop yield?
5. Why have others in this village not adopted the conservation farming technique?
6. Are you happy with the presentations of the programmes on conservation farming on the radios?
7. What do you think could be done to improve the dissemination of information through the radios on the new farming technique?
8. How can the problems of low crop yield be overcome?
9. What advice would you give to those that have not adopted the new farming technique?
10. What should the government do to help the farmers improve on conservation farming?

IN-DEPTH INTERVIEW GUIDE FOR RESPONDENTS

1. Has the conservation farming technique improved the crop yield?
2. What do you think are the problems causing low crop yield in your area?
3. How can these problems be overcome?
4. Why have others not adopted the conservation techniques?
5. Do you think everyone in the village will adopt the conservation farming technique in the near future?
6. How did you learn about conservation farming technique?
7. Apart from the Agricultural Extension Officers, where else did you get information about conservation farming?

8. Are the Agricultural Extension Officers giving you enough information about conservation farming techniques?
9. What would you wish the Extension Workers do to help you succeed with the new farming techniques?
10. Are there NGOs helping you adopt the new conservation farming techniques?
11. Are the community radios (Mphangwe, Breeze and Maria), ZNBC Radio 1, and 2 providing enough information?
12. What do you think could be done to improve the disseminating of information through the radios on the new farming technique?
13. How often do the Extension Officers visit you in this area?
14. When do they visit you frequently? Is it during the farming season or after farming season?

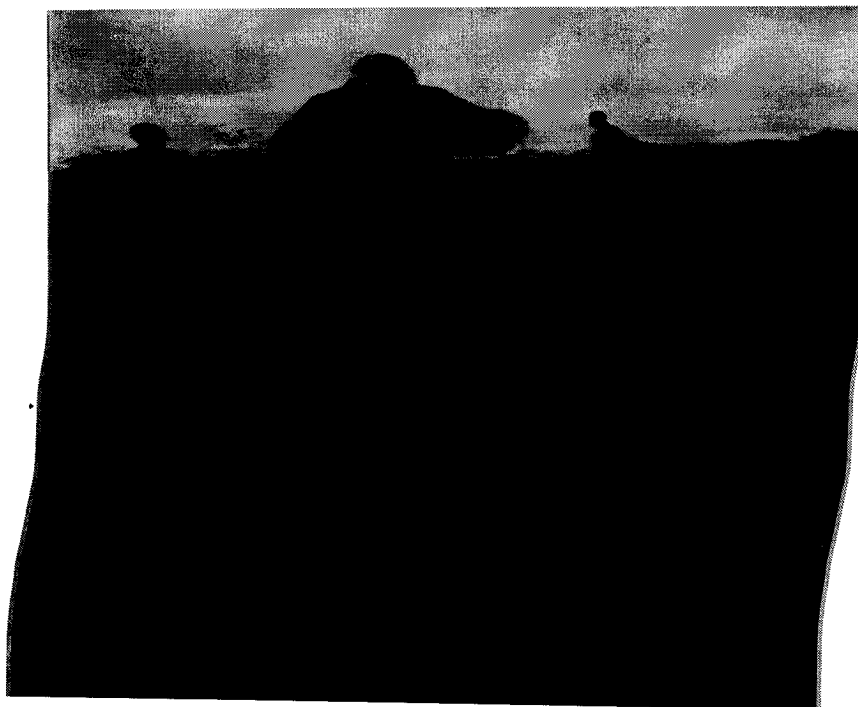
5.2.1 How the people of Kagoro/Kafumbwe learnt about conservation farming

The researcher wanted to know how the respondents learnt about CF. In both group discussions held, the discussants expressed almost same ideas. Most of the respondents said they learnt CF technique from the Extension Officers' visits and trainings while others learnt from their friends during field days where the lead farmers demonstrate how CF is practiced using rippers and Chaka hoes. Some learnt from shows that are done in different camps and at District level every after harvesting the yields.

Other respondents learnt from the NGOs such as LWF, CFU who gave them tools such as Chaka hoe, ripper to motivate them. Some learnt from reading books such as GART, CF hand book, magazines, pamphlets, brochures.

From researchers own observations, many people are aware about CF though not all practice it. Many people learn from field demonstration days where the lead farmers demonstrate how to use rippers Chaka hoes and how they grow crop rotation. There are taught on how to grow trees (agroforstry).

Figure 18: A picture showing one of the Lead farmers on a demonstration day using a ripper on 22nd June, 2010



Source: Field Data

5.2.2 Problems causing low crop yield

The discussants testified that the poor soils contributed a lot in low crop yield. They said they have been using the same fields for years and were using conventional type of farming, which causes the soil to be poor. They said traditionally the farmers rake up and burn the residues at the end of the dry season, which leaves the soil completely bare and encourages soil erosion. Some said farmers wait for rains to plough their fields that will always be late hence low crop yield.

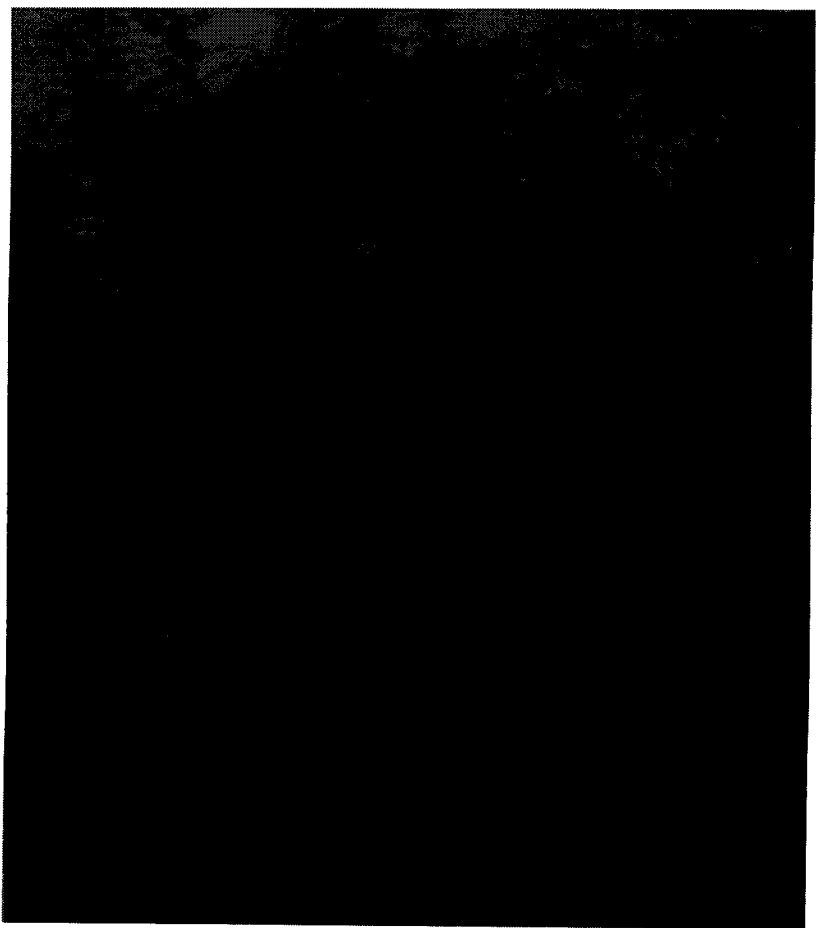
Some respondents said droughts and floods also contributed to low crop yields.

