A STUDY OF THE SOKOINE UNIVERSITY EXTENSION PROJECT AND ITS IMPACT ON EXTENSION WORK AT THE VILLAGE LEVEL IN TANZANIA

by

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Abstract

Purpose

The study examined the impact of the Sokoine Extension Project (SEP) on the farmers' and extension workers' (Bwana Shambas) activities and programmes in solving the food and cash crop production problems in the villages of Morogoro region, Tanzania. It also investigated the effectiveness of the SEP in developing the capacity of the extension system and in accelerating agricultural developments at village level in the study area. In doing so, the main emphasis was to assess the extension workers' and farmers' performance in the SEP activities and programmes and in particular the farmers' changes in food production, food sufficiency and cash crop production as a result of the extension intervention.

Objectives

The objectives of the study were:

i) to identify, compare and contrast the major elements and activities of the extension service in the SEP and non-SEP village in the Morogoro region as factors which influenced the performance of the village extension workers;

ii) to determine the impact of the extension work on food and cash crop production in the SEP and non-SEP villages by examining the performance of farmers in the project;

iii) to examine the factors which influenced the farmers' performance in the SEP; and

iv) to draw conclusions in relation to the overall effectiveness of the SEP at the village level.

Design

The study was based on the assumption that farmers' performance in the SEP can be used as indicators of agricultural and rural development. However, farmers' performance was influenced by farmers' characteristics, factors related to the SEP approach and the extension workers' performance in the project.

The study was conducted in both SEP and non-SEP villages in Morogoro and Kilosa districts. All the twenty Bwana Shambas involved in the SEP were included and five Bwana Shambas from non-SEP nearby villages were selected. A total of 300 farmers were interviewed. Two hundred farmers were selected from the SEP villages (97 target and 103 non-target farmers) and 100 farmers from non-SEP village for comparison purposes. Data were collected from the selected farmers, Bwana Shambas, SEP staff at Sokoine University of Agriculture (SUA), the Regional and District Extension Officers and village government leaders. Interview schedules, project reports, discussions and observations were used to collect the data. The data were analysed comparing the categories of farmers (target, non-target and non-SEP) and the SEP and non-SEP Bwana Shambas. The method of analysis involved a univariate, bivariate and multivariate analysis.

Study Findings

The study findings were organised into three section: (i) a comparison of the major elements and activities of the extension service in the SEP and non-SEP villages in the Morogoro region; (ii) the impact of the extension work on the selected performance variables used; and (iii) the factors affecting farmers' performance in the SEP. The following observations and conclusions are made on the basis of the data analysis.

1. Agricultural and rural development was seen as an outcome of the extension service intervention and farmers' participation and involvement in the extension project activities and programmes.

2. The extension workers' performance was influenced by: the type of activities carried out in the villages (micro-projects/programmes); the extension methods used; the type of training provided; the management and support system used; and the linkages of extension with research and other agricultural related institutions.

3. The selected performance variables used in the SEP were significantly influenced by the factors related to the SEP (the Management Marketing Approach) and the farmers' personal and farm characteristics such as gender, level of education, marital status and farm size.

4. Almost two-thirds of the SEP farmers had a high level of participation in the SEP. The SEP farmers made more changes in their agricultural practices than non-SEP farmers. They followed recommended cropping patterns like early planting, correct spacing, planting in lines and weeding. Also over two-thirds of the SEP target farmers, one-third of the SEP non-target farmers and only 30 per cent of the non-SEP farmers had a high level of involvement in extension activities.

5. Farmers in the SEP villages recorded higher crop yields per hectare for maize, rice, sorghum, sunflower and cotton than farmers in the non-SEP villages. Despite the importance of agriculture in generating income for farmers in the Morogoro region, almost twice as many non-SEP farmers as those who participated in the SEP did not make any income from crop sales. A majority of all the respondents earned less than Tshs.50,000 in a year.

6. On average, 60 per cent of the farmers in the study had not achieved self sufficiency in food production. More non-SEP farmers than SEP farmers were not self sufficient in food.

Implications

i) The extension approach that uses micro-projects and programmes can greatly improve the work efficiency of the extension workers in introducing, demonstrating new ideas and complementing existing farmers' agricultural practices.

ii) There is need to establish the work priorities for extension workers at all levels particularly for village extension workers.

iii) An extension management and support system is vital in reducing the isolation and gap between the village extension workers and the extension service and in enhancing their effectiveness in carrying out extension duties.

iv) The food situation in the study villages was still poor and food sufficiency had not been attained.

v) The involvement of small farmers, women and young farmers in extension programme groups is essential if significant improvement is to be made in the impact of the project on increasing the food and cash crop production in the villages.

Approved Joseph Mannion

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TABLE OF CONTENTS

Page

ABSTRACT ii

ACKNOWLEDGEMENTS v

TABLE OF CONTENTS vii

LIST OF TABLES xii

LIST OF FIGURES xvi

ABBREVIATIONS xvii

CHAPTER

I INTRODUCTION 1

A Historical Review of the Development Events in Tanzania 1

Pre and Post Independence 2

After the Arusha Declaration 3

The Political and Administrative Structures in Tanzania 5

The Culture 9

The Population 9

Agriculture in Tanzania 10

Agriculture and the Economy 11

The Study Background 12

The Problem 17

Objectives of the Study 19

CHAPTER

II AGRICULTURAL RESEARCH AND EXTENSION IN TANZANIA 21

Introduction 21

Section I: Agricultural Research in Tanzania 22

Agricultural Research During the Colonial Period 22

Agricultural Research After Independence 22

Section II: The Agricultural Extension Service inTanzania 26

The Extension Service During the Colonial Period 27

The Extension Service After Independence 28

The Extension Service After Decentralisation 30

Section III: The Training of Extension Workers in Tanzania 38

Summary 42

CHAPTER

III THE SOKOINE UNIVERSITY EXTENSION DEMONSTRATION AND TRAINING PROJECT (SEP) 44
Introduction 44
Early Contacts 44
Aims of the Project 45
The SEP Objectives 46
The Operational Structure of the Project 47
The Project Management Committee 47
The Expert Groups 48
The Project Manager/Counterpart 49
The Sokoine Extension Project Strategy 50
The Sokoine Extension Project Activities and Progress 56
Summary 66

CHAPTER

IV THEORETICAL ORIENTATION 68
The Concepts of Agricultural and Rural Development 68
Development: What Does it Mean? 68
Agricultural and Rural Development 69
Issues and Problems in the Developing Countries 70
Problems of Agricultural Development 71
Non-Agricultural Problems of Development 76
Models and Approaches to Agricultural and Rural Development 80
The Conventional Agricultural Extension Approach 80
Agricultural Extension Organised by Universities 82
The Commodity Development and Production System..... 84
The Management and Marketing Approach 85
The Training and Visit System 85
Farming Systems Research 89
Integrated Agricultural Development Programmes 92
Integrated Rural Development Programmes 93
An Extension Model for Tanzania 94
Summary 96

CHAPTER

V A FRAMEWORK FOR UNDERSTANDING THE IMPACT OF THE SEP AT THE VILLAGE LEVEL 98
Introduction 98
Indicators of Change and Farmers' Selected Performance Variables Used in the SEP 99
The Farmers' Contact with the Extension Service 99
Participation in Projects and Programmes 100

CHAPTER V (continued)

Agricultural Practices and Technology 102
Selection of Priority Problems 103
Food and Cash Crop Yields and Increases in Income .. 104
Factors Influencing Extension Workers' Performance in the SEP 107
Factors Affecting Change and Selected Farmers' Performance Variables in the SEP 111
Involvement of Farmers in Problems and Solution Identification 111
Farmers' Involvement in Selection of Projects and Programmes 112
Awareness of the SEP 113
Farmers' Characteristics 114
The Study Model 115
The Study Hypotheses 117

CHAPTER VI THE PROJECT, THE METHOD AND THE MATERIALS .. 120
Project Selection 120
Methodology Used 120
Collection of Data 122
The Interview Schedules 124
Data Analysis 127

CHAPTER VII AN ANALYSIS OF THE MAJOR ELEMENTS OF THE SOKOINE EXTENSION PROJECT 128
Introduction 128
Section I: A Comparison of the Extension Service Major Elements and Activities in the SEP and non-SEP Villages in the Morogoro Region 128
The Personal and Background Characteristics of Bwana Shambas 129
The Types of Extension Projects and Programmes at the Village Level and how they are Developed 130
The Development of the Micro-Projects 131
The Extension Programmes 132
The Extension Management and Support System Used 133
The Type of In-Service Training Provided for Bwana Shambas 135
A Comparison of the Duties, Work Activities and Methods Used by Bwana Shambas in their Work 141
The Transport and other Support Facilities Provided for Bwana Shambas to Carry out their Work 143

CHAPTER VII (continued)

The Links Between Bwana Shambas, Research, Farmers and other Institutions 145
Section II: The Farmers' Performance in the SEP 147
Part 1: Farmers' Contact with the Extension Service and its Programmes 148
Number of Farmers' Visits to the Demonstration Farm 148
The Number of Meetings Organised by the Extension Workers and Attended by Farmers 151
The Number of Farm Visits by the Extension Workers to Individual Farmes' Farms 151
The Observed Change in the Extension Workers' Performanace 152
Part 2: The Level of Farmers' Participation in SEP 155
The Construction of the Participation Index 155
Part 3: The Level of Farmers' Involvement in Extension Activities 159
Part 4: Farmers' Agricultural Practices 164
Cropping Pattern for the Main Crop 164
Farm Operations Carried Out 166
Inputs Used 166
Use of Farm Implements 167
Storage Methods Used 168
Part 5: Farmers' Priority Problems 169
Problems on the Farm 169
Storage Problems 171
The Problems that Cause Low Yields in the Farms 172
Part 6: The Levels of Food and Cash Crop Production 177
Types of Crops Grown 177
Yields of Major Crops Grown 178
Food Production and Sufficiency 182
Food Sufficiency 185
Farmers' Income from Crop Sales 189
Summary 192
Section III: Factors Affecting Change and Selected Performance Variables Used in the SEP 195
Part 1: Factors Related to the SEP 195
Involvement of Farmers in Problem and Solution Identification 196
Awareness of the SEP 198
Involvement of Farmers in Selecting Village Projects 201
Summary 205
Part 2: Personal/Social and Farm Situational Characteristics that Influence Selected Performance Variables Used in the Study 207
Personal/Social Characteristics of the Farmers 207
Farm Situational Characteristics 220
Summary 229

CHAPTER

VIII SUMMARY OF FINDINGS, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS 233
Introduction 233
The Reseach Problem 233
Design of the Study 234
Summary of Findings Using the Framework for Understanding the Impact of the SEP 236
Conclusions and Implications 254
Specific Recommendations 267

BIBLIOGRAPHY 272

APPENDICES 289

A The Map of Tanzania 290
B The Study Villages in the Morogoro and Kilosa Districts 291
C Modes of Crop Production in Tanzania 292
D Letter of Introduction to Village Leaders 293
E_1 Interview Schedule for SEP Bwana Shambas 294
E_2 Interview Schedule for Non-SEP Bwana Shambas 295
E_3 Interview Schedule for SEP and Non-SEP Farmers 296
E_4 Interview Schedule for SEP and Non-SEP Farmers (Kiswahili version) 297
F The SEP Participation Index 298
G The Extension Involvement Index 299

LIST OF TABLES

Table		Page
1	Tanzania's population growth 1948-1988	9
2	Percentage population in urban and rural areas in Tanzania	10
3	Landuse categories in Tanzania	14
4	Potential and average yields of some of the major food crops	15
5	Zones for research and training in agriculture and livestock	25
6	Distribution of extension workers at region, district and villages in 1988	31
7	Changes in the responsibilities of Ministry of Agriculture 1960-1990	32
8	Agriculture and livestock training institutes in Tanzania	40
9	District, villages and households and work force for selected project villages	56
10	Summary of participants of the staff development programme of the SEP (1987-1990)	60
11	SEP village programmes – 1988/89	61
12	SEP village micro-projects	62
13	A typical timetable for T&V extension staff	87
14	The yield of major crops in kgs/hectare for the Morogoro Region	106
15	Name of village and number of study sample farmers selected	124
16	A comparison of the extension micro-projects and programmes carried out by SEP and non-SEP Bwana Shambas	131
17	In-service training course content	136
18	Curriculum summary of the certificate course in agriculture	139
19	Percentage time estimated by Bwana Shambas spent on agricultural and non-agricultural duties	142

