

The Communication And Utilisation Of Recommended Agricultural Practices In Three Mankwe Field Crop Projects

by

MONA BEN MATIWANE

Submitted in partial-fulfilment of the requirements for the degree M. Inst. Agrar.

In the

Faculty of Natural and Agricultural Sciences
University of Pretoria

Pretoria

JANUARY 2002



ABSTRACT

The general state of agriculture in Rhenosterfontein, Schoongesicht and Bapo II is unsatisfactory in that many recommended agricultural practices are not implemented. This includes practices related to:- soil preparation, planting, weed control, pest control and harvesting. These practices and the cause of their non-adoption need to be investigated thoroughly and addressed.

The study also focussed on communication, and communication networks. The role of opinion leaders and their influence on decision making were also observed. Communication networks revealed all opinion leaders of the projects and the farmers who speak directly to them. The study revealed the level of extension and information transfer as seen by farmers of the three projects.

The area of Mankwe district was chosen because no documentation existed regarding cropping. There was no available information to reveal the perception and the views of farmers about cropping in the area. The results of this study will help extension workers to draw up programmes to address the needs and problems of the farmers.

Sunflower and maize are the main crops in these three projects. Sunflower is grown in all projects and maize is planted in Rhenosterfontein and Bapo II. The production practices carried out by all the farmers influences yields of crops planted.



The potential of the land where the projects are, as shown in the maps, is fairly good. It is the dual responsibility of Farmers and Extension Officers to raise production to the level of the potential of the area. The challenge for extension is to help farmers through training and guidance, to produce within the yield potential of their projects.

Projects differ in size and <u>number of farmers</u>. They are located at the extreme ends of the district, Bapo II in the west, Rhenosterfontein South and Schoongesicht North. In this way a good part of the district is covered by this study.

Agricultural practices in these projects presents some problems to farmers and they can be addressed by: changing attitudes and beliefs of farmers, as well as conducting demonstrations and on-farm trials.

In order to alleviate the agricultural production problems, the farmers perceptions of the different characteristics of these various practices need to be assessed and extension programmes be drawn up accordingly. Adoption and utilisation of new technology and (agricultural) innovation may be a solution to some of the agricultural production problems.

Training of farmers is an element that could change the general state of the projects so that farmers are able to produce within the range of the potential of the area.

ACKNOWLEDGEMENTS

My sincere gratitude is expressed to the following people:

- My Supervisors, Prof. G.H. Duvel and Mr. J. B. Stevens for their guidance, advice and unfailing support throughout the study.
- My wife for giving me support throughout my years of studies.
- My relatives who also give me support cousins, aunt and uncle.
- A. Shude for helping me to identify farmers of his project Rhenosterfontein.
- Ms M. Sechoaro for typing Questionnaires and assisting in making the final corrections of the document
- My co-workers of Jericho ADC for their support throughout.
- Rose Eiman for typing the dissertation.
- The farmers of Schoongesicht, Bapo II and Rhenosterfontein Projects who cooperated well during the collection of data.

TABLE OF CONTENTS

	Pag	e No.
	Abstract	(i)
	Acknowledgement	(iii)
	Table of Contents.	(iv)
	List of Figures	(xiii)
	List of Tables	(xiv)
	PTER 1 ODUCTION	1
СНА	PTER 2	
PROI	BLEM BACKGROUND	6
2.1	OVERVIEW	6
2.2	CURRENT PROJECT SITUATION	6
2.3	MOTIVATION AND NEED FOR THE STUDY	7
2.4	COMMUNICATION MODEL FOR THE PROJECTS	8
2.5	LAND UTILISATION	9
	PTER 3	
	DRETICAL BACKGROUND	
3.1	COMMUNICATION - A THEORETICAL BACKGROUND	
3.1.1	Definition	10



3.1.2	Objectives of communication	10
3.1.3	Communication is a process	11
3.1.4	Methods of Communication	12
3.2	COMMUNICATION NETWORKS: A THEORETICAL OVERVIEW	14
3.2.1	Introduction	14
3.2.2.	Factors influencing network development	15
3.2.2.1	Group work	15
3.2.22	2 Interaction	16
3.2.2.3	Friendship	16
3.2.2.4	Use of channels	17
3.2.2.5	Propinquity	17
3.2.2.6	Types of networks	18
3.2.3	Opinion Leadership: Theoretical Background	18
3.2.3.1	Measuring opinion leadership	19
3.2.3.2	Characteristics of opinion leaders	19
3.2.4	Communication roles in communication networks	21
3.3.	ADOPTION OF INNOVATION	21
3.3.1	Adoption process	21
3.3.2	Rate of adoption	22
3.3.3	Adoption categories	22
3.3.4	Factors affecting adoption	23
3.3.5	The extension worker's role in adoption	23
3.3.6	Farmers' view of the nature of innovation	24
3.4	CAUSES OF UNSATISFACTORY PRODUCTION:	25
3.4.1	Declining soil cover and fertility:	25