5.2.2.1 How they can be overcome

The discussants opinions were that the solution to the problems of soil fertility is to stop using conventional farming and start using CF, which will restore the lost fertility in the soils. They stated that the benefits are more with CF because soil erosion is reduced,

degraded soils are brought back to life enabling families to farm the same land again without need to migrate. This is done by crop rotation, planting trees such as Musangu, Sesbania sesban that will help retain the lost soil fertility.

Figure 19: A picture showing lead farmers Anastazio Mvula and Gawani Phiri who grow trees (agroforestry)



Source: Field Data

5.2.3 Respondents benefits on CF

The discussants testified the benefits of CF that involves a number of husbandry practices that together comprise a complete farming system. If these followed correctly, a number of important benefits arise. Some of the benefits are; retaining residues reduces soil and water loss, improves infiltration, reduces surface temperatures and in time, improves sol fertility. CF minimizes crop loss in drought years and improves food security.

A number of respondents witnessed a number of benefits when started using CF than Conventional farming. One of the respondents - Rabson Banda said CF has given him a lot of benefits in terms of increase in crop yield especially maize. He said since he started using CF, he has had enough to eat and sell some as a source of income. He said from the sells, he has managed to build a house and used 20 iron sheets, bought bicycle and a TV. He also planted Musangu tree, which brings back the fertility in the soil.

Another farmer who expressed happiness since he started using CF is Damiano Tembo who said he has more than enough to eat. He said for the 2009/2010 season he harvested more than enough. He said that he cultivated a small area with 21 roles (120m each) and got 2 scotch carts where in a bigger field he got 2 scotch carts as well.

From researcher's own observation, it was visible with farmers practicing CF had more crop yields. Those who have been using CF have been benefiting a lot. The soils are really changing with fertility being maintained hence high crop yields. Their fields had big stalks with big cobs of maize, which were very visible. All those who adopted CF have enough maize for consumption. Other crops are also doing very well such as cotton, cassava, sun flower, soya beans.

Headman Mangani Phiri of Bizaliyele village in Kagoro Camp is one of the lead farmers who teach about CF to his subjects and he said almost all the villagers in his village are have adopted CF. He said a farmer should not rest after harvest but continue cultivating using a ripper or Chaka hoe for gamphani so as to reduce labour.

Cecilia Phiri is another lead farmer who has also expressed happiness by adopting CF. She practices crop rotation and also plant trees such as sebania seban which brings back fertility and the leaves are also used for food for cattle and branches are used for fire wood.

She also use natural fallow where she divided her field into parts and leaves the other part to fallow for at least 3 years and the leaves drop and give fertility back to the soil.

5.2.4 Benefits from Extension Officers' visits

The respondents expressed happiness over the Extension Officers' visits who act as an incentive when they visit. The farmers said they get encouraged with visits by the officers because they help them correct the mistakes in CF by giving them technique advice.

They said that the visits by extension officers have been a factor in influencing the adoption of CF. Therefore; they wished the Extension workers would continue to visit them and give them more training on new methods of farming.

5.2.5 NGOs helping in adoption of CF

The respondents expressed gratitude towards the NGOs who are giving them support in terms of technical advice, equipment and tools (Chaka hoes, rippers). Some of the NGOs are Care International, CFU, LWF and the 2 running projects that are Conservation Agricultural Scaling Up for increased Productivity and Production (CASPP) from a Norwegian government and Farmer Input Support Response Initiative (FISRI) funded by European Commission.

CASPP and FISRI have helped a lot in the adoption of CF in Kagoro/Kafumbwe Camps. These two projects running in the District have given more support to farmers. They have trained On-Farmer Facilitators (OFFs). These are beneficiaries who were trained and in turn train other farmers. There are 28 OFFs for each Camp and there are 24 Camps in the District. Each OFF is expected to train 15 farmers which gives the District 672 OFFs who should train 10 080 farmers.

They also give inputs to farmers in form of vouchers and these varieties are; maize, ripper and Chaka hoe.

5.2.6 What government should do to help improve CF?

The respondents wished the government help them with loans in terms of farm equipments and tools especially the ripper, which is used for ripping the land and the Chaka hoe, which is a special hoe, used for digging holes for planting seeds. They also said if they loans in terms

of cattle so that they can cultivate larger areas because it will be easier to use cattle than to use hoes.

They also said if the government could provide them with radios that do not use batteries (wind up radios) because they would like to listen to radio farm forums that will help them improve in CF techniques.

Part 3: In- depth Interview Guide for Agricultural Extension Officers

5.3.0 Description

In-depth Interviews were held with the key officers who are the Block Officers and Camp Extension Officers. These live closer to people in terms of service delivery. The Extension Officers provide professional communication intervention to obtain a voluntary change in the behaviour of farmers' farming practices.

Block Officers are agricultural staff in charge of an agricultural Block. A block is a partitioned area in the District that comprises a number of Camps that fall under the Block Extension Officer. A Camp is also an agricultural partitioned area in a block administered by the Camp Officer. An Extension Officer is an agricultural field worker in charge of an agricultural camp and he/she works in close contact with the farmers.

5.3.1 Communication Strategies used by Extension Officers.

The interviewed staff expressed that they do communicate with the farmers frequently and this has influenced the adoption of CF in Kagoro/Kafumbwe Camps in the Southern Block of Katete District. Agricultural extension services have been considered to be one of the reliable and surest methods of delivering relevant agricultural information to farmers. They said that they use a number of channels and approaches to disseminate information to the farmers and these are field days/demonstrations where farmers gather at one's field where demonstrations are carried out on how to go about the new technique. This is where the lead farmers teach their friends by actually practicing in their fields and the other farmers watch. Meetings are also held to talk about the farming methods. They also use seminars and workshops, visiting farmers/direct talk with them, Agricultural shows at both Camp and District level.

They said these approaches are important because they are face to face interaction and they motivate the farmers in the adoption of CF. They continued to say the farmers have benefited a lot from their messages and have helped in adopting CF. Those who adopted CF have experienced high crop yield especially maize yield. They said people are able to grow enough and sell the surplus of which they were failing to do when they were using conventional type of farming.

They said though others have not adopted the technique, they are yet to do so because most of them are attending field/ demonstrations days to learn from their friends. This has helped them to adopt CF especially that it comes from their friends. This is in line with Rodgers, (1983).

They said that every year they have new farmers that learn from their friends and adopt CF and this is called Spill-Over. They are not trained but just learn from their friends. Others that have not joint CF think that the government chose CF farmers and they are paid for that. They fill even if they join their friends they will not benefit. Some are just Laggards who are always waiting to see if CF works.

5.3.2 Challenges faced by Farmers

The staff spelt out some of the major problems that farmers are facing and they include; some farmers believing in the old farming method and resist to change to CF because they say the method has been there even before they were born and cannot change what their forefathers used.