20	Available field level extension staff in Morogoro rural and Kilosa districts, June 1988	145
21	The number and percentages Bwana Shambas who indicated that links had been improved with specific institutions	146
22	The average number of visits to the demonstration farm by male respondents	149
23	The average number of visits to the demonstration farm by female respondents	150
24	Number and percentage of farmers who observed changes in the extension workers' performance	152
25	Average SEP participation score by type of respondents	155
26	Ranking of the SEP villages by their average SEP participation score	156
27	Relationship between type of respondents and level of SEP participation score	157
28	Comparison of the average SEP participation score of respondents by type and gender	158
29	The relationship between type of respondent and level of involvement in extension activities	160
30	Extension activity involvement scores by type of respondent	161
31	Ranking of the study villages according to their average extension involvement score	162
32	Comparison of farm practices used by the three types of study respondent	165
33	Frequency distribution of respondents according to their perceptions of problems on their farms	170
34	Frequency distribution of respondents according to their perceptions of crop storage problems	171
35a	Causes of low crop yields as indicated by national agricultural research stations and the extension service	172
35b	Frequency distribution of respondents according to their perception of problems causing low crop yields	173
36	Frequency distribution of respondents according to their priority farming problems	174

37	Distribution of respondents by the type of crops grown	177
38	Comparison of the average yields of the major crops for SEP respondents for three cropping seasons	178
39	Comparison of the average yields of the major crops according to the type of respondents	179
40	Comparison of the average yields of the major crops per village in 1988/89 season	180
41a	Distribution of SEP village respondents according to their total food production	183
41b	Distribution of SEP and non-SEP village respondents according to their total food production	183
42	Total food production by type of respondent – 1988/89 season ...	184
43a	Distribution of respondents according to their level of food sufficiency	186
43b	Farmers' perception of the level of food sufficiency in their households	186
44	Comparison of the average food sufficiency by type of respondent	187
45	Comparison of the villages by their levels of food sufficiency	188
46	Distribution of respondents according to the total income from crop sales	190
47	Average income from crop sales per respondent for the study villages	191
48	Distribution of respondents by type and their awareness of SEP	199
49	Relationship between awareness of SEP, type of respondent and selected performance variables	200
50	Distribution of respondents by type and their involvement in selecting village projects	202
51	Distribution of respondents by type and their perception on the usefulness of the village projects	203
52	Relationship between involvement in selecting village projects, type of respondent and selected performance variables	204
53	Distribution of respondents by type and age	208

54	Distribution of respondents by type and religion	209
55	Comparison of the distribution of the respondents by type and gender	210
56	Distribution of respondents by type and marital status	212
57	Relationship between type of respondents and number of people in the households	213
58	Distribution of respondents by type and level of education	215
59	Number and percentage of each type of respondent reading particular newspapers	217
60	Relationship between newspaper readership, type of respondent and selected performance variables	219
61	Distribution of respondents by type and major sources of income	220
62	Distribution of respondents by type and area farmed in 1988/89 season	223
63	Relationship between farm size and selected performance variables	224
64	Distribution of respondents by type and number of farm fragments	226
65	Distribution of respondents by type and livestock owned	227
66	Distribution of respondents by type and size of family labour force	228
67	Average extension contact per year by type of respondent	242

LIST OF FIGURES

Figure		Page
1	The administrative structure in Tanzania	7
2	The structure and organisation of the village government in Tanzania	8
3	Extension bridges the gap between research and farmers experience	15
4	Organaisational structure of the Ministry of Agriculture and Livestock Development	36
5	The organisational structure of the extension service in Tanzania	37
6	The development sequence of the Sokoine Extension Project strategy	50
7	Problem analysis in the SEP involving farmers, research and extension workers	53
8	Model of the SEP participation	54
9	Model for development of the course content (training models) under the SEP	58
10	Kihenge for storing large quantities of grain	65
11	The functional components of an agricultural system	71
12	A model for analysing the Sokoine Extension Project study data	116
13	Outline of SEP structures and main functions of each	134
14	Traditional rat traps using tins	175
15	Names of the villages which exceeded the average crop yields for the entire population in the 1988/89 season	181
16	Model for village problem and solution identification	268

ABBREVIATIONS

Bwana Shamba	Extension worker
CCM	Chama Cha Mapinduzi (Tanzanian Ruling Party)
CRBD	Co-operative Rural Development Bank
DAE	Department of Agricultural Extension
DAERD	Department of Agribusiness, Extension and Rural Development
DALDO	District Agricultural and Livestock Development Officer
DATO	District Agricultural Training Officer
DED	District Executive Director
EEC	European Economic Community
ERP	Economic Recovery Programme
FAO	Food and Agriculture Organisation
FTC	Farmer Training Centre
FSR	Farming System Research
GDP	Gross Domestic Product
Godown	Warehouse or store
HEDCO	Higher Education for Development Co-operation (Ireland)
ICE	Institute of Continuing Education
LITI	Livestock Training Institute
MATI	Ministry of Agriculture Training Institute
MATI-Tutor	Instructor in the Agricultural Training Institute
MALD	Ministry of Agriculture and Livestock Development
MDB	Marketing and Development Bureau
MMA	Management and Marketing Approach
NAIC	National Artificial Insemination Centre
NON-SEP	Not involved in the Sokoine Extension Project
PMD	Planning and Marketing Division
PMO	Prime Minister's Office
RALDO	Regional Agricultural and Livestock Development Officer
RDD	Regional Development Director
SUA	Sokoine University of Agriculture
SEP	Sokoine Extension Project
SEP PART.) FARMERS)	Target group farmers or Sokoine Extension Project Participating Farmers
SEP NON-PART.) FARMERS)	Non-target group farmers or Sokoine Extension Project Non-Participating Farmers
SEP VILLAGES	Sokoine Extension Project Villages
SIDO	Small Industries Development Organisation
SAP	Structural Adjustment Programme
TNAP	Tanzania National Agricultural Policy
TARO	Tanzania Agricultural Research Organisation

TALIRO	Tanzania Agricultural Livestock Research Organisation
TPRI	Tengeru Pesticide Research Institute
T&V	Training and Visit
Tshs.	Tanzanian shillings
UCD	University College Dublin
USAID	United States Agency for International Development
VEW	Village Extension Worker

CHAPTER I

INTRODUCTION

This is a study of the impact of the Sokoine Extension Project (SEP) which has been implemented by the Institute of Continuing Education and the Extension Service in the Morogoro region. The programmes of this project are an attempt at fulfilling some of Sokoine University of Agriculture's objectives in extending its educational advantages to farmers living near the University thus accelerating rural development.

The development of Tanzania depends mainly on the agricultural sector. Agriculture is the backbone of the Tanzanian economy. This means that development efforts must be directed towards improving the agricultural sector. The majority of farmers involved in agricultural production in most villages in the Morogoro region and elsewhere in Tanzania are small farmers. They are subsistence farmers managing small farms of only one to three hectares and a maximum of ten hectares per family. These farmers get crop yields which are below the regional targets and potential yields for their land. The Ministry of Agriculture and Livestock Development through its extension service is the body charged with the task of improving agricultural production for all farmers. Today the extension service has been in operation for about three decades but it has continuously been criticised for its inefficiency. The way the extension service is structured and functions is an area of particular interest in this study.

The purpose of this study is: (i) to examine the impact of the Sokoine Extension Project (SEP) on farmers' and extension workers' programmes in solving the food and cash crop production problems in the project villages and (ii) to determine the effectiveness of the SEP in developing the capacity of the extension system and in accelerating agricultural development at village level in Tanzania.

A Historical Review of the Development Events of Tanzania

In order to understand the development strategies of Tanzania it is necessary to reviews its history before and after independence to the present day. Tanzania like many other African countries which were colonised had to undergo continuous changes in its policies as discussed in the following sections.

Pre and Post Independence

Before independence, Tanzania was under German administration from 1880 to 1918. The Germans encouraged settlers and supported them. During the German colonial period the major concerns were pacification and putting in place economic and administrative infrastructures. In the agricultural area, plantation agriculture was emphasised. The German administration imposed taxes and forced farmers to grow cotton, tea and coffee, hence, this left a resentment that is evident to this day.

The British colonial era was from 1919 to 1961. During this period Britain encouraged and forced African peasant producers to grow crops considered important for the European market especially cotton, coffee and pyrethrum. The colonial agriculture was based on improving peasant farming, initially introducing haphazardly new crops without paying attention to their suitability or to soil fertility. A good example is the failed groundnut scheme of the 1950s based at Kongwa, Urambo and Nachingwea. Later the British authorities introduced by-laws and regulations, e.g. cattle dipping, terracing, cutting cotton stalks, etc. and backed these with force. The farmers rightly resented this interference and many adopted a strategy of passive resistance to any innovation which upset their farm management practices. This resentment became rooted in their culture and is still a hindrance to development activities even today.

There was no research devoted to the food crops such as maize, cassava, millet and others nor was any credit extended to food crop farmers before independence. The promotion of cash crops was a high priority both for the Germans and the British. One of the legacies of the colonial period has been the co-operative movement which has played a major role in the development of agriculture since independence.

After independence in 1961 the agricultural policy in the country took two main directions: the improvement and transformation approach. The earliest rural development approach introduced after independence was the improvement approach also known as focal point approach. In this approach the extension officer's effort was directed towards progressive farmers with the expectation that they would serve as demonstrators and disseminators of modern technology to less progressive farmers. The transformation approach introduced the idea of block farms and stressed the establishment of village settlements. This approach aimed at rapid increases in agricultural production through village settlements. The village settlements were

comprised of selected farmers moved from their traditional setting and settled in planned settlements. It involved heavily capitalised and mechanised agriculture in newly created villages which were oriented towards crop production. The transformation approach failed because its costs were out of proportion with the results.

After the Arusha Declaration

The Arusha Declaration was started on February 5, 1967 and this was the turning point in Tanzania's political, social and economic aspirations. The Arusha Declaration pronounced the party's (TANU now CCM) policy of socialism and self-reliance. This steered Tanzania towards a policy of development through maximum use of physical, natural and human resources. It emphasised communal production, a new educational policy, egalitarianism, villagisation and self-help.

Following this in 1972 the Decentralisation policy was legislated. Decentralisation aimed at giving greater decision making responsibilities to the regions. In the period between 1974-1976 the Villagisation Programme and the creation of Ujamaa villages was introduced and this was the most fundamental and dramatic institutional change which took place in Tanzania. These villages were given legal recognition with the enactment of the Village and Ujamaa Act of 1975. The purpose of villagisation was mainly to change the settlement pattern in the countryside, to bring together all the peasants so that they lived in fairly large settlements (average 250 families per village) to facilitate provision by the government of socio-economic services like schools, water, health centres and roads.

The party and government, through subsequent publications, elaborated further policies and strategies for the development of various sectors in the socio-economic set-up of the country. Throughout the period after independence, the party and government launched many campaigns and issued several directives related to agriculture. Some of the directives related to agriculture included: *Siasa ni Kilimo, Kilimo cha Kufa na Kupona, Kilimo cha Umwagiliaji* and the National Agricultural Policy. *Siasa ni Kilimo* (Politics in Agriculture) was a major policy document which was the outcome of the Party Conference held in May 1972 to review the country's deteriorating performance in the agricultural sector. The party called upon peasants to adopt modern agricultural production techniques. According to Khalid (1988, p.13) *Siasa ni Kilimo* was supposed to turn every leader into an

extension agent after a short seminar. As a result, extension became no longer a scientific discipline that could be performed by qualified personnel. After 1972 the few extension workers who had been left in the extension service became frustrated, lost morale and their professional pride. *Kilimo cha Umwagiliaji* (Irrigation Agriculture) was promoted partly by the 1973/74 drought and by the Party's concern over Tanzania's excessive dependence upon rainfed agriculture. In this directive, emphasis was put on the use of improved small scale traditional irrigation schemes and on the adoption of medium to large-scale irrigation using modern techniques and proper water resource management. *Kilimo cha Kufa na Kupona* (Agriculture for life and death) campaign was launched in 1974/75. It was directly aimed at cautioning farmers on the need for increased food production for national survival. This campaign resulted in increased national production of food crops.