3.4.2	Poor farming methods	20
3.4.3	Farming system in general:	26
3.5	INCREASING THE PRODUCTIVITY OF TROPICAL CROPPING SYSTEMS	27
3.6	CROPPING EFFICIENCY	27
3.6.1	Crops	30
3.6.1.1	Maize	30
3.6.1.2	2 Sunflower	30
3.6.2.	Soil	30
3.6.2.1	Acardia	30
3.6.2.2	2 Hutton	30
3.6.2.3	3 Glencoe	31
3.6.2.4	Shortland	31
3.7	PLANNING FOR CORP PRODUCTION	31
3.8	THE INFLUENCE OF THE AGRICULTURAL RESOURCES ON CROP	
	PRODUCTION RISK	32
3.9	FARMING PLANNING BASED ON THE NATURAL RESOURCES	32
3.9.1	Managerial ability of the farmer and tradition	34
3.9.2	Success in farming	34
3.10	HYPOTHESIS	35
CHAI	PTER 4	
RESE	ARCH METHODOLOGY	
4.1	INTRODUCTION	36
4.2	CHOICE OF RESEARCH AREA	.36
4.3	ORIENTATION AND PLANNING	.37



4.4	INFORMATION SOURCE	37
4.5	RESEARCH METHODOLOGY	37
4.5.1	Major steps in the research process	38
4.5.2	The questionnaire design	38
4.5.2.1	Meaning of variable/questions	39
4.5.2.1	.1 Socio-demographic information	39
4.5.2.1	2 Socio-economic information	40
4.5.2.1	3 Communication	41
4.5.2.1	.4 Crop production practices	41
4.5.2.1	.5 Crop Management	42
4.5.2.1	.6 Soil Management	42
4.5.2.2	Type of questions	43
4.5.3	Data collections	43
4.6	SAMPLE SIZE	43
4.7	RELIABILITY OF DATA	44
4.8	INTERVIEW PROCEDURE	45
4.9	DATA ANALYSIS	45
СНАР	TER 5	
THE	MANKWE DISTRICT: AN OVERVIEW	
5.1	INTRODUCTION	46
5.2	GENERAL INFORMATION AND ADMINISTRATION	46
5.3	CLIMATE	54
5.4	SCHOONGESICHT PROJECT	55
5.4.1	Location	55



5.4.2	Brief historical background	55
5.4.3	Crops	56
5.5	RHENOSTERFONTEIN PROJECT	56
5.5.1	Location	56
5.5.2	Brief historical background	57
5.5.3	Crops	57
5.6	BAPO II PROJECT	58
5.6.1	Location	58
5.6.2	Brief historical background	58
5.6.3	Crops	58
5.7	SUMMARY	59
CHA	PTER 6	
COM	MUNICATION NETWORKS	
6.1	INTRODUCTION	60
6.2	COMMUNICATION NETWORKS IN BAPO II	60
6.2.1	Introduction	61
6.2.2	Bapo II	62
6.2.2.	I The communication network of Bapo II Project	62
6.2.3	Rhenosterfontein	63
6.2.4	Schoongesicht	66
6.3	MESSAGES FROM EXTENSION OFFICERS TO PROJECT	70



CHAPTER 7

FARMER'S CHARACTERISTICS

7.1	INTRODUCTION	76
7.2	CHARACTERISTICS OF THE FARMERS	76
7.2.1	Ethnic group	76
7.2.2	Age distribution	78
7.2.3	Education	79
7.2.4	Experience	81
7.2.5	Marital status	82
7.2.6	Household	84
7.2.6.	1 Household composition and employment	84
7.3	SUMMARY	90
СНАР	PTER 8	
CROP	PING EFFICIENCY OF FARMERS	
8.1	INTRODUCTION	91
8.2	AGRICULTURAL POTENTIAL	91
8.2.1	Topography and soil distribution of Mankwe district	91
8.2.2	Rainfall distribution throughout the district	94
8.2.3	Soil potential for maize and sunflower	96
8,2.3.1	Soil potential for maize	98
8.2.3.2	Soil potential for sunflower	100
8.3	UTILIZATION OF AGRICULTURE PRACTICES	102
8.3.1	Introduction	102
8.3.2	Current Crop Practices	103