They also said that the farmers lack radios and batteries, poor reception. They said if farmers can be given wind up group radios where they learn a lot from them. They also lack tools such as Chaka hoes and rippers to use for cultivating their fields.

The staff also expressed some challenges that include; officer/farmer ratio which is 1:1 600. This means that one extension officer deals with 1 600 farmers which is almost impossible but they are doing it under difficulties. They have motor bikes but have a challenge of fuel. They need fuel to visit all the 1 600 farmers in their areas.

The government has given support by training the Extension workers through Ministry of Agriculture and Cooperatives who in turn recruit the farmers who own land and train them. They are also provided with fuel though usually not as expected because the motor bike they have need fuel which is given to them once a week sometimes there is nothing. They are usually helped by the NGOs who provide them with fuel. The allowances are not motivating because they are so little or none.

5.3.3 Other Channels of communication

The staff accepted that they are CF programmes on all radio stations namely ZNBC radio 1 and 2, the community radios Maria, Breeze from Chipata District and Mphangwe radio from Katete District. They said the programmes have helped the farmer especially on CF. The radio programmes help them correct the mistakes they make especially when they listen in groups, they advise each other.

CHAPTER 6: DISCUSSION OF THE RESULTS

6.0 Introduction

This chapter discusses the findings of the study. The findings are from the survey, in-depth interviews from both the farmers and the Extension Officers, group discussions and from secondary data gathered.

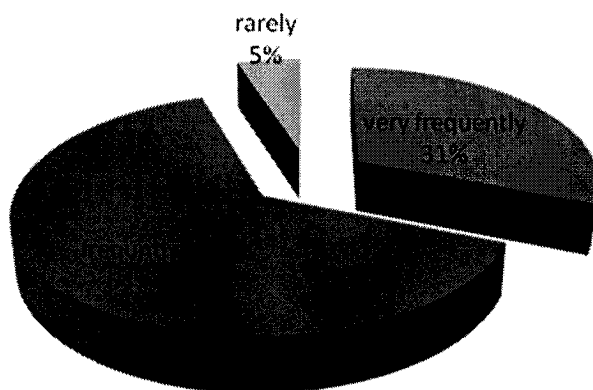
The effectiveness of agricultural extension communication strategies used, their applicability, relevance and their impact on reinforcement of Agricultural Extension Services to influence farmers' adoption of agricultural innovations (Conservation Farming) and improve the development of rural agriculture are discussed in this chapter.

The evaluation was based on a mixture of qualitative and quantitative methodologies. Therefore, the discussions are based on views, opinions and experiences of the respondents as they presented them. Other issues discussed such as sources of agricultural information and other related information were meant to provide baseline for establishment of the effectiveness of extension communication strategies in use and their impact.

6.1 Visits by Extension Officers

The farmers are eager to learn new options and solution to their farming activities. Almost all the farmers are aware of the new technology of CF. This is evident from the findings in figure 8, that showed that almost all the farmers were visited by Extension Officers.

Figure 8: Frequency of Visits to the area by Extension Officers



Source: Field Data

The figure above shows that the highest numbers of respondents 64% are visited frequently, 31% are visited frequently and a small number of 5% say are rarely visited. The survey has reviewed that the farmers in Kagoro/Kafumbwe have the knowledge from Extension Officers about CF.

From the results, we can say that many farmers had visits that are more regular. We can therefore conclude that, there is information flow in Kagoro/Kafumbwe camps between the farmers and the agricultural extension officers. Almost all the farmers indicated that information on CF is available. Failure to adopt CF is based on individual wishes and not that they lack information. The other reason could be that others cannot adopt CF because they think those practicing it were chosen and are given something or paid.

Therefore, we can conclude that visitation from extension workers has been a major factor influencing the adoption and sustenance of CF technology as a soil improvement strategy in Kagoro/Kafumbwe. The study confirms the findings by Suzuk and Atsusbi (2002), that *Agricultural Extension Services have been considered one of the reliable and surest methods* of delivering relevant agricultural information to rural farmers especially those that have no access to Radio or Television. There is an obvious bias from extension workers towards adopting farmers in terms of visits because most of the help comes from developmental

NGOs in the area like CFU, Care International who provide transport and other allowances to officers. These incentives improve their effectiveness in disseminating information on CF technologies in the study area.

The MOA and Cooperatives must also devise policies that will make the dissemination of information on CF part of everyday tasks for extension officers in the study area if the adoption of CF technology is to have the desired impact among small-scale farmers.

6.2 Importance of Agricultural Broadcast Programmes

From the findings of the study, the respondents are exposed to Agricultural Radio messages on CF. Radios on the other hand seems to be a popular source of information. The 71% of the farmers expressed that they mostly accessed their knowledge and skills from radios such as radio Maria, Breeze, ZNBC radio 1 and 2. The group radios though not enough have helped the farmers acquire information although they have own hiccups.

The radios have been used extensively as an educational median in developing countries. According to Long (1994), he said that radios in India were used for rural development. He further said that educational radios have been employed within a wide variety of instrumental design contexts.

According to Adhikanya (1984), extension services have been criticised both for failing to reach the majority of the farmers in many developing countries and to communicate successfully with those that fall within range. Radios offer both the reach and the relevance to its listeners and more than any other mass communication medium. Radios speak in the language and with accent of its community or nation-state. This means that people need to be sensitized to take keen interest in listening to the radio not only in groups but also as individuals in their homes.

It should be noted that communication has the potential to play an empowering role and to enable the society to take control of their lives and set their own economic, political and social agendas. Communication can be a potential tool for expressing the needs and creating

a voice for the people to realize their own goals and desires as information is power. Radios have a mandate to provide relevant information that enable audiences to strengthen their agricultural capacities for greater community achievement.

Research finding can easily be channelled through the radio. Therefore, agricultural broadcasters and researchers should constantly interact and share latest findings and recommendations of scholars. The experience of national and international research institutions demonstrates some of the benefits of linking research with radio especially for the rural populace. Radios have various benefits such as:

1. Radios can reach a wide range of stakeholders including farmers, extension workers, community groups, schools, local officials, rural business and NGOs.
2. Radios allow researchers to share information about research projects and activities.
3. Radios can disseminate research findings across long distances and also in languages familiar to the listening public
4. Radio transmits valuable information about where research projects are used and where inputs/services can be obtained.
5. Radio can relay critical information such as disasters, weather and market news.
6. Radio allows communication to share feedback about research products and activities.

The cross-tabulation below shows the respondents sex in relation to listening to agricultural programmes on other channels.

Sex * q5e do you recieves agriculture programmes especially on conservation farming techniques through other channels Crosstabulation

			q5e do you recieves agriculture programmes especially on conservation farming techniques through other channels		Total
			yes	no	
Sex	Male	Count	54	14	68
		% within Sex	79.4%	20.6%	100.0%
		% within q5e do you recieves agriculture programmes especially on conservation farming techniques through other channels	77.1%	45.2%	67.3%
		% of Total	53.5%	13.9%	67.3%
	female	Count	16	17	33
		% within Sex	48.5%	51.5%	100.0%
		% within q5e do you recieves agriculture programmes especially on conservation farming techniques through other channels	22.9%	54.8%	32.7%
		% of Total	15.8%	16.8%	32.7%
Total	Count	70	31	101	
	% within Sex	69.3%	30.7%	100.0%	
	% within q5e do you recieves agriculture programmes especially on conservation farming techniques through other channels	100.0%	100.0%	100.0%	
	% of Total	69.3%	30.7%	100.0%	

The data above shows that more men with 79% received agricultural programmes on CF through other channels. This means men could be more exposed to media than women could. Usually men attend meetings, watch TV, and listen to radios more than women do. Generally, men know more than women because of more networking.