The Tanzanian National Agricultural Policy was introduced by the Ministry of Agriculture and Livestock Development in April 1983. The policy emphasised the importance of agriculture in the development and economic growth of Tanzania. The National Agricultural Policy was introduced because the Ministry of Agriculture and Livestock Development felt that it had lost control and responsibility of managing the extension service. The policy recognised that extension was a system by which proven methods of agriculture are put across to the farmers in order to improve farming method and techniques thereby increasing production efficiency for the betterment of the social and living standards of rural people. This work was to be carried out by trained extension workers who must live and work with farmers. The National Agricultural Policy was a clear turning point from the previous political directive of *Siasa ni Kilimo* and emphasis was placed on scientific agriculture, requiring trained extension workers. It, therefore, re-kindled hope of improving the performance of extension workers.

In June 1982, the Government of Tanzania adopted a three year comprehensive Structural Adjustment Programme (SAP) to address the country's structural problems and to rehabilitate the economy. As a follow-up to this programme the Ministry of Agriculture and Livestock Development in 1985 adopted a National Food Strategy and Export Crop Package (Makweta, 1989). These policies were aimed at promoting increased food production and cash crops for export which would increase the national foreign exchange earnings. Also, in 1985 the co-operatives were re-introduced to carry out marketing and distribution functions to farmers. They replaced

the crop authorities, the National Milling Corporation and input supply organisations.

Later in June 1986, the Economic Recovery Programme (ERP) was introduced by the Government. The ERP was an intensification and continuation of the Structural Adjustment Programme of 1982/83 to 1984/85. The main objectives of the ERP was to increase productivity and strengthen the economic services, storage, roads, transportation and institutional improvement in marketing and distribution systems in the country.

Political and Administrative Structures in Tanzania

Tanzania is a one-party state and is ruled by a democratically elected government. The ruling party is CCM (*Chama cha Mapinduzi* or Revolutionary Party) and there are 25 regional centres of authority. The local politics and government are organised from the individual household, work place to district, regional and national level. The Tanzanian Government is highly structured and is active at all levels (Figure 1).

The CCM Party is responsible for setting out the broad objectives, guidelines on policy and development strategies for the government. The role of the government is therefore to implement these policies. The CCM is the source of the country's ideology and the government is the chief implementor of the policies of the party. It is particularly important that all development strategies initiated must be endorsed by the party before they become operational at any level in the country.

The village in the rural society in Tanzania is the smallest and basic administrative unit where usually 250-450 farm families live. The village government is the functional body at village level. It determines the needs of the villagers, draws up plans for village development, decides on projects to implement and ensures their implementation. In its political organs, the villages follow the model established for villages by the Village and Ujamaa Act of 1975. According to this act, each village has a Chairman, Secretary and Ten Cell leaders. The Village Chairman and Secretary are also Chairman and Secretary of the local branch of the CCM party. The village government (see Figure 2) has five committees each with five members. These five committees include: Finance and Planning, Security and Defence, Construction and Transport, Education, Culture and Social Welfare, and Production and Marketing, hence, constituting a 25 member committee responsible for all village affairs. The village government ideally is

composed of at least 250 households which are organised into ten cell units under ten cell leaders, village chairman and chairpersons of the village committees are elected by the members of the village assembly for a term of five years. These village leaders must be members of the party and should be residing in the village. Each member of CCM in the village over the age of 18 years is allowed to vote and every member of the village is expected to be engaged in productive work. The village government is a legal corporation with the right to own property and operate enterprises. It is also a unit of government with the right to pass by-laws and it is in charge of all administration in the village. From the village further decisions are made at the ward, division, district, region and national levels respectively (see Figure 1).

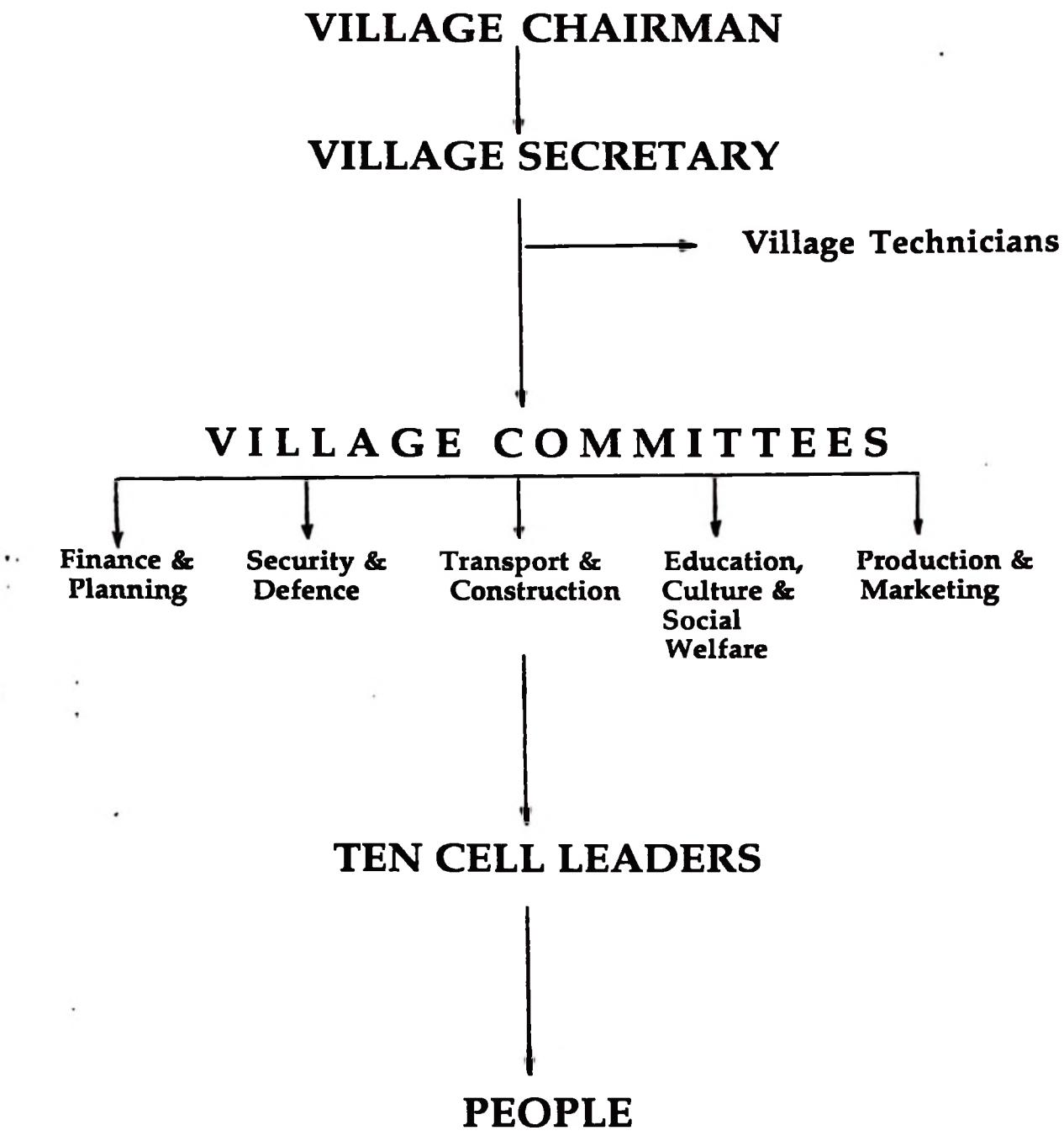
The Ministry of Agriculture and Livestock Development is organised with agricultural officers working at the village, ward, district, region and national levels. Directives from the Ministry headquarters follow this hierarchy down to the frontline extension workers before they reach the farmers. The village extension workers implement the government directives with the assistance of the village government and especially the relevant committees (i.e. production and marketing, finance and planning, etc.).

Tanzanian's mainland is divided into twenty administrative regions (see Appendix A). From 1972, with the decentralisation policy, regional authorities were given increased autonomy for designing and implementing plans within broad national guidelines established by the respective ministeries (see Figure 1). The Prime Minister's Office has an overall co-ordinating role. At the regional level there is the Regional Development Director and at the district level is the District Executive Director, while the Ward Secretary at the ward level and the Village Chairman at the village level carry out the administrative functions.

Figure 1: The Administrative Structures in Tanzania

LEVEL	THE GOVERNMENT	THE PARTY CCM
NATIONAL	President	National CCM Chairman
	Prime Minister and 1st Vice President	National Executive Committee
REGIONAL		Regional Chairman
	Regional Commissioner	
	Regional Development Director	
DISTRICT	Regional Functional Managers	District Chairman
	District Commissioner	
DIVISION	DISTRICT COUNCIL District Executive Council District Functional Managers	
	Division Secretary	
WARD	Ward Secretary	
VILLAGE	Village Secretary	Village Government
		Ten Cell Leaders
		THE PEOPLE
		Village Chairman

Figure 2: The Structure and Organisation of the Village Government in Tanzania



The Culture

Tanzania is a traditional society where customs, norms and traditional beliefs are closely observed. The Tanzanian society is roughly divided equally among Muslims, Christians and traditional believers. The country's population is made up of more than 120 ethnic groups. Most of these groups are small, the largest being the Sukuma tribe which accounts for thirteen per cent of the total population and no other groups exceeds five per cent. Although each group has its own language or dialect, they all speak Kiswahili which is the national language. It is difficult to generalise about the culture of Tanzania. The decision making process in each family is influenced by the task and type of family. However, throughout the country, elders are respected and are central in all family decisions and all other social relations are specific to a tribe or ethnic group.

The Population

Tanzanian population has been increasing with high annual growth rates for the past forty years. Table 1 shows that the country's population was about 8 million people in 1948 but is reported to be 23.2 million people in the 1988 census. It is also projected that the population of Tanzania will be 35 million people by the year 2000.

TABLE 1
TANZANIA'S POPULATION GROWTH 1948-1988

Census Year	Total Population	Annual Average Increase	Annual Growth Rate (%)
1948	7,981,120		
1957	9,600852	179,970	2.25
1967	12,313,469	271,262	2.82
1978	17,512,610	519,914	3.20
1988	23,174,336	566,173	2.80

Source: Yeager, 1982; SENSA, 1988 and EUROSTAT, 1988

According to the 1988 census, Tanzania had an average density of 26 inhabitants per square kilometer. The average annual growth rate was at 2.8 per cent which was lower than the 1978 growth rate which was 3.2 per cent. The average household size for the Tanzanian mainland was 5.3 persons and

4.7 persons for Zanzibar Island. Other interesting features in the 1988 census were that women were still dominating the population. There were 11.8 million females and 11.3 million males in the country. The life expectancy at birth improved for women from 44 to 53 years and 41 to 51 for men in the 1988 census. A comparison of the population in urban and rural areas from 1960 to 1988 shows that there was an increase in urban migration (see Table 2).

TABLE 2
PERCENTAGE POPULATION IN URBAN AND RURAL AREAS IN TANZANIA

Year	1960	1970	1975	1980	1985	1988
Urban	4.8	6.9	9.2	11.8	14.8	26.6
Rural	95.2	93.1	90.8	88.2	85.2	73.4

Source: EUROSTAT, 1988, p.21 and Daily News, March 15, 1989

According to the data in Table 2 the urban population was about 26 per cent of the total population by 1988. The major contribution to this low urban migration was the better infrastructure, job creation in the rural areas and the promotion of Ujamma villages.

Agriculture in Tanzania

Agriculture is of paramount importance in Tanzania. It contributes about 50 per cent to the Gross Domestic Product (GDP). About 80 per cent of the population depend on agriculture and as much as 75 per cent of Tanzanian exports are agricultural products. It is estimated that 70 per cent of the total food produced is consumed in the subsistence sector and the remaining 30 per cent is sold both to official and unofficial markets.

Crop farming is the major production branch of agriculture and accounts for 80 per cent of the volume of agricultural production. This is followed in importance by animal husbandry at 15 per cent and forestry and fisheries with 5 per cent.

In 1987 there were 9.5 million small farmers living in more than 8,000 Ujamaa villages (EUROPA, 1990). Over 75 per cent of these households possessed a farm area of less than 2.4 hectares (six acres). The soil is tilled by traditional methods using a hand hoe. Land clearing by burning is still

The Study Background

Tanzania has an area of about 940,000 square kilometers and is basically an agricultural country, with a population of about 23 million people. It is located between 2° and 10° south latitude and 30° to 40° east longitude and surrounded by Kenya and Uganda in the north, Burundi, Rwanda and Zaire in the west, Zambia in the south-west and Malawi and Mozambique in the south (see map, Appendix A).

Tanzania like many developing countries puts its development efforts on rural development in recognition that over 73 per cent of the country's population is rural based. Agriculture is the backbone of Tanzania's economy and it is the major preoccupation of about 80 per cent of the country's population. The agricultural sector contributes 75 per cent of the country's foreign exchange and 50 per cent of its GDP. Food production in Tanzania is a mass activity involving small farmers living in rural areas who cultivate farms ranging from 0.5 to 2.5 hectares. Most of the food grown by these farmers is produced through human effort using hand implements (*Jembe na Shoka*). They use very little new technology and get limited extension and research intervention. Most of the improved technology were developed for cash crops on large commercial farms and not for the limited-resource small farmers (Mwanjali, 1987; Shao, 1987; and Moyo, 1987).

The importance of agriculture was emphasised by the Ministry of Agriculture when it outlined the objectives of the Tanzania National Agricultural Policy (1982, p.viii):

1. To develop an egalitarian agricultural community, based on the policies of socialism and self-reliance.

2. To achieve national self-sufficiency in food and to raise the nutritional standards of all the people.

3. Through increased output, to contribute to the general raising of the living standards of all Tanzanians.

4. To earn foreign exchange for the nation as well as to meet the needs of agriculture.

5. To provide raw materials for the nation's industrial sector.

With such dependence placed on agriculture it is no exaggeration to claim that agriculture is the engine of Tanzania's socio-ecoinomic progress. It is therefore true to say that the health of the Tanzanian economy is intimately

related to the health of the agricultural sector. Where the agricultural sector is weak, the other sectors of the economy are also likely to be weak.

The performance of the agricultural sector has remained inadequate despite many party and government pronouncements towards the development of an efficient socialist agricultural sector. Self-sufficiency in food has not been achieved and export earnings from agriculture have lagged behind the requirements to maintain the required tempo of development (The Tanzanian National Agricultural Policy, 1982). Increasing food production by the small scale farmer has been the major concern of the politicians and high level policy makers. This has been one of the greatest challenges for agricultural research scientists and the extension service in Tanzania. The extension service is charged with the responsibility of bridging the gap between research scientists and farmers, disseminating relevant messages to the farmers and carrying feedback to research services of farm level problems. Rural development is therefore recognised as a challenge in many Third World countries. Hence, Tanzania has given higher priority to the development of agriculture and of the rural areas.

Tanzania has a land area of about 88 million hectares. According to Shao (1987), the agricultural potential of Tanzania is 49 million hectares of land which are cultivatable under rainfed conditions. However, only five per cent of this land area is under cultivation where one per cent is under large scale farming and four per cent is used by the small scale farmers. The land use pattern in Table 3 shows that Tanzania as a country does not suffer from acute land shortage or from the problem of landlessness. The country (Cortas, 1988, p.31) offers a large potential for increased agricultural production due to a favourable man to arable land ratio, its diverse agro-climate which allows for a wide range of agricultural production from food to cash crops. There are also substantial untapped or underutilised resources for livestock production and fishery resources. It is the view of many agricultural research scientists in Tanzania (Shao, 1987) that small holder farmers could increase their crop yields to their farm yield potential if they adapt to the changing environmental conditions and also adopt new technologies. These new technologies are being developed by the agricultural research scientists in the country. This view is refuted by many extension workers. The Tanzanian National Agricultural Policy (1982), Roling (1985) and Holmes (1987) observed that most research in Tanzania has been centered on single crops and favouring large scale farming. However, with the present state of African

TABLE 3
LAND USE CATEGORIES IN TANZANIA

Land Category	Area ('ooo ha)	Per Cent of Total Area
Total cultivation land	4465	5.1
- small holder	3380	4.4
- large scale holder	585	0.7
Grazing land	44045	50.1
Forest woodland	38050	43.1
Urban, swamps	1600	1.8

Source: Shao, 1987, p.147.

agriculture and the desperate need to improve productivity (Holmes, 1987), the major part of the research programme should be resource oriented, i.e. to the small farm which constitutes the major part of agricultural production. In Tanzania, five distinct modes of crop production can be found and both research and extension need to provide these with the required technology. These modes of crop production consists of the small scale farming sector, medium scale, large scale commercial farmers, private commercial estates and public estates (see Appendix C for a detailed description).

In Tanzania, eighty per cent of the staple cereal and twenty per cent of exported crops are produced by small holders. Table 4 provides a picture of the potential yields on the research station and on small scale farmer fields. It has been observed by Kyomo and Keswani (1987) that the average yield of all crops for small scale farmers in Tanzania is lower than the accepted standards. This is mainly due to the unavailability of high yielding seed, inputs, adverse soil and climatic conditions, unattractive prices, lack of irrigation, large post harvest losses, poor research-extension-farmer linkages and poor extension services. The situation in Table 4 clearly suggests that there is need to assist farmers to increase their production/yields to reach the on-farm yields. This is the task which research institutions and the extension service need to be tackling.

TABLE 4

POTENTIAL AND AVERAGE YIELDS OF SOME OF THE MAJOR FOOD CROPS

Crops	On-station Yields (kg/ha)	On-farm Yields (kg/ha)	Average Yields Small Holder (kg/ha)	Average Yields SEP Farmers 1987/88 (kg/ha)
Maize	6000	4000	1000	538
Rice	8000	4000	1265	323
Sorghum (millet)	5000	3500	700	368
Root crops (cassava)	10000	5000	1760	NA
Grain legumes	2500	1500	500	83

Source: Shao, 1987 and Ngetti, 1989

However, this situation raises a number of questions as follows: (i) Can farmers increase their yields? (ii) Why are farmers not getting high yields? (iii) Is research in the country directed to the needs of small farmers? (iv) What is the role of the extension service in linking researchers and farmers? The key linking relationship of extension can be presented as shown in Figure 3.

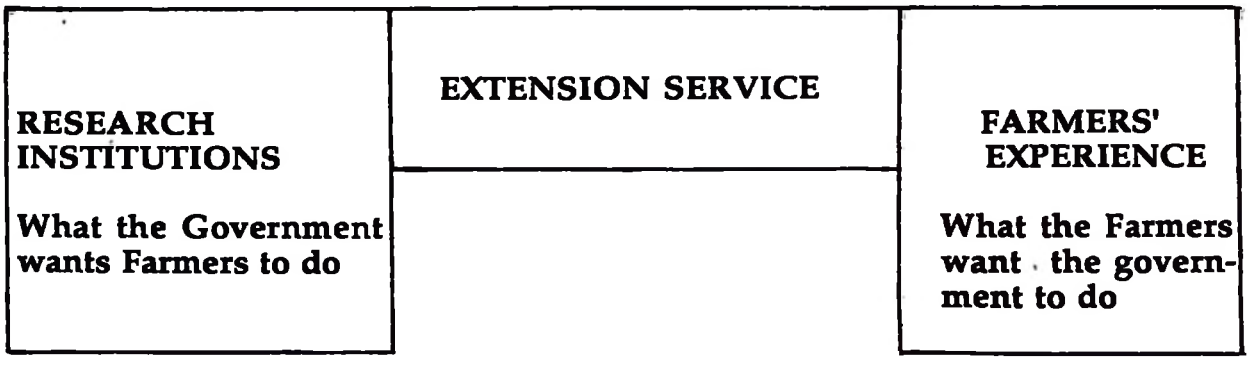


Figure 3: Extension Bridges the Gap Between Research and Farmers' Experience (adapted from A.H. Savile (1965, p.4).

To ensure that the linking relationship is effective, the author sees that the extension service has to perform a number of duties which include:

1. To disseminate the proven methods of agriculture (transfer of knowledge and skills) from the research institutions to the farmers and to assist farmers to use this knowledge effectively.

2. To improve farming methods and techniques through training and education of farmers.

3. To increase production efficiency of farmers so they can have enough food for their families and produce surplus for marketing.

4. To conscientise rural people to take the initiative in solving their problems and hence advising farmers on the formation of farmers' organisations.

5. To provide motivation and self confidence to farmers. This removes isolationism among farmers and develops in them a feeling of being able to change their lives.

In this connection therefore, few would dispute that extension can make an important contribution towards the national economy and overall well-being of people. In the past three decades since the attainment of independence, the Government of Tanzania has been preoccupied with appropriate conceptual and institutional structures for effective extension. Traditionally, extension in agriculture emphasised the introduction of new agricultural practices and bridging the gap between the government and people as well as researchers and farmers. The extension approach was basically top-down in nature with little or no effort to involve the farmer in the problem solving process. It was an extension approach aimed at technological change and increased productivity rather than human development (Wiggins, 1986). Criticism of the extension service has been growing especially for its lack of contact with the majority of farmers. In 1975, for example, the nation's first President, Julius Nyerere, remarked that it would make very little difference to agricultural production if all extension workers were fired (The Daily News, October 21, 1975, cited in Reidy and Keregero, 1987). The extension workers have always been putting up their case by pointing out weakness in the government's poor planning, inadequate funding, poor staffing and improper organisation. The government has taken steps towards improving the situation by the formulation of the National Agricultural Policy in 1983 but the extension service is still a long way from being able to operate in an effective manner.

Several extension approaches have been attempted but farmers, even those nearest to the universities and research stations, have not changed their way of farming and their standards of living are still very low (Lugeye, 1986 and Ibrahim, 1988).

The Institute of Continuing Education (ICE) as an outreach arm of the Sokoine University of Agriculture (SUA) has sought to strengthen the performance of the extension service at the grassroots level through an externally funded co-operative pilot project in collaboration with the Department of Agricultural Extension, University College Dublin (Reidy and Keregero, 1987). The Sokoine Extension Project (SEP) is a pilot project which has been initiated at a time when there is a lot of discussion on the worth of the extension service in Tanzania. The SEP is in operation in twenty selected villages in the Morogoro and Kilosa districts. It has the general objective of developing from the local situation an effective extension system and of demonstrating the effectiveness of intensive extension programmes in accelerating agricultural development in Tanzania. The project works with the national extension service in up-grading extension workers through in-service training courses and in providing support necessary for the effective performance of their roles. At the village level the SEP has aimed at bringing the University, the extension service, other agricultural institutions and the village governments together to solve the problems of food and cash crop production with technologies and practices within the reach of the majority of the farmers. However, if the extension service is to have the desired impact on Tanzania agriculture then there is need for an improvement in its structure and facilities, its staff need considerable re-training and a more effective operational procedure must be developed (Reidy and Keregero, 1987).

The Problem

The Sokoine University Extension Demonstration and Training Project (SEP) started operating in September 1987. At the time data for the present study were collected it had been in existence for almost two years. The main objectives of the project in this initial phase have been to demonstrate that the district extension service when provided with manpower, effective training, adequate support facilities and motivation could act as a catalyst in initiating and providing on-going support for the development of Tanzania's agriculture (Reidy and Keregero, 1987). The

continuation and expansion of the SEP depends on its success in achieving the objective of improving the extension workers' and farmers' performance especially in solving the food and cash crop production at the village level. It is therefore necessary to assess the extent to which the SEP objectives have been fulfilled. More specifically, the following questions can be raised in the context of the proposed study:

1. What are the duties and work activities of the extension workers in the villages? We examine also the methods used by the extension workers in their work.

2. What type of in-service training was provided to the extension workers, and what was the content of the in-service training courses?

3. What is the effect of the in-service training programmes on the extension workers' performance? Were the training needs of extension workers met?

4. How effective were the project support, management and monitoring systems on the extension workers' performances?

5. What procedures have been followed in developing the SEP projects and programmes?

6. What type of projects and programmes have been implemented in the SEP and non-SEP villages?

7. What is the level of farmers' contact with the extension service and its programmes?

8. What is the extent of farmers' participation in the SEP projects and programmes?

9. To what extent were farmers involved in extension activities?

10. How had the SEP influenced the changes in farmers' agricultural practices? Have farmers changed their farm operations? What changes have taken place since SEP was initiated?

11. What farmers' priority problems have been addressed by the project?

12. What are the changes on food and cash crop production at the village level since SEP was started?

Objectives of the Study

The overall objective of this study is to determine the impact of the Sokoine Extension Project (SEP) on the village extension workers' and farmers' programmes and activities in the villages participating in the project in the Morogoro region. The study aims at examining the extension workers' performance, and the farmers' performance in particular their agricultural practices, the food production, food sufficiency and cash crop production as a result of the proposed extension intervention. In order to arrive at firm conclusions it will be necessary to compare the performance of farmers and the extension workers in the SEP to the non-SEP villages and to the objectives of the Sokoine Extension Project.

To give direction and conciseness to the study the following more specific objectives were developed:

1. To identify, compare and contrast the major elements and activities of the extension service in the SEP and non-SEP villages in the Morogoro region as factors which influence the performance of the village extension workers. These elements and activities are:

   a) the types of extension programmes and projects at village level and how they are developed;

   b) the extension management and support system used;

   c) the type of in-service training provided for extension workers over the last 18 months;

   d) the duties, work activities and methods used by Bwana Shambas in their work;

   e) the transport and other support facilities provided for Bwana Shambas to carry out their work;

   f) the links between Bwana Shambas, research and other institutions.

2. To determine the impact of extension work on food and cash crop production in SEP and non-SEP project villages by examining the performance of farmers in the project as indicated by:

   a) the farmer's contact with the extension service and it programmes;

   b) the levels of participation of farmers in extension projects and programmes;

c) the levels of farmers' involvement in extension activities;

d) the farmers' changes in agricultural practices;

e) the farmers' priority problems;

f) farmers' changes in the levels of food and cash crop production.

3. To examine the factors which influence the farmers' performance in the Sokoine Extension Project.

4. To draw conclusions in relation to the overall effectiveness of the SEP and to make recommendations in relation to:

a) changes that would improve the operation of the project;

b) the possible extension of the SEP approach to extension work in other parts of Tanzania.

CHAPTER II

AGRICULTURAL RESEARCH AND EXTENSION IN TANZANIA

Introduction

Agricultural research programmes that do not answer farmers' needs, perceptions and problems are academic in nature and are irrelevant at the grassroots level. The process of scientists and farming families learning together is crucial in the development of the agricultural sector. However, there is a large gap between what agricultural research and extension have to offer and the needs of the majority of small scale farmers. There is a need for the gap to be bridged. In order to achieve this farmers must participate more actively in agricultural research and development. One of the most challenging tasks facing agricultural research and extension efforts in the developing world is that of developing appropriate agricultural technology based on the experience of the peasant farmers (Maria, 1988, p.15).

This chapter includes three main sections. Section one deals with the development of agricultural research in Tanzania. This section presents a brief historical development of agricultural research activities and programmes from the colonial era of Tanganyika (now Tanzania) to the present day. The second section contains a discussion of the development of the agricultural extension service in Tanzania from the colonial period to the late 1980s. The way the extension service is organised, managed, functions and the various approaches used are presented in this section. In completing this chapter a section on the training of extension workers in Tanzania has been included. Hence, an analysis of how the village extension workers are trained and how this training is linked with research, extension and farmers is discussed. It is, however, important to point out here that while all these services – research, extension and training – are under the same Ministry there is a great wall separating them that remains to be dismantled if farmers are to benefit and improve their standard of living.

SECTION I: AGRICULTURAL RESEARCH IN TANZANIA

Agricultural Research in the Colonial Period

Agricultural research in Tanzania started after the 1920s when the Department of Agriculture was founded. During this period the tasks of experimentation and advisory services were under a unified management. The experimental stations and demonstration centres were established in many districts and were kept under the responsibility of the district advisory services. It was not until 1955 that an Assistant Director in-charge of research was appointed. He was to work under the Director of Agriculture who was also responsible for the advisory services division (MALD, 1987, p.60).

During the colonial era the economy of Tanzania (then known as Tanganyika) was based on the development of plantation crops like cotton, coffee, sisal, tea and cashewnuts. Agricultural research policies in this period took the same orientation with research programmes aimed at solving problems facing the plantations or estate farmers. Hence the commodity research stations were established at: Lyamungu which specialised in coffee; Ukiriguru in cotton; and Mlingano in sisal research. All the research stations were controlled by the Ministry of Agriculture and there was virtually no research on food crops.

Agricultural Research after Independence

Agricultural research after independence in 1961 changed and put more emphasis on diversified crop production and the integration of cash crops with food crops. This strategy was intended to bring about self-sufficiency in food production and producing surplus for export. The Party, CCM in 1972 in its policy document *Siasa ni Kilimo* urged the government to strengthen research activities in order to transform the peasants' methods of production and raise their farm incomes.

In 1981 the research function was transferred to parastatals which in effect alienated research from the extension services which remained with the Commissioner of Agriculture in the Ministry of Agriculture. The Director of Research and Training thus headed both research and training sections. Beginning in 1981, research administration was entrusted to four parastatals namely, (1) TARO (Tanzanian Agricultural Research Organisation), (2) TALIRO (Tanzanian Livestock Research Organisation),

(3) TPRI (Tropical Pesticide Research Institute) and (4) UAC (Uyole Agriculture Centre). Each of these parastatals had a specific mandate as follows:

TARO – to undertake and co-ordinate agricultural research throughout Tanzania;

TALIRO – to undertake and co-ordinate all livestock research in Tanzania;

TPRI – to undertake responsibilities with respect to pesticide regulation and testing and plant quarantines.

UAC – to undertake the responsibilities of research, training and production problems for agriculture and livestock in the southern highlands.

In addition, certain research activities remained directly under the Ministry, the Horticultural Research at Tengeru, Agro-scientific centre at Dakawa in Morogoro, the National Coconut Development Programme in Dar-es-Salaam and others at Sokoine University of Agriculture in Morogoro. Despite the considerable overlap in the mandate of these different organisations, there was extremely little interaction among them (MALD, 1987, p.72). There are conceptual gaps, and no linkage exists between extension, research, farmers, the Ministry and other institutions. The primary goal of agricultural research has been to develop production packages which obtain maximum biological potential of individual crops with optimum inputs. Although some advances were achieved using this system, in all too many instances the results of this research have proven to be irrelevant to the majority of farmers in Tanzania (Shao, 1987; Mwanjali, 1987; Mushokolwa, 1984). Most farm families operate small scale but complex multiple enterprise systems. Historically, since the colonial era all research in Tanzania has been oriented along single commodity lines and conducted on research stations. The agricultural researchers neither have direct contact with their client groups, the farmers, nor their intermediaries, the extension services, hence it is not surprising that research has not addressed the clients' needs.

In 1982, the Minister of Agriculture formed a task force to look into the whole agricultural sector in Tanzania. On agricultural research, the National Agricultural Policy Task Force (1982, p.44) found a number of weaknesses affecting its effectiveness that included: (i) lack of policy direction; (ii) shortage of competent researchers; (iii) insufficient funds to meet both recurrent and development expenditure; (iv) inadequate transport;

(v) ineffective co-ordination between research parastatals, and between research parastatals and the extension service; (vi) inadequate research facilities; and (vii) lack of farm based research.

Working in these conditions agricultural researchers in Tanzania achieved very little of use and interest to the farming communities. For example, at Ukiriguru research station (the lake zone research centre) Lugeye (1986) and Ibrahim (1988) observed that farmers were still following traditional cotton crop husbandry practices. The farmers were getting yields far below the research stations and the district potential yields despite this research station existing at Ukiriguru for more than half a century. This situation repeats itself at many other research centres like Ilonga, Lyamungu, Naliendele, Tengeru, Mlingano, Maruku and Mpwapwa just to mention a few. The Ministry of Agriculture and Livestock development noting this deficiency decided to reorganise its structure for a tenth time in 1988. In the new Ministry organisation, the training, research and extension sectors have been united (Makweta, 1989, p.22). They all, now fall under the Commissioner of Agriculture and Livestock (see Figure 4, page 36).

In the new organisation, the agricultural research parastatals (TARO, TALIRO, UAC and TPRI) have been dissolved, while research and training have both been placed under the Commissioner for Research and Training. According to the new Ministry organisation , Makweta (1989, p.27) further explained that research and training would be divided into seven agro-ecological zones. These zones included:

(i)	Lake zone	(Ukiriguru-Mwanza)
(ii)	Southern highland	(Uyole-Mbeya)
(iii)	Northern zone	(Salieni-Arusha)
(iv)	Central zone	(Mpwapwa-Dodoma)
(v)	Southern zone	(Naliendele-Mtwara)
(vi)	Eastern zone	(Ilonga-Morogoro)
(vii)	Western zone	(Tumbi-Tabora)

Each of these zones would carry out research in both the crops and livestock sectors (see Table 5). Despite this new organisation, some centres will continue to conduct zonal research and co-ordinate national crop research programmes. The emphasis of the crop research programmes at these centres will be on food and cash crops and the production of improved seeds. In the livestock sector, animal diseases, pastures and production of

TABLE 5

ZONES FOR RESEARCH AND TRAINING IN AGRICULTURE AND LIVESTOCK

Zone	Region	Research Centre	Main Research Centre	Crops/Livestock Research		Training Institutes
				National	Zonal	
1. LAKE	Kagera Mwanza Mara Shinyanga	Kituntu Maruku Lubaga Malya Ukiriguru Mwanhala Bwaga Mabuki	Ukiriguru	Cotton Bananas Root crops	Coffee Maize Legumes Pastures Sorghum/ Millet Agro-forestry Inter-cropping	MATI - Ukiriguru Nyegezi Maruku
2. WESTERN	Kigoma Tabora	Tumbi Mubondo Seatondale	Tumbi	Tobacco	Cotton Root crops Inter-cropping Maize Palms	MATI - Tumbi Mubondo
3. NORTH-ERN	Arusha Kiliman-jaro	Tengeru Lyamungu W.Kiliman-jaro Miwaleni Hanang Salieni	Salieni	Fruits and vegetables Coffee Wheat	Dairy cattle Bananas Maize Legumes Pastures	LITI - Tengeru
4. EASTERN	Morogoro Tanga Coast Dar-es-Salaam	Mlingano Kibaha Minazi Cholima Cvl Temeke Katrin Chambezi Msowero Ilonga Lpc Tanga	Ilonga	Rice Sisal Sugar cane Ttsetse fly Spices Livestock diseases Livestock Legumes Maize	Cotton Sorghum/ Millet Pastures Cocoa Fruits/ vegetables Oil seeds Dairy cattle	MATI - Ilonga Morogoro Mlingano Buhuri

TABLE 5 (continued)

5. SOUTH-ERN	Mtwara Lindi	Naching-wea Naliendele Mtopwa	Naliendele	Cashew nuts Oil seeds	Root crops Maize Rice Pastures	MATI - Mtwara
6. CENTRAL	Dodoma Singida	Makuto-pora Kongwa Hombolo Mpwapwa	Mpwapwa	Grapes Sorghum/ millet Ground-nuts Dairy cattle Beef cattle Pig feed	Root crops Rice Maize	MATI - Mpwapwa
7. SOUTH-ERN HIGH-LANDS	Iringa Mbeya Ruvuma Rukwa	UAC Suluti Iringa Mufindi Mbozi/ Mbimba Isimani Mitulula Nkundi Ndengo/ Igeri	Uyole	Tea Pyrethrum Maize	All food crops Livestock and Pastures Coffee Cocoa Tobacco	UAC MBEYA

Source: Ministry of Agriculture and Livestock Development, 1989

vaccines will be strengthened. In order that research findings are focused on the needs or problems of small scale farmers, local agricultural and livestock officers for respective regions will be involved in various research committees. This will make the research activities more relevant to the farmers rather than satisfying researchers' academic interests alone.

SECTION II: THE AGRICULTURAL EXTENSION SERVICE IN TANZANIA

Agricultural extension represents a second important service which the government of Tanzania provides to producers. The main aim of extension is to disseminate improved techniques from research to farmers in order to increase agricultural production. Simultaneously, extension has to feed back farmers' felt needs and their assessment of new technologies to research. It is important that research centres be able to continuously produce appropriate technologies and information relevant to farmers. In Tanzania,

the role of the extension service in agricultural production goes beyond meeting the national food needs. The agricultural extension service is a necessary key player in the overall social and economic development of the country.

The Extension Service During the Colonial Period

The agricultural extension service in Tanzania started in the 1950s during the British colonial era (Kahama et al., 1986, p.50). The agricultural officers during this period were considered as inspectors of defaulters of government agricultural directives. Using the extension service the British tried to institute conservation measures such a terracing and animal husbandry techniques such as cattle dipping but these tended to act as focal points for peasant resistance to British rule. The main extension approach during the colonial period was the 'focal point approach' or the 'improvement approach'. The colonialists trained peasants by using colonial employed extension agents and primary school teachers whose task was to ensure that farmers followed prescribed methods and practices of agriculture. These colonial agricultural officers accomplished this by going to the villages looking for defaulters, who would then be sent to court and be fined or imprisoned for not implementing the set agricultural practices. An outstanding feature of this approach was the emphasis on *control* rather than *persuasion*. This method was unpopular and was not successful and as a result the progressive farmer approach or transformation approach was introduced. In this approach the extension worker focused extension resources on the farmers who were rich, modern and could readily follow extension advice. During the entire period before independence the main focus of the colonial administration was on producing export crops and stability for the territory. Discussing the extension service in Tanzania, Hyden (1980) and Yeager (1982) support the idea of De Vries (1977, p.4) who pointed out that:

> The British pursued a conscious policy of encouraging the exports of primary agricultural products, namely cotton, sisal and coffee to feed her machinery and to pay for the administration of Tanganyika. The aim was to extract the maximum from the territory with minimum effort.

Furthermore, reviewing the agricultural situation in Tanzania Kahama et al. (1986, p.50) stated that:

The promotion of cash crops was a high priority for the Germans and British because these crops did the most to support their respective colonial economies.

This situation led to a lot of resistance and dislike by farmers of the extension workers in Tanzania. This distaste by farmers is prevalent even today and the task of the extension worker has to start with convincing farmers that they are not agents of the colonialists.

The Extension Service after Independence

Tanzania got her independence on December 9, 1961 and the British rulers handed over the extension activities to the Tanzanian government in 1962 and the extension division was then Africanised. At the beginning of this period, the extension service was formed as a government service through the Ministry of Agriculture. In the years following independence, the government followed a dual approach to agricultural development. It followed the ***improvement and transformation*** approaches. In the improvement approach the extension service was charged with the task of bringing gradual improvement in farming methods for the small-scale farmers while adhering to their social values and customary attitudes. The transformation approach was aimed at rapid increases in production through village settlements. The village settlements comprised of selected farmers moved from traditional villages and settled in planned settlements. These farmers were encouraged to use mechanised farming methods in growing new priority cash crops under close government supervision and assistance. The transformation approach was short-lived because it lacked peoples' participation in decision-making hence, all the settlement schemes collapsed and were abandoned.

Beginning in 1967, the government intensified the use of farmer training centres (FTC) by building nearly one centre per region. The FTC provided an opportunity for farmers to learn specific agricultural skills by hearing, seeing and doing. The effectiveness of the FTC was later greatly affected by continuous transfers from the Ministry of Agriculture to the Ministry of Regional Administration and Rural Development and later to the Ministry of Education and partially to the Ministry of Agriculture. These centres virtually no longer serve the purpose of providing agricultural and livestock training to farmers. The emphasis has been placed on leadership and management skills.

On February 5, 1967 the Arusha Declaration was announced and it changed the whole concept of farming in Tanzania. In this policy communal production and provision of services was intensified. The decentralisation of government business in 1972 further contributed to the burden of reduced impact of the advisory services in the country. The extension services were divided into the central extension service with very few staff, the regional extension service under the Prime Minister and the commodities extension services under parastatals (Moyo, 1987). These changes were the beginning of the development of a role-conflict and mixed responsibilities between the Prime Minister's office and the Ministry of Agriculture. In theory, the Ministry of Agriculture was in charge of all extension personnel but in practice it could not directly address the farmers and extension workers in the field. This system (TNAP, 1982; Moyo, 1987) reduced the linkage of the Ministry of Agriculture with its own frontline staff. Consequently, this government service became fragmented and was criticised as being ineffective.

During the 1970s, the preceding extension approaches were discontinued and replaced by a more modest approach, the ***persuasive and dialogical model.*** In these approaches farmers were no longer compelled to adhere to certain regulations. Compulsion of farmers to use soil conservation measures were relaxed and the cultivation of prohibited areas such as river banks, water sources, forestry areas and hilly grounds became very common. The co-operative unions, which had played a great role in agricultural development especially in the supply of farm tools, inputs, farm credits, purchase and handling of members crops, were dissolved – further weakening the extension service. It was during this same period that the local governments were also abolished.

There are other policy announcements (Baguma, 1984; Kahama et al., 1986; Khalid, 1988) which affected the agricultural and livestock extension services. The directive on 'politics in agriculture' of 1972 awakened politicians and administrators on the declining productivity of the agricultural operations. The farming community was reoriented towards farming as a business and as a result agriculture started to take shape. Then, later the 'farming as a matter of life and death' policy of 1974/75 led to bumper harvest of food crops for two years. The 'irrigation policy' also contributed to the explanation of the importance of using water for increased production. However, a major weakness of these policies was that extension

was no longer considered to be a profession or a scientific discipline to be performed by qualified personnel (TNAP, 1982). At this time almost every leader in Tanzania could give agricultural advice to farmers without consultation with the extension service. Hence, farmers received contradictory and often incorrect advice on agriculture but, all the same, the extension service carried the blame for not being effective. These policies also left behind scars with land misuse and the destructions of forests and water points. These malpractices led to soil erosion, depletion of forest reserves, destruction of water points and to cultivation, livestock-keeping and grazing in towns and municipalities. During decentralization most of the agricultural extension staff were assigned administrative duties and some were transferred to crop authorities. As a result, the Ministry of Agriculture, as a technical ministry, was left weak both in experience and in the number of experts left to undertake the technical advisory functions. By 1977, the number of extension staff was about 6,500 (TNAP, 1982, p.45) representing a ratio of one agent to 700 farm families.

The Extension Service After Decentralisation

After ten years of decentralisation the government decided to centralise the extension service and this coincided with the adoption of the Tanzanian National Agricultural Policy and its implementation. In the same period the government decided to revive the co-operative unions and local governments were re-introduced.

TABLE 6

DISTRIBUTION OF EXTENSION WORKERS AT REGION, DISTRICT AND VILLAGE IN 1988

Region	No. at Region	No. at District	No. at Villages	Total
Arusha	29	77	157	263
Dar-es-Salaam	26	30	107	163
Dodoma	17	55	155	227
Iringa	61	71	371	503
Kagera	29	54	272	355
Kigoma	11	20	211	242
Kilimanjaro	53	111	274	438
Lindi	34	35	85	154
Mara	15	91	80	186
Morogoro*	**56**	**102**	**204**	**362**
Mbeya	61	59	270	390
Mtwara	46	85	85	216
Mwanza	23	63	265	351
Pwani	26	45	124	125
Rukwa	44	32	118	194
Ruvuma	46	26	193	265
Shinyanga	27	92	194	313
Singida	31	21	146	198
Tabora	25	73	299	397
Tanga	43	65	235	347
	703	1,207	3,845	5,755

Source: Ministry of Agriculture and Livestock Development, Statistics for Extension Workers, 1988.

* Morogoro Region – where the study was carried out.

According to the Ministry of Agricultural and Livestock Development records, there was 5,755 extension workers posted at the region, district and village level by 1988 (see Table 6). However, the number of extension workers at the village level was only 3,845 representing an average ratio of one agent to 902 farm families. Supporting these findings, Moyo (1987, p.21), Msambichaka (1984), Mushokolwa (1984), and Edith Shayo (1989, pers.

comm.) comment that it was common to find that an extension worker was assigned two or more villages and even a whole ward. For example, in the Morogoro region there were about 465 villages and only 204 village extension workers in 1988, hence, each agent served more than two villages (Table 6).

Since Independence in 1961 the Ministry of Agriculture has undergone ten re-organisations and the extension service has been changed internally from one division or section to another on numerous occasions. The ministerial changes which have taken place are summarised in Table 7.

TABLE 7
CHANGES IN THE RESPONSIBILITIES OF THE MINISTRY OF AGRICULTURE 1960-1990

Up to 1960	Agriculture and Co-operative Development
1960 - 1962	Agriculture
1962 - 1966	Agriculture, Forestry and Wildlife
1966 - 1973	Agriculture, Food and Co-operatives
1973 - 1983	i Agriculture
1980 (March-November)	ii Natural Resources & Livestock Development
1980 December)	iii Livestock Development iv Agriculture
1983 - 1989	• Agriculture & Livestock Development (crop/ livestock research parastatals formed)
1989 (from February)	• Agriculture & Livestock Development (crop/ livestock research parastatals dissolved)

Source: MALD, 1987

These organisational changes greatly affected the set up and functioning of the agricultural and livestock extension services. Due to the continuous fall in agricultural production, in 1982 the Ministry of Agriculture formed a Task Force to review the performance of the agricultural sector. The Task Force report produced what was later known as the Tanzanian National Agricultural Policy (TNAP). The main objective of the TNAP was to achieve national food sufficiency, as well as sufficient agricultural output to meet the expanding needs of the industrial sector and to provide increased earnings

from export crops. The extension service in Tanzania has been criticised for being ineffective by many politicians in the country. Reviewing the agricultural situation in Tanzania, the National Agricultural Policy Task Force in 1982 in its report identified the major weaknesses of the extension service to include:

(i) Absence of an effective policy

(ii) Mis-allocation of manpower

(iii) Inadequate training and retraining of extension personnel

(iv) Lack of transport facilities for extension personnel

(v) Lack of technical packages suitable to differnet ecological zones to deliver to farmers

(vi) Lack of extension aids

(vii) Total demoralisation of extension staff

(viii) Lack of farmers' education

(ix) Absence of effective research-extension linkage

Since 1983 the Ministry of Agriculture and Livestock Development has started implementing some of the recommendations contained in the National Agricultural Policy. In order to make the agricultural extension service effective, the Ministry has already taken the following steps:

1. Re-organised the Ministry of Agricultural and Livestock Development in 1985 and 1989 (see Figure 4 for the current structure);

2. Unified the agricultural training, extension and research activities in the country;

3. Dissolved the crop and livestock parastatals which operated semi-autonomously to the parent ministry;

4. Actively involved Sokoine University of Agriculture in conducting research and extension activities in the villages to help advise the Ministry on appropriate extension models. The Institute of Continuing Education is carrying out this task by the implementation of the Sokoine Extension Project (SEP).The Sokoine Extension Project approach is discussed in Chapters III and VII.

5. Adoption and implementation of the recommendations contained in the Tanzanian National Agricultural Extension Rehabilitation Programme.

The Extension Rehabilitation Programme is a 20 year project which started in 1987. This project is being financed by the World Bank and it is intended to solve some of the extension problems. According to the MALD (1987, p.128), the objectives of the Extension Rehabilitation Programme include:

a) To provide an effective regional and crop specific extension organisation, co-ordination, management and supervision.

b) To correct inherent weaknesses in the current extension services, particularly those related to misallocation of manpower, inadequate training of extension personnel, lack of transport, housing, extension aids and technical packages.

c) To increase farmers' education so that they may be more receptive to technological changes and adoption of new farming practices.

d) To provide procedures for attaining an effective research-extension linkage.

The Ministry of Agriculture and Livestock Development and the World Bank through this Extension Rehabilitation Programme have set out to streamline the extension service as a system which will be more effective in disseminating knowledge to farmers. The Training and Visit System (T & V) is being used to carry out extension work (see Chapter IV for a critique on T & V).