8.3.2.1	Soil preparation	103
8.3.2.2	2 Planting date	105
8.3.2.3	3. Planting depth	105
8.3.2.4	1 Planting methods	106
8,3,2,5	5 Plant population	106
8.3.2.6	5 Fertilization	107
8.3.2.7	Weed and pest control at the three projects	109
8.3.2.8	3 Crop harvesting and production inputs	111
8.4	INFLUENCE OF SOME FARMER CHARACTERISTICS ON CROP YIELD	114
8.4.1	The influence of age.	114
8.4.2	The influence of education	115
8.4.3	The influence of experience.	116
8.5 S	UMMARY	117
СНАІ	PTER 9	
INNO	VATION ADAPTION SITUATION	
9.1	INTRODUCTION	118
9.2	PERCEPTION OF FARMERS CROPS	119
9.3	PERCEPTION OF CROPPING INNOVATION	119
9.3.1	The perception of how well they are doing with regard to the crop and the practices	120
9.4	VIEWS OF FARMERS REGARDING CROPPING	. 126
9.4.1	Maize production	127
9.4.2	Sunflower production	128
9.5	SUCCESS OF FARMERS IN CROPPING	128



9.6	EXTENT OF SUCCESS OF FARMERS	130
9.7	SUMMARY	131
СНАР	PTER 10	
THE A	AGRICULTURAL PRODUCTION CONSTRAINTS IN THE THREE PROJE	ECTS.
10.1	INTRODUCTION	133
10.2	DESCRIPTION OF AGRICULTURAL PRODUCTION CONSTRAINTS OF	
	THE THREE PROJECTS	133
10.2.1	Drought	134
10.2.2	Rainfall	. 134
10.2.2	1 Late rains	134
10.2.2	2 Early rains	. 134
10.2.3	Pests	135
10.2.3	1 Insects	135
10.2.3	2. Large animals.	135
10.2.4	Weeds	135
10.2.5	Soil	136
10.2.6	Land ownership	136
10.2.7	Low yield	136
10.2.8	Contractors	137
10.2.9	Finance	. 137
10.3	SUMMARY	. 138



CHAPTER 11

CONCLUSION	139
LITERATURE CITED	143
Annexure A: Questionnaire for farmers	151
Annexure B: Questionnaire for Project Committee	175



LIST OF FIGURES

Figure	Page No.
3.1	Steps in the communication process (Smith & Cronjé, 1997)
5.1	Location of ADC and FSU's in Mankwe District
6.1	The typical wheel communication network of Bapo I project, Mankwe district, (1997)
	(n=5)61
6.2	The all-channel type of communication network system of the Rhenosterfontein
	agricultural project, Mankwe District (1997)(n=6)
6.3	The all-channel type of communication network system of the Schoongesicht
	agricultural project, Mankwe District (1997)(n=15)
8.1	Broad soil patterns of Mankwe district (North West Province, RSA) (2001)
8.2	Climatic zones of Mankwe district (North West Province, RSA) with specific reference
	to rainfall according to Mc Dent (2001) 95
8.3	Calculated soil potential for map for maize in Mankwe district (North West Province,
	RSA) Based on long term average rainfall Mc Dent (2001)
8.4	Calculated soil potential for map for sunflower in Mankwe district (North West Province,
	RSA) Based on long term average rainfall Mc Dent (2001)
8.5	Comparison of yield of farmers using fertilizer and those not using fertilizer in the
	Rhenosterfontein, Schoongesicht and Bapo II Projects (1997) (n=26)
8.6	Difference in crop yields at Rhenosterfontein, Schoongesicht and Bapo II, Projects in
	relation to the potential (1997)(n=26)