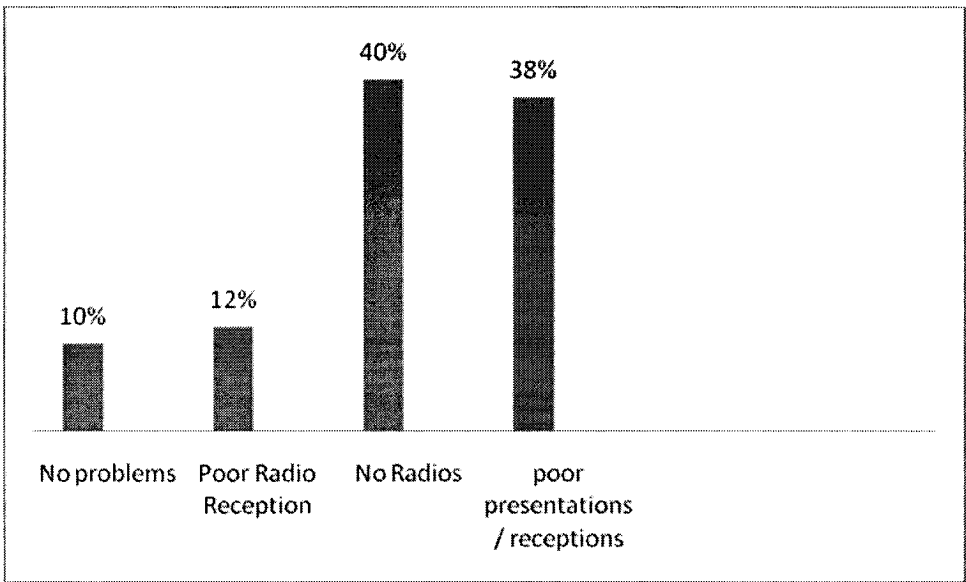
6.3 Applicability of extension communication strategies

The impact of communication strategies can also be measured by the degree and extent of the frequency of use of the communication strategies. The more frequently the communication strategy is used, the more confidence the extension worker has in the strategy to influence

change in behavior, attitude and knowledge of clients towards achievement of the target objectives.

6.4 Barriers to effective listening to radios

The strength of Agricultural radio programmes as an extension tool lives in its ability to reach the illiterate farmers and provide them with information relating to all aspects of agriculture production in a language they understand. In one hand, this does not mean simply reading technical information on the airwaves in local languages, having farmers sharing their problems and achievements in the community and providing relevant information in the local agro ecological and cultural context. On the other hand, the quality in terms of reception plays a very big role in creating interest in the listeners to pay maximum attention to the programme broadcast.

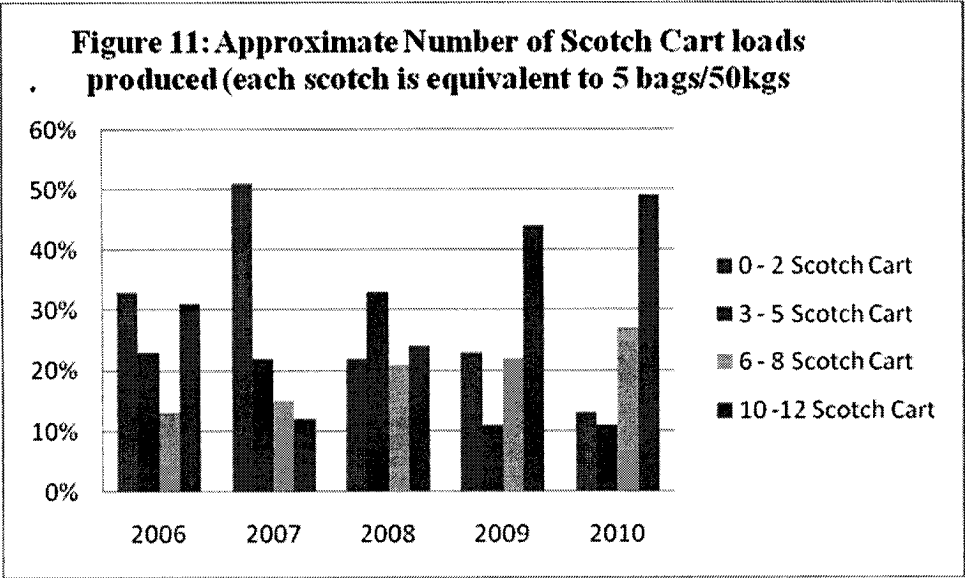


Source: Field Data

The study reveals that about 90% of the respondents experienced problems in listening to radio programmes. The problems experienced are lack of radios with 40% farmers, poor presentations/ receptions with 38%, poor reception 12% and 10% indicating that they do not experience any problems at all.

6.5 Maize Production Increase due to CF

From the findings in figure 11, we can conclude that the adoption of CF has significantly contributed to improved household food security among the adopting farmers. There is a lot of increase in maize yield especially in 2009 and 2010 with households producing more scotch carts where the highest number produced 49% producing between 10-12 scotch carts in 2009/2010 and 44% households producing between10-12 scotch carts in 2008/2009.



This is because CF contributes to the improvement of the soil structure and organic matter content of the soil. This soil improvement enhances its ability to retain moisture even during periods of moisture deficiency. This state of affairs improves the production of the staple cereal, maize and this contributes to food security among the adopting households in the study area.

6.6 Land Ownership

Taking a comparison of land ownership and practicing conservation farming technique, it appears that those who do not own land do not practice CF. It can therefore be concluded that ownership of land determines whether a farmer adopts CF technique or not. Those who own

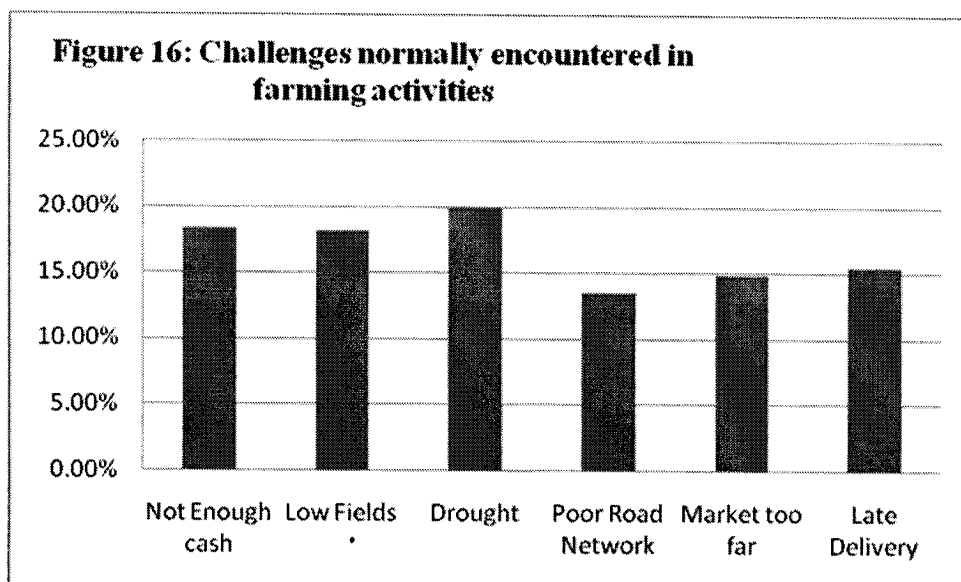
land are free to choose to practice CF or not because that is their land unlike those who do not own it.

q2a do you own the land you cultivate on * q3c2 practice conservation farming techniques Crosstabulation					
			q3c2 practice conservation farming techniques		Total
			yes	No	
q2a do you own the land you cultivate on	yes	Count	67	29	96
		% within q2a do you own the land you cultivate on	69.8%	30.2%	100.0%
		% within q3c2 practice conservation farming techniques	97.1%	90.6%	95.0%
		% of Total	66.3%	28.7%	95.0%
	No	Count	2	3	5
		% within q2a do you own the land you cultivate on	40.0%	60.0%	100.0%
		% within q3c2 practice conservation farming techniques	2.9%	9.4%	5.0%
		% of Total	2.0%	3.0%	5.0%
Total	Count	69	32	101	
	% within q2a do you own the land you cultivate on	68.3%	31.7%	100.0%	
	% within q3c2 practice conservation farming techniques	100.0%	100.0%	100.0%	
	% of Total	68.3%	31.7%	100.0%	

6.7 Challenges encountered in farming activities

Most of the farmers in Kagoro/ Kafumbwe camps produce for subsistence and sale the surplus. They mostly use hand hoes, oxen (rippers are used) to cultivate their fields. Clearly, the farmers are facing many problems such as; lack of access to ready market and this has led the farmers being exploited by briefcase dealers who buy at a very low price.

Some of the challenges expressed are shown below in figure 16.



Source: Field Data

From the findings, 20% said they experienced droughts, 18% said low crop yields from their fields due to poor soils as a major problem and no enough cash to buy fertilizer as they were expensive and difficult to obtain. 15% said the markets were too far and late delivery of farm inputs such as fertilizer and seeds. The others said the roads were so poor that makes transport problems to take their produce to markets.

The researcher also observed 2010 opening of markets where a lot of desperate farmers sold their crops to briefcase dealers at a low price because the markets were opened in August instead of May. Though they sold in August, they were not given money immediately. FRA started paying the farmers in November/ December, which was very late for buying inputs. This discourages farmers to grow for sell yet others depend on farm sells.

Most of the farmers suggested the solution to this problem that the government should introduce market places or selling points within the villages for easy access. The opening of market by government (FRA) should be done in May to help them access finances because the briefcase businesspersons and women start buying maize in May where desperate farmers do sale their maize at a very low price.

In view of the discussions made, this far, it is evident that a lot still needs to be done in order to reach small-scale farmers and to make information flow between them and the agricultural officers efficient, effective and adequate. A lot of world changes such as technological, climatic, prices, market and environmental changes are taking place today. Small-scale farmers such as the Kagoro/Kafumbwe farmers need to keep abreast with such changes in order for them to expand their produce and move on to commercial farming.

6.8 Problems Extension Officers Face

The number of extension offices in Katete District is very small and this affects visitations on the farmers especially those that have not adopted CF to be motivated. Some of the trained Extension Officers go away for greener pastures because of the demotivating factors of lowly paid and other factors such as lack of transport to enable them visit the farmers as often as possible so that they can closely monitor their progress and for quicker response. The extension offices in Katete have problems in visiting and covering all the 26 camps. The government does not give them sufficient funds to enable them to have refresher courses.

The staff also expressed some challenges that include officer/farmer ratio, which is 1:1 600. This means that one extension officer deals with 1 600 farmers which is almost impossible but they are doing it under difficulties. They have motor bikes but have a challenge of fuel. They need fuel to visit all the 1 600 farmers in their areas (field data).

6.9 Education Level

e. education level * q3c2 practice conservation farming techniques Crosstabulation					
			q3c2 practice conservation farming techniques		Total
			yes	No	
e. education level	illiterate	Count	15	16	31
		% within e. education level	48.4%	51.6%	100.0%
		% within q3c2 practice conservation farming techniques	21.7%	50.0%	30.7%
		% of Total	14.9%	15.8%	30.7%
	Primary 1-7	Count	36	13	49
		% within e. education level	73.5%	26.5%	100.0%
		% within q3c2 practice conservation farming techniques	52.2% *	40.6%	48.5%
		% of Total	35.6%	12.9%	48.5%
	Secondary 8-12	Count	18	3	21
		% within e. education level	85.7%	14.3%	100.0%
		% within q3c2 practice conservation farming techniques	26.1%	9.4%	20.8%
		% of Total	17.8%	3.0%	20.8%
Total	Count	69	32	101	
	% within e. education level	68.3%	31.7%	100.0%	
	% within q3c2 practice conservation farming techniques	100.0%	100.0%	100.0%	
	% of Total	68.3%	31.7%	100.0%	

On the question of the relationship of levels of education to farmers’ adoption of innovation in the table above shows that the adoption of the CF innovations is related to their level of education. From the table above, illiterate farmers cover a smaller percentage of 48% while 73% had attained primary education and the highest is secondary educated with 86% However, there is potential for the farmers to adopt innovations as long as these are simplified and disseminated in properly refined and clear ways.

We can conclude that there is an indication from the data that the level of education attained by the head of household determines the adoption of CF. This means that the education level

has a relationship with the adoption of CF. The higher the standard of education attained by a farmer, the faster the farmers respond to innovations.

The lower the standard of education attained, the slower the rate of responses to innovations. Mostly the illiterate farmers' responds after the majority with better education have done so. These farmers are referred to as laggards. The lower standards of education among the farmers have affected agricultural development adversely. If Ministry of Agriculture (MOA) is to combat poverty through Agriculture, then there must be a deliberate policy development to improve the educational standards of the farmers through introduction of:

1. The Ministry of Community Development and Social Welfare could conduct working Literacy Campaigns in collaboration with the MOA and Cooperatives.
2. Agricultural extension education in the curriculum of the MOA at all levels of study as compulsory courses.

Agricultural extension education must be designed in such a way, which would suit field situation and not necessarily academic oriented.

6.10 Gender Imbalances in Agricultural

The findings have shown gender imbalances in agricultural sector at both staffing and farmer participation levels. The cross tabulation below shows there are more male farmers with 68% and female farmers with 33%. The difference between males and females practicing CF technique could be small but the fact is that there are more males than females practicing agriculture. This could be because males are more networking as already stated. Another possible explanation could be that of the cultural barrier where women cannot mingle freely with men. This is because there are more male Extension Officers than female Extension officers are.

Sex * q3c2 practice conservation farming techniques Crosstabulation

			q3c2 practice conservation farming techniques		Total
			yes	No	
Sex	Male	Count	48	20	68
		% within Sex	70.6%	29.4%	100.0%
		% within q3c2 practice conservation farming techniques	69.6%	62.5%	67.3%
		% of Total	47.5%	19.8%	67.3%
	female	Count	21	12	33
		% within Sex	63.6%	36.4%	100.0%
		% within q3c2 practice conservation farming techniques	30.4%	37.5%	32.7%
		% of Total	20.8%	11.9%	32.7%
	Total	Count	69	32	101
		% within Sex	68.3%	31.7%	100.0%
		% within q3c2 practice conservation farming techniques	100.0%	100.0%	100.0%
		% of Total	68.3%	31.7%	100.0%

The Situation is not conducive for promotion of gender mainstreaming which the current international approach to advancing gender equality and equity all levels of activity participation in society. The concern for gender mainstreaming is to allow for advancement of gender equality and equity regardless of sex. Women have always played an important role in Agriculture, undertaking a wide range activities relating to food production, processing and marketing. They have been responsible for the growth of rural agriculture, which is now recognized as being vital to food security and wealth creation for a rural household.

The low participation of women farmers could be attributed to the low deployment of female extension workers at field levels and the cultural bias, which prevail in society. The researcher observed that in Katete District the female agricultural extensions are very few as compared to male officers. There are 5 females against 21 male extension officers. This discourages the female farmers hence few female farmers in the District.

According to Food and Agricultural Organization, there is wide spread of gender imbalances in developing countries with regard to recruitment of female extension workers (FAO, 1999).

The FAO, (1999) and World Bank,(2000) reported 15% of female extension workers had been in the extension services as against 85% male extension officers and these tended to direct their services to male farmers.

6.11 Household size

From the findings in figure 5, a larger percentage of household size is that which has 4-6 people, which is 50% while the lowest is that which has above 11 people with 11%. From the figures, we can conclude that household size does not give us a clear indication as to why some farmers in Kagoro/Kafumbwe have adopted CF and others have not. The data presented does not give conclusive evidence that CF requires a larger labour (input as compared to other traditional soil fertility management practices).

We can therefore argue that lack of family labour does not prevent the farmers of Kagoro/Kafumbwe from adopting CF. The researcher disagrees with Ngoma,2003:25, who says that lack of adequate labour may pose an important limitation on the area that a farmer allocates to CF.

CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

7.0 Introduction

Agriculture has been identified as one of the important and potential means of future national development in Zambia. Small-scale farmers in Zambia make about 75% of the households and therefore most of the growth coming from agriculture is expected to come from these Small-scale farmers.

This study therefore was undertaken with an aim of evaluating whether they is effective communication between Small-scale farmers and Extension Officers regarding the development, adoption and impact of Conservation Farming on people of Kagoro and Kafumbwe Camps in the Southern Block of Katete District. To make any sustainable impact, any agricultural technological innovation should be targeted to meet the real needs of farmers in relevant locations. There should also be active encouragement of user modification and adaptation of the technology the way it best suits them.

Conservation farming has shown to be more profitable than the traditional practice of continuous maize cultivation without fertilizer, but less profitable compared to fully fertilized maize plots especially when fertilizer is subsidized. CF is relatively new technology and its dissemination on a large scale to farmers took place more recently in the study area.

The main benefit of CF in Kagoro/Kafumbwe farmers is increased yield of crops especially maize. The study shows high maize yield since the adoption of CF especially in the 2009/2010 season with 49% of the respondents producing 10-12 scotch carts. In addition to increasing crop yields, CF provides benefits to farmers in terms of reduced risks from droughts, it increases wood fuel from agro forestry, and other products such as insecticides made from Tephrosia leaves. Sebania Sesban fallows have also been found to greatly reduce

the occurrence of weeds that generally thrive under conditions of low soil fertility. Improved tree fallows may also help reduce pressure on woodlands for wood fuel.

The main environmental benefits are an improved soil physical property such as better infiltration and aggregate soil stability to store water.

The study found that there is information flow between the farmers and the agricultural extension service providers. The Extension Officers visited 64% of the respondents frequently, 31% were visited very frequently and 5% said were rarely visited. This means that the farmers had access to information that is relevant and useful to them from the Extension Officers.

The Agricultural Extension Officers are using a number of channels and approaches to disseminate information to Kagoro/Kafumbwe farmers. Some of them are; demonstrations, field days, workshops and seminars. These are best sources for dissemination of information to farmers because of the face-to-face interaction. These are done with difficulties due to lack of resources.

1.0 Recommendations

From the findings and discussions, it can be concluded that though the farmers have a zeal to learn from other sources such as listening to group radios, is slowly losing ground due to a number of reasons such as; lack of radios, poor reception, lack of batteries. Farmers lean a lot when they meet in groups by sharing ideas and knowledge learned from Radio Farm Forum Programmes. The Radio Farm Forum is expected to play a permanent role in Zambia's Socio-economic development system by providing information that is necessary to farmers. They also play a role in contemplating the efforts of the extension officers since distance,

quality roads and literacy levels do not affect its reach. From the findings, the group radios are not enough and the reception is poor with hissing sounds.

The researcher therefore, recommends that the Government through Ministry of Agriculture and Cooperatives take firm measures in encouraging Radio Farm Forums in communities to encourage farmers in new methods of farming especially to encourage the new technology (CF). The Government through MOA and Cooperatives to provide radios that do not use batteries such as winding radios. This will greatly help the farmers in adoption of CF which will help the farmers improve their crop yield. The provision of winding radios by Government acts as an incentive for farmers to adopt the new technologies.

2.1 Communication and effective Reception

Communication refers to process of exchange of the agricultural technical ideas, information and opinion through speech, writing, pictures and other symbols. It is a sharing process where the radio (widely accessed) is used to share the messages with the farmers in order to influence the farmers' thoughts, action, and vice-versa.

From the findings, lack of radios ranked highest among the list of problems revealed by the respondents thus 40%. Then poor reception and presentation ranked second highest with 38% this indicates that there is still a very big problem in terms of the way farmers receive their messages from the radios.

The researcher recommends that Zambia National Broadcasting Corporation (ZNBC) should ensure they improve radio reception especially in rural areas country wide because this is where the majority of the smallholder farmers live. Clear reception by the farmers' radios can add value to the growth of the agricultural industry because of its wide coverage. Radio is a

common medium used because it is affordable, can reach the large farming population that the extension officers cannot reach maybe due transport.

2.2 Supervision Visits

In this study, it was found that 5% of respondents had rare contacts with extension officers while a large number of 64% had extension officers visiting them. The government through MOA and Corporation should provide transport and fuel to extension officers and provide allowances as a motivation to these workers so that in turn they make frequent visits to farmers to motivate them too. The findings from the Extension Officers, reviewed that they received fuel once a week from NGOs and little or none from government.