The new organisation of the Ministry of Agriculture and Livestock Development and the extension service in Tanzania (see Figures 4 and 5) is a top-down,one-line command administrative machine from the headquarters in the Ministry of Agriculture and Livestock Development to the village level. The extension service is headed at the Ministry headquarters by the Commissioner of Agriculture and Livestock Development. Reporting to this

department are five Assistant Commissioners in Extension and Technical Services, Crop Development, Livestock Development, Crop Protection and Quarantine Services and Irrigation. At the regional level the extension service is under the Regional Agriculture and Livestock Development Officer (RALDO) who is an appointee of the Ministry of Agriculture and Livestock Development. Under the RALDO there are four officers responsible for Extension Services, Irrigation, Crop and Livestock development respectively. As a one-line command the regional officers give directives to the District Agriculture and Livestock Officers (DALDO). The DALDO for each district has three main section including the extension services, crop and livestock development. According to this organisational structure there is a Ward Extension Officer at the ward level and at the village level there is a Village Extension Workers who lives and works with farmers.

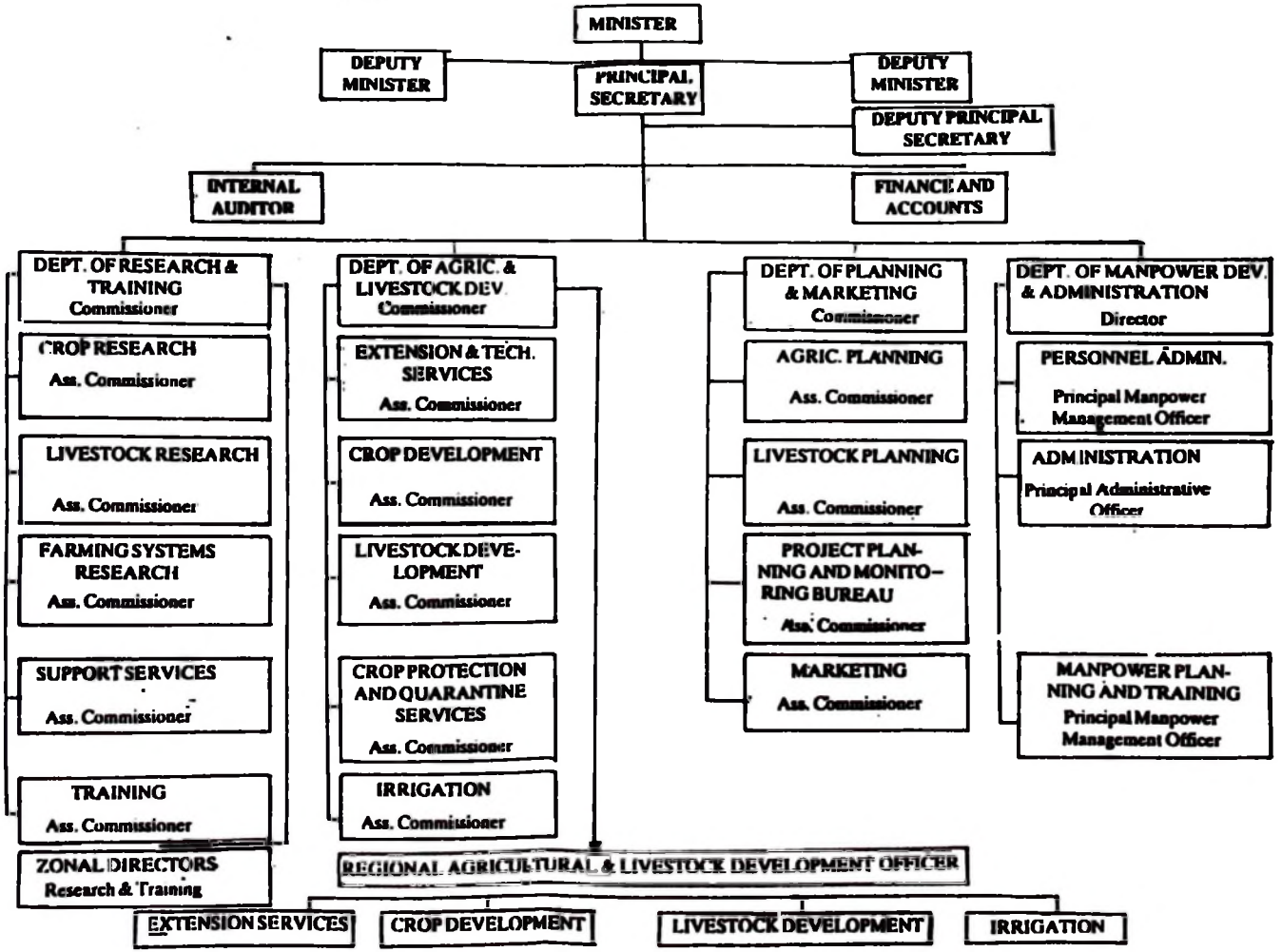


Figure 4: Organizational Structure of the Ministry of Agriculture and Livestock Development

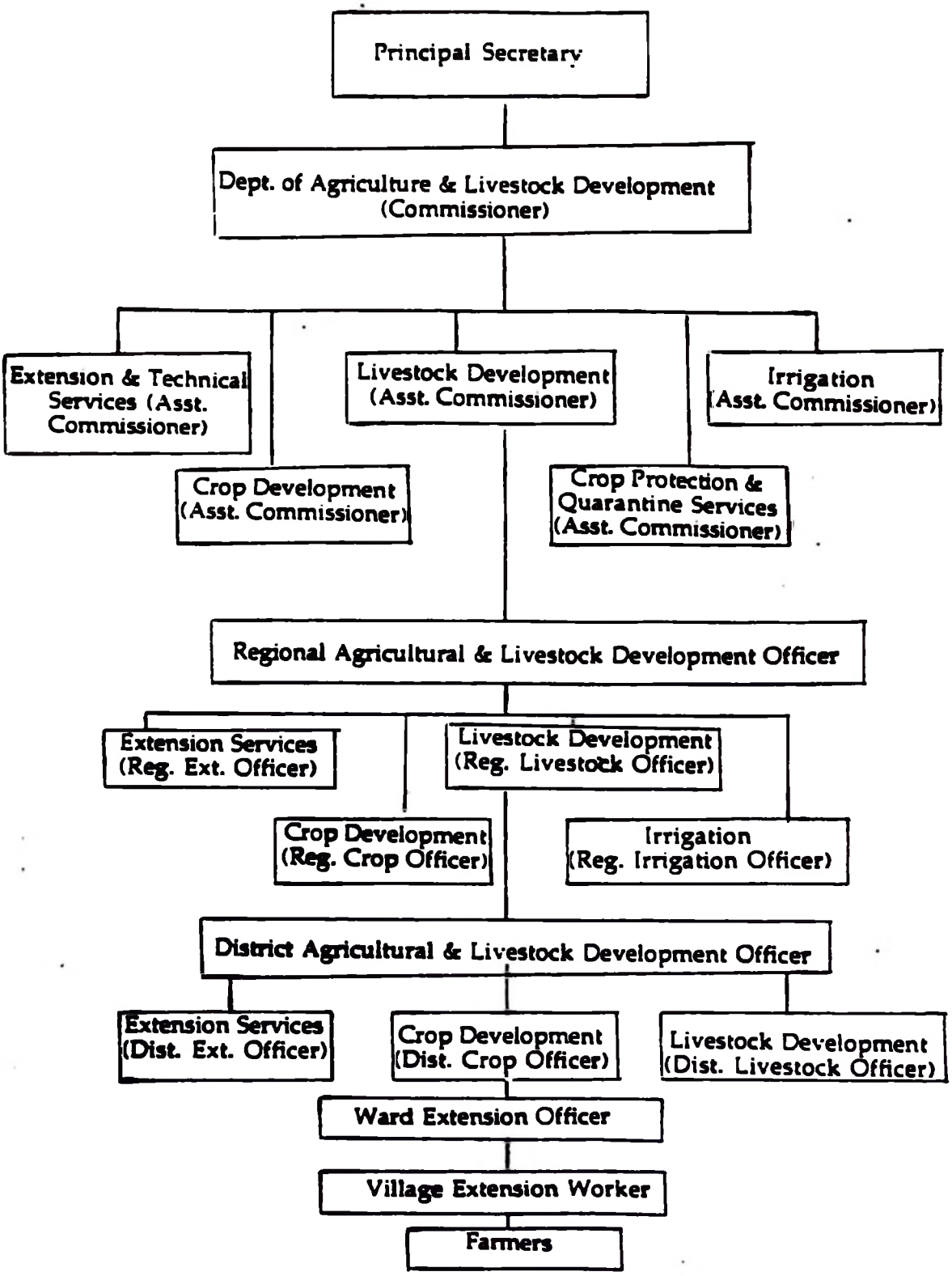


Figure 5: The Organisational Structure of the Extension Service in Tanzania

SECTION III: THE TRAINING OF EXTENSION WORKERS IN TANZANIA

The training of extension workers in Tanzania started after Independence in 1962 at the Ministry of Agriculture Training Institute at Ukiriguru and Tengeru. This task of training extension workers and the control of the extension service is the responsibility of the Ministry of Agriculture and Livestock Development. Farmers in rural areas depend on the village extension workers to provide them with information which can help improve their farming practices. The main source of these extension workers is the Ministry of Agriculture and Livestock Development. This Ministry trains its extension staff at the Ministry of Agriculture Training Institute (MATI) and Livestock Training Institute (LITI). The majority of these institutes are located in rural areas where they are surrounded by villages and share the same premises with an agricultural research station (see Table 5, page 25).

Many of these agricultural institutions have been operating for a period of over three decades. Despite this long existence, these agricultural institutions have had very little influence on farmers' agricultural practices. The training institutes have developed isolationism and have divorced their participants from the community. This criticism is widespread among farmers and leaders in Tanzania. It is true that the training of the graduates of these MATIs and LITIs is not targetted to meet the needs of the farmers in the villages. Discussing the training of extension workers in Tanzania, Lele (1975, p.73-74) stated that:

> Because of low level training ... of field agents and the deficiency in research support, the innovations have often been of dubious quality and relevance.

As stated earlier, the ratio of extension workers to farm families is still very high and the extension workers cannot practically visit all the farmers in their villages. There are currently 16 training institutes under the Ministry of Agriculture and Livestock Development offering certificate and diploma programmes (see Table 8). However, the output of these training institutes is very small. They are currently not operating under their full capacity and the total output per year is about 400 village extension workers while their capacity is set at 2,700 students. The quality of the graduates from these

institutes is disappointingly very low. The village extension workers lack practical skills, and training in the dissemination of improved agricultural technology. These extension personnel should have a sound technical training and must be able to demonstrate this among farmers in the villages where they work. An opportunity should be provided for field level extension personnel to improve their practical skills, knowledge and expertise needed to introduce improved agricultural practices. The pre-service training for the extension workers must be improved (Adams, 1982, p.14; Swanson, 1984, p.197; Keregero et al., 1988, p.75) to include knowledge of agriculture, management and communication skills. This requires a review of the existing syllabi. The current extension syllabus in MATIs and LITIs in Tanzania emphasises mainly technical subject matter in agriculture or livestock. For example, extension subjects are allocated only 110 hours in the first year and 70 hours in the second year certificate course out of a total 2,000 hours of instruction over the two years. Also, Keregero and Matee (1988, p.75) observed that only ten per cent of the class time is allocated to social science subjects as opposed to technical subjects. With these problems in extension training coupled with other problems such as poor selection criteria, lack of incentives, lack of administrative support and re-training programmes, it is difficult for extension workers to be motivated and carry out effectives extension work.

The selection criteria is the beginning of the weakness in the training of extension workers in Tanzania. Students who have completed four years of secondary school are selected for training in MATI/LITIs as future extension workers. This selection is done by the Ministry of Manpower Development in collaboration with the Ministry of Agriculture and Livestock Development. The criteria are based on (i) student's job preference as indicated in forms completed at the end of secondary school training; (ii) academic performance (passes in biology, chemistry, mathematics and geography, physics or agricultural science); (iii) recommendation by head master.