LIST OF TABLES

Table	Page No.
5.1	Chiefs and Tribal Authorities of Mankwe District (ANON, 1996)
5.2	Land Ownership in the Mankwe District (ANON, 1991(b)) 50
5.3	Salient features of Mankwe District (ANON, 1991(a); Anon, 1994)
5.4	Salient features of the Schoongesicht, Rhenosterfontein and Bapo II agricultural
	projects in Mankwe District (1997)(n=26)
6.1	Communication networks of Bapo II Project(1997)(n= 5)
6.2	The extent to which farmers take advice from opinion leaders at Bapo II on maize
	and sunflower 63
6.3	Communication networks of Rhenosterfontein Project (1997)(n=6)
6.4	The extent to which maize and sunflower farmers take advice from opinion leaders at
	Rhenosterfontein Project (1997) (n=6) 65
6.5	Communication networks of Schoongesicht Project(Mankwe district) (1997)(n=15) 67
6.6	The extent to which sunflower farmers take advice from opinion leaders at Schoongesicht
	Project(1997)(n=15)
6.7(a)	The extent to which Extension Officers informed maize farmers of Rhenosterfontein,
	Schoongesicht and Bapo II Projects about the importance of product inputs
	(1997)(n=26)
6.7(b)	The extent to which Extension Officers informed sunflower farmers of Rhenosterfontein,
	Schoongesicht and Bapo II Projects about the importance of product inputs
	(1997)(n=26)



6.8(a)	The extent to which Extension Officers informed maize farmers of Rhenosterfontein,
	Schoongesicht and Bapo II Projects about handling of crops at harvest
	(1997)(n=26)
6.8(b)	The extent to which Extension Officers informed sunflower farmers of Rhenosterfontein,
	Schoongesicht and Bapo II Projects about handling of crops at harvest
	(1997)(n=26)
7.1	The tribal relationship of farmers from Schoongesicht, Rhenosterfontein and
	Bapo II Projects(1997) (n=26)
7.2	Age distribution of farmers per project (1997) (n=26)
7.3	Farmers level of education of Rhenosterfontein, Schoongesicht and Bapo II Projects
	(1997)(n=26)
7.4	Number of years in cropping for farmers of Rhenosterfontein, Schoongesicht and Bapo
	II Projects (1997)(n=26)
7.5	Marital status of farmers at Rhenosterfontein, Schoongesicht and Bapo II Projects
	(1997)(n=26)
7.6	Bi-variant analysis of household composition and income of farmers at Rhenosterfontein,
	Schoongesicht and Bapo II Projects(1997) (n=26)
7.7	Bi-variant analysis of household size income from cropping and family contribution at
	Rhenosterfontein, Schoongesicht and Bapo II Families(1997) (n=26)
7.8	Bi-variant analysis of employment status and income from cropping and family contribution
	of Rhenosterfontein, Schoongesicht and Bapo II Families(1997)(n=26)
8.1	Types of crops planted at Rhenosterfontein, Schoongesicht and Bapo II
	Projects(1997)(n=26) 96



8.2	Aspects of crop planting practices as implemented by farmers at Rhenosterionic	ein,
	Schoongesicht and Bapo II Projects (1997) (n=26)	03
8.3	Weed and pest control at Rhenosterfontein, Schoongesicht and Bapo II	
	projects(1997)(n=26)	110
8.4	Aspects of crop harvesting, agricultural production financing and crop yields	at
	Rhenosterfontein, Schoongesicht and Bapo II, Mankwe district (1997)(n=26)	112
8.5	Relationship between farmers age and crop yield at Rhenosterfontein, Schoongesicht	and
	Bapo II, Mankwe district (1997)(n=26).	114
8.6	Relationship between farmers education crop yield at Rhenosterfontein, Schoongesicht	and
	Bapo II, Mankwe district (1997)(n=26)	115
8.7	Relationship between farmers experience and crop yield at Rhenosterfont	ein,
	Schoongesicht and Bapo II, Mankwe district (1997)(n=26)	116
9.1	Crops planted by farmers in the three projects (1997)(n=5).	119
9.2(a)	The extent to which farmers use of fertiliser in maize (1997) (n=26)	20
9.2(b)	The extent to which farmers use of fertiliser in sunflower (1997) (n=26)	21
9.3(a)	The extent to which farmers control pests in maize (1997) (n=26)	22
9.3(b)	The extent to which farmers control pests in maize (1997) (n=26)	23
9.4(a)	The extent to which farmers practice weed control in maize (1997) (n=26)	23
9.4(b)	The extent to which farmers practice weed control in sunflower (1997) (n=26) 12	24
9.5(a)	The extent to which farmers control foreign in the grain at harvesting in maize (1997)	
(n=26)) 12	25
9.5(b)	The extent to which farmers control foreign in the grain at harvesting in sunflower (19	97)
(n=2	26)	26
9.6	The extend of success of farmers of the three Projects (1997) (n=26)	130