The government should improve funding at District level. The government should use bottom-up approach, that is planning should be done from District level going upwards so as to allow extension officers do their own planning since they know what problems they are facing. Also, empower extension workers to conduct farming training activities where new farming technologies are taught. These trainings revamp inactive groups, strengthen and encourage farmers to effectively use the knowledge learnt in their farming cycles.

2.3 Improvement of infrastructure in rural areas

Implementation of the rehabilitation of the feeder road programme by Government should be done in rural areas so that Extension Officers can have access to remote areas to disseminate information about CF. There should be rural electrification also so that farmers can own Television sets and make use of TV broadcasts. The Government and other stakeholders

should build schools in rural areas so that farmers' literacy levels can be improved because this will help them make good use of printed materials on Agriculture.

Glock, Charles. Y. (1952). *The Comparative Study of Communication and*

Opinion Formation, Public Opinion Quarterly, Winter, pp 512-523

Geography Journal, *Zambia Geographical Association*, Lusaka

Jones, G. E. (1967). *The Adoption and Diffusion of Agricultural Practices: World*

Agricultural Economics and Rural Sociology Abstract, London: Temple
Smith.

Jonsson, U. (1996), *Human Rights Approach to Development Programming*, UNICEF,

Kenya

Kajoba, G. M. (1988), *Land Tenure, Land usage and Historical Development*

of Agrarian Capitalism in Zambia: The Experience of periphery. Unpublished
Master of Philosophy Thesis, University of Sussex. U.K.

Katz, E. and Lazarsfeld, P. (1955). *Personal Influence*. New York: The Free Press.

Kwesiga, F. R. and Beniast, J. (1998), *Sesbania Improved Fallows in Eastern*

Zambia: An Extension Guideline. ICRAF, Nairobi, Kenya. 55pp

Miyagawa Shingeru and Gaudi, Manishi. (2002). *Radio Farm Forum and*

Afronet: Learning from Successful ICT Projects in Zambia. Lusaka: Afronet.

Ministry of Finance and Planning Report (2002). Lusaka: Zambia.

Ministry of Agriculture and Cooperatives: Participatory Extension

Approaches: Trainers Manual- 2nd Ed. (2002). Lusaka: Zambia.

Ministry of Agriculture and Cooperatives: National Annual Report

(2005/2006). Lusaka: Zambia.

Naidoo, M. R. and Bwalya, T. M. (1995), *a Secondary Geography of Zambia*, Longman,

Zambia Ltd, Lusaka, Zambia

Norrish, Pat. (1998), “*New ICTs and Rural Communities*” in Don Richardson, and Lynrita

Rolling, Niels and Pretty, Jules (1997) “*Extension’s Role in Sustainable Development*” in *Improving Agricultural Extension: A Reference Manual*.

Rome: FAO, 181-191. Rome, Italy

Rogers, E. M. (1983), *Diffusion of Innovations*, 3 editions. New York: Free Press.

Rodgers, E. and Shoemaker, L. (1971). *Communication of Innovations: A Cross- Cultural*

Approach. New York: Rinehart and Winston.

Sen, A. Martya (1998), *Development as Freedom*. New York: Alfred A. Knop.

Sikatana, F. M. (2004). *National Agricultural Policy (2004/2005)*. Lusaka: Zambia.

Suzuki, Atsushi et al. (2002). *Zambia Agricultural Extension and Information Survey: Media*

Use and Information Acquisition by Agricultural Extension Workers and Small Scale Farmers. Lusaka: Mijalo Printers Ltd.

Vaden Ban and Hawkins. (1998). *National Agricultural Policy (2004/2005).*

Lusaka: Zambia.

Whiteside, M. (1998). *Living Farms: Encouraging sustainable Smallholders*

in the Southern Africa, UK: Martin Whiteside.

Yin, R. K. (1984). *A Case Study Research: Design ad Research.* Thousand Oak (USA):
Sage Publications (<http://www.fe.le.sunyit.edu/triangulation.htm>).

9.0 APPENDICES

APPENDIX A

Dear respondent

You are randomly chosen to take part in this research study focusing on Conservation Farming techniques as an agricultural innovation. Your cooperation in answering this Questionnaire will greatly assist government and other stakeholders in planning on Agricultural Innovations.

You are therefore, requested to answer honestly and truthfully. You are reminded not to Write your name on this questionnaire to maintain strict confidentiality.

QUESTIONNAIRE FOR FARMERS

1. Socio – economic characteristics of residents

Please tick in the box the correct answer

a. How old are you?

- | | | |
|----|----------|--------------------------|
| 1. | 20 - 24 | <input type="checkbox"/> |
| 2. | 25 - 29 | <input type="checkbox"/> |
| 3. | 30 - 34 | <input type="checkbox"/> |
| 4. | 35 - 39 | <input type="checkbox"/> |
| 5. | 40 - 44 | <input type="checkbox"/> |
| 6. | 45 - 49 | <input type="checkbox"/> |
| 7. | Above 50 | <input type="checkbox"/> |

b. Sex

- | | | |
|----|--------|--------------------------|
| 1. | Male | <input type="checkbox"/> |
| 2. | Female | <input type="checkbox"/> |

C. Marital Status

1. Single

2. Married

3. Divorce

4. Widowed

5. Separated

d. Household size

		Male	Female	Total
1	Children below 12 years			
2	Children 12 – 15 years			
3	Adults			
	Total			

e. Highest level of Education attained by the Head of household

1. Illiterate

2. Primary 1 - 7

3. Secondary 8 - 12

f. Sources of income for household

1. Sale of produce from farm (field crops)

2. Sale of garden produces (vegetables, sugar cane, etc)

3. Sale of cattle and other smaller livestock

4. Other (specify).....

g. How long have you lived in Kagoro/Kafumbwe?

1. Less than a year
2. From 1 – 4 years
3. From 5 – 9 years
4. From 10 – 14 years
5. More than 14 years

h. Average annual income for household (from either sale of agricultural produce or other sources)

1. Below K500, 000
2. K500, 000 – K999, 000
3. K1, 000,000 – K1, 499,000
4. K1, 500,000 – K1, 999,000
6. Above K2, 000,000

2. LAND TENURE

a. Do you own the land where you are cultivating?

1. Yes
2. No

b. If no, who does it belong to?

c. How big is your farm (in hectares).....

d. Do you cultivate all of it every year?

1. Yes
2. No

e. How large is the area normally cultivated (in limas)?

f. What happens to the area not cultivated?

1. Fallow (natural)
2. Plant improved tree fallows
3. Winter ploughing

3. **AGRICULTURAL PRODUCTION**

a. Crops normally grown

- | | | |
|----|-----------------------|----------------------|
| 1. | Local maize | <input type="text"/> |
| 2. | Hybrid maize | <input type="text"/> |
| 3. | Cotton | <input type="text"/> |
| 4. | Sunflower | <input type="text"/> |
| 5. | Cow peas | <input type="text"/> |
| 6. | Tobacco | <input type="text"/> |
| 7. | Soya beans | <input type="text"/> |
| 8. | Others (specify)..... | |

b. Challenges normally encountered in your farming activities

- | | | |
|----|---|----------------------|
| 1. | Not enough cash to procure agricultural inputs (seed, fertilizers, Chemicals) | <input type="text"/> |
| 2. | Low fields because of soil exhaustion | <input type="text"/> |
| 3. | Drought – (dry spells in the growing season) | <input type="text"/> |
| 4. | Poor road network in the area | <input type="text"/> |
| 5. | Markets are located at long distances | <input type="text"/> |
| 6. | Late delivery of inputs by agents | <input type="text"/> |

c. How have you tried to counter the problem of low fields due to soil exhaustion in your area?