Personal experience in MATI/LITIs shows that many students selected do not meet the selection criteria and were not interested in agriculture. The selection criteria lay too much emphasis on academic qualifications and excluded well motivated graduates from active field work (Adams, 1982). Because the extension worker's job demands strong personal commitment, it

is important that only people with a real desire to go into extension should be encouraged. Therefore, the selection criteria need to be reviewed.

TABLE 8
AGRICULTURE AND LIVESTOCK TRAINING INSTITUTES IN TANZANIA

No.	Institute	Location	Training Offered
1	MATI-Tumbi	Tabora	Certificate
2	MATI-Mubondo	Kigoma	Certificate + short courses
3	MATI-Ilonga	Kilosa	Certificate + Diploma
4	MATI-Mtwara	Mtwara	Certificate
5	MATI-Maruku	Kagera	Certificate
6	MATI-Nyegezi	Mwanza	Certificate + Diploma
7	MATI-Ukiriguru	Mwanza	Certificate + Diploma
8	MATI-Mlingano	Tanga	Diploma
9	HORTI-Tengeru	Arusha	Diploma
10	UAC-Mbeya	Mbeya	Certificate + Diploma
11	LITI-Buhuri	Tanga	Farmers short courses
12	LITI-Tengeru	Arusha	Certificate + Diploma
13	LITI-Mpwapwa	Mpwapwa	Certificate
14	LITI-Temeke	Dar-es-Salaam	Certificate + Diploma
15	LITI-Morogoro	Morogoro	Certificate + Diploma
16	NAIC-Usa River	Arusha	Short courses

In addition, a diagnosis of the training of the extension workers in Tanzania reveals that there is no linkage between research, extension and training in the country despite the training institutes being in the same locality as these other services.

A major weakness also of the training institutes has been their lack of contact with villages and farmers. There was no emphasis on outreach programmes. It is reported in a recent study by Lugeye (1986) that it was after 1980 that more vigorous outreach programmes were introduced in the MATIs and LITIs. It is therefore important for the Ministry to look at the impact of these programmes on the farmers, training and research institutes and on field extension staff.

In-Service Training

This has been a major deficiency and weakness in the extension service in Tanzania. It is very common in Tanzania to find that extension workers who once trained in the MATI or LITI never go on refresher courses or seminars. The extension workers eventually become dissatisfied and their knowledge is out-dated. Personal experience working with village level extension staff shows that those who do not get the opportunity for attending in-service courses lose their competence and are ineffective. All extension service staff require a systematic in-service training programme. Adams (1982, p.20) emphasised this idea when he stated:

> The extension worker will be involved in many activities. He can not hope to retain all information gained during his training, much less keep up-to-date with new techniques. Thus extension departments must offer a regular series of courses, conferences and workshops for staff.

The Ministry of Agriculture and Livestock Development has from 1985 been encouraging training officers at regional and district extension offices to arrange for in-service training courses for their field staff. These courses should be carried out at the nearby agricultural or livestock training institute. The types of in-service training which were proposed by the Ministry included induction training, monthly meetings, seminars, non-residential courses or field days and farmer training. It is only through such training opportunities that the extension staff will be kept up-to-date with changes in the organisation, production and services for farmers as well as with research results in their area of interest. According to the data from the agricultural development offices at Morogoro and Kilosa districts, less than five per cent of the field staff are provided with in-service training in a year. This situation repeats itself in every other district in the country. In view of this weakness of the extension service in Tanzania,there are now many extension related projects (or rural development projects) that are interested in providing in-service training for their local extension staff. These projects include the Sokoine Extension Project (see Chapter III for a detailed coverage), the FAO Extension Training Project in Morogoro, the EEC-funded projects in the Southern Highlands and the Tanga Region Integrated Development Project just to mention a few. All these projects aim at improving the quality of the extension service by increasing the number of village extension workers who

go for in-service training. It is beyond the scope of this study to give an assessment of the impact of all of these projects.

Summary on Agricultural Research and Extension in Tanzania

The purpose of this chapter was to discuss the development of agricultural research, extension and the training of extension workers in Tanzania. The chapter has shown that agricultural research in Tanzania started more than seven decades ago. Agricultural research programmes in the country were commodity oriented aimed at solving problems facing the plantations or estate farmers. Before Independence there was virtually no research devoted to the raising of food crops. Agricultural research after Independence in 1961 put more emphasis on diversified crop production and integration of cash and food crops. During this period research was conducted on research station farms without involvement of the farmers. Working in this way agricultural researchers in Tanzania achieved very little of use and interest to the farming communities. Later in 1988, the Ministry of Agriculture and Livestock Development was re-organised for the tenth time since Independence in an effort to try and overcome the research problems. In the new organisation, agricultural research was targetted to focus on farmers in each ecological zone and emphasis was placed on both food and cash crops and livestock production.

The aim of agricultural extension in Tanzania is to disseminate improved techniques from research to farmers in order to increase agricultural production. The discussion in this chapter has revealed that the extension service in Tanzania was well established by the late 1950s. The main extension approaches used were top down in nature. The emphasis was on export crops and on progressive and well-to-do farmers who could readily follow extension advice. After Independence, a dual approach involving the improvement and transformation approaches were adopted where small farmers were encouraged to improve their farming methods and increase production. The Arusha Declaration in 1967 encouraged communal production and provision of services to farmers. Later in 1972, the decentralisation policy further reduced the impact of the extension service in the country by placing the extension service under the Prime Minister's office, parastatals and the Ministry of Agriculture. During this period the persuasive and dialogical models of extension were predominant. The period

between 1970 and 1988 experienced numerous policy announcements and organisational changes in the Ministry of Agriculture which greatly affected the agricultural and livestock extension services. The continuous fall in agricultural production prompted the formation of a Ministry of Agriculture Task Force in 1982 to review the performance of the agricultural sector in the country. The Task Force later in 1983 produced a report which formed the Tanzanian National Agricultural Policy. The policy identified a number of research and extension service weaknesses and made recommendations which are currently being implemented by the Ministry of Agriculture and Livestock Development.

Also discussed in this chapter has been the way training of extension workers is carried out in Tanzania. It has shown that there are many institutes involved in training extension workers but the quality is poor and the number of extension workers is still very low in relation to the number of farmers. The author also pointed out the weaknesses in the training programme for extension workers. It is against this background that the SEP (which is discussed in the following chapter) was initiated to address some of these problems.

CHAPTER III

THE SOKOINE UNIVERSITY EXTENSION DEMONSTRATION AND TRAINING PROJECT (SEP)

Introduction

> The major role of extension workers in Tanzania is to change farmers way of farming by introducing new ideas. An extension worker helps to increase farmers' productivity and improves their living standards. (TNAP, 1982)

Despite this statement, as already discussed in the previous chapter, the traditional extension service in Tanzania has been an ineffective government service. The extension approach is basically top-down in nature, with little or no effort made to involve farmers or village governments in the problem solving process. Consequently, very few farmers have had extension contact and neither have they changed their traditional agricultural practices. Food, cash crops and livestock production has continued to decline. It is against this background that the Sokoine University Extension Demonstration and Training (SEP) was started to assist in restructuring the extension service in the country.

The evolution of the Sokoine Extension Project (SEP) is discussed in this chapter. Why and how the Sokoine University of Agriculture at Morogoro got involved in this project is described. Also examined are the major aims of the project, its objectives, its operation and project strategy. Finally, the last part of the chapter focuses on the progress made in the implementation of SEP in the Morogoro region.

Early Contacts

In 1985 the Irish government, through the Higher Education Development Co-operation (HEDCO), sent a team of experts to meet with government officials of the United Republic of Tanzania. The HEDCO working party visited and held talks with officials at the Ministry of Agriculture and Livestock Development and at Sokoine University of Agriculture in Morogoro. During this visit, the HEDCO team identified the Institute of Continuing Education as a possible institution to develop links with a similar Irish institution. Hence, in 1986 the Head of the Department of Agricultural Extension from University College Dublin was asked by HEDCO

to make a follow-up visit to Sokoine University of Agriculture and meet staff at the Institute of Continuing Education. It was during this visit that agreement was reached between the two universities to develop a project proposal.

This proposal spelt out that the Institute of Continuing Education (ICE) and the Department of Agricultural Extension (DAE) would intervene with a co-operative programme of training for extension workers and of action research. The project aimed at supporting Sokoine University of Agriculture in strengthening the extension service at the grassroots level. Initially, it would involve twenty villages from Morogoro and Kilosa districts in the Morogoro Region. The project developed would then be funded by the Irish Government as part of Irish Bilateral Aid to the United Republic of Tanzania.

In 1987, the project proposal was presented by the Director of the Institute of Continuing Education and was accepted for funding by the Irish government. This project was later known as the Sokoine University Extension Demonstration and Training Project (SEP).

SEP is a collaborative research cum extension effort between the Department of Agricultural Extension at University College Dublin and the Institute of Continuing Education at Sokoine University of Agriculture. The project is based on a number of observations pertaining to the extension situation in Tanzania:

i) Extension and farmer education can be regarded as among the most important inputs into agricultural development;

ii) The performance of the extension service in the last decade has been very disappointing;

iii) The numerical strength of the extension service has been depleted seriously in recent years and available staff seem to be strongly oriented towards a regulatory rather than an educational approach to their work.

Aims of the Project

The major aims of the Sokoine Extension Project are divided into three categories:

(i) **Short Term Aim**

– to identify current operational problems and need support packages for the extension service in the project area.

(ii) **Medium Term Aims**

– to re-train village level extension staff in the 20 selected villages;

– to restructure and develop more effective operating procedures of the extension service, with emphasis on the development of good village development programmes;

– to train at postgraduate level Tanzanian staff who would perform key roles at middle management levels in the future revamping of the service.

(iii) **Long Term Aim**

– to develop a new effective extension system for Morogoro and Kilosa and to transfer this idea to other regions.

Consequently, if the extension service was to have the desired impact on Tanzanian agriculture, there was need for improvement in its structure, facilities and staffing. The extension staff would require considerable re-training and a more effective operational procedure must be developed (Reidy and Keregero, 1987). The project, which effectively started in January 1988 aims to up-grade the training and programmes of village level agricultural extension workers in the 20 selected villages in Kilosa and Morogoro districts of Tanzania. The training programme also has the aim of bringing the University, Extension Service and the Village Governments together in solving the food and cash crop production problems of village farm families.

The SEP Objectives

According to Reidy and Keregero (1987) the specific SEP objectives are stated as follows:

a) .To investigate the current extension system and identify its operational problems.

b) To make adjustments to the present extension service structure particularly in relation to the nature of the roles performed by extension officers at local and district levels.

c) To design and implement a staff development programme which would be appropriate for the revised roles of the extension officers.

d) To plan for long and short term village level development programmes.

e) To develop an appropriate package of extension methods.

f) To identify the support items necessary for the revised extension system in terms of transport, equipment, etc.

g) To continuously monitor, evaluate and adjust the extension system until an effective operating formula/model has been developed.

h) To make recommendations on the effective transfer of the operational formula developed in the pilot project to district, regional and national levels.

The Operational Structure of the Project

The Sokoine Extension Project is a comprehensive project which has simultaneous operations in three major task areas as follows:

(i) **Extension field work**
This includes the implementation of agreed development programmes with the villages.

(ii) **Re-training programme**
This is a continuous programme which enables village extension workers to acquire the expertise necessary to operate effectively in a revamped extension service.

(iii) **An on-going monitoring and evaluation programme**
It provides data on which the ultimate structure and operational procedures of the extension service will be based.

The co-ordination of these operations is very important in ensuring that the objectives of the project are achieved. The following was the design of the project being implemented in Morogoro. It consists of a project management committee, expert groups and a project manager.

The Project Management Committee

The responsibility of sequencing and integrating the above mentioned tasks was shared by the institutions involved through a project management committee. This committee consists of: the Director of the Institute of Continuing Education at Sokoine University of Agriculture; a nominee of University College Dublin; the Regional Agricultural and Livestock Development Officer for Morogoro; the Charge d'Affaires from the Embassy of Ireland in Tanzania; and the Project Manager.* This