- | | | |
|----|---|----------------------|
| 1. | Use of fertilizer | <input type="text"/> |
| 2. | Practice conservation farming techniques – Basin making (gamphani), Ripping (near zero tillage) | <input type="text"/> |

3. Use natural fallow
4. Planting of improved tree fallows
5. Use animal manure

d. What is the approximate area planned for the fallow in hectares?

What is the approximate area using conservation farming technique
 *(gamphani, near zero tillage).....

e. What benefits have you seen in your farming since you began using improved tree fallows as a soil improvement conservation technique?

1. Reduced expense on fertilizer
2. Higher local maize field from 'treated' fields
3. Other crops have started doing well after maize in fields treated with
 Improved tree fallows
4. Tree fallows provide fuel wood to homes

f. Do you use chemical fertilizers in your farming activities?

1. Yes
2. No

g. Did you buy any chemical fertilizers last farming season?

1. Yes
2. No

If yes, can you state the quantities purchased?

D compound (50kg).....

Urea (50kg)

Where did you obtain the fertilizer from?

1. Purchased from Katete Stores
2. Fertilizer Support Programme

i. Have you increased your maize production since adapting conservation farming techniques as a soil improvement innovation?

1. Yes
2. No.

If yes, state the number of bags (50kg) or scotch cartloads that you have Produced (roughly each scotch – cartload is equivalent to five bags/50kgs).

Local maize

2003

2004

2005

2006

2007

Hybrid maize

2003

2004

2005

2006

2007

j. Household food consumption (number of 50kg bags of maize consumed per month)

1. 1 x 50kg (1 – 50kg)
2. 2 x 50 kg (51 – 100kg)
3. 3 x 50kg (101 – 150kg)
4. 4 x 50kg (151 – 200kg)
5. 5 x 50kg (201 – 250kg)

k. Do your households have sufficient maize for consumption throughout the year?

1. Yes
2. No

If yes, state the period when your maize stocks are at the lowest level?

September – November

December – February

4. a. Why have you not bothered to adopt or practice conservation farming technique?

1. The results are not impressive with those experimenting the technology

2. I normally use cattle manure

3. Too much labour

4. It's cheaper to use fertilizer

- b. Do you in the near future think of experimenting with improved tree fallows?

1. No

2. Yes

3. I will think about it

4. No idea

5. a. What help have you received from Extension Officers in the area on your conservation farming techniques?

1. Seeds

2. Provided training on how to go about conservation farming techniques

- b. How often do Extension Officers visit you in this area?

1. Very frequently

2. Frequently

3. Rarely
4. Very rarely
- c. Do you get all the help / advice / technical assistance you need from extension workers?
1. Yes 2. No
- d. What would you wish Extension workers do to help you succeed with the new farming technique?.....
.....
- e. Apart from help/advise/technical assistance from extension workers in your area, do you receive agricultural Programmes especially on Conservation farming techniques through other channel
1. Yes 2. No
- If yes, which sources?
1. Radio Maria 2. Radio Breeze
3. ZNBC Radio 1 4. ZNBC Radio 2
5. Pamphlets, brochures and posters 6. Workshop/Seminars
7. Shows
8. Newspapers (specify).....
- f. What do you think could be done better by?
1. Radio Maria
2. Radio Breeze
4. ZNBC Radio 1.....
5. ZNBC Radio 2

6. Do you find it beneficial to listen to agricultural programmes on radio?

1. Yes

2. No

If yes, in which way?

7. Do you experience any problems as regards your effective listening to agricultural programmes broadcast on radio?

1. Yes

2. No

If your answer is yes, which are those problems you experience in your Radio Farm Forum as regard effectiveness listening?

1. Poor reception

2. Poor presentation

3. No radio

8. What do you think or suggest should be done to alleviate the problem(s) you have Stated in question 6?

1. Improved reception

2. Government to provide radios

3. Any other

THANK YOU SO MUCH FOR YOUR TIME AND COOPERATION

APPENDIX 2

IN-DEPTH INTERVIEW GUIDE FOR RESPONDENTS IN KAGORO VILLAGE

1. Has the conservation farming technique improved the crop yield in Kagoro Village?
2. What do you think are the problems causing low crop yield in Kagoro village?
3. How can these problems be overcome?
4. Why have others not adopted the conservation techniques?
5. Do you think everyone in the village will adopt the conservation farming technique in the near future?
6. How did you learn about conservation farming technique?
7. Apart from the Agricultural Extension Officers, where else did you get information about conservation farming?
8. Are the Agricultural Extension Officers giving you enough information about conservation farming techniques?
9. What would you wish the Extension Workers do to help you succeed with the new farming techniques?
10. Are there NGOs helping you adopt the new conservation farming techniques?
11. Are the community radios (Mphangwe, Breeze and Maria) and ZNBC Radio 1 and 2 providing enough information?
12. What do you think could be done to improve the disseminating of information through the radios on the new farming technique?
13. How often do the Extension Officers visit you in this area?
14. When do they visit you frequently? Is it during the farming season or after farming season?

APPENDIX 3

IN-DEPTH INTERVIEW GUIDE FOR AGRICULTURAL EXTENSION OFFICERS IN KATETE DISTRICT

1. What communication strategies have you used to disseminate information on conservation farming in Kagoro?
2. How have the people of Kagoro village viewed the new farming technique as compared to the old method.
3. Are there others that have not adopted conservation farming techniques?
4. How often do you visit the farmers in Kagoro village?
5. What are the challenges you have faced with the farmers in Kagoro?
6. How can these problems be overcome?
7. Has the government given you all the support needed in the dissemination of the information in the innovation of conservation farming technique?
8. Are the programmes about conservation farming techniques on both ZNBC Radio 1 and 2 and community radios (Mphangwe, Breeze and Maria?)
9. What do you think should be done to enhance the farming techniques on the radios mentioned?
10. What do you wish the government to do to help farmers improve on the conservation farming techniques?

APPENDIX 4

FOCUS GROUP DISCUSSION PROMPT LIST

1. As members of Kagoro village, what do you like about conservation farming method?
2. Have you benefited from the Extension Officers visits to you village?
3. What are the benefits of their visits and what would you like them to do in order to enhance conservation farming in your area?.
4. Has the conservation farming technique improved the crop yield?
5. Why have others in this village not adopted the conservation farming technique?
6. Are you happy with the presentations of the programmes on conservation farming on the radios?
7. What do you think could be done to improve the dissemination of information *through the radios on the new farming technique?*
8. How can the problems of low crop yield be overcome?
9. What advice would you give to those that have not adopted the new farming technique?
10. What should the government do to help the farmers improve on conservation farming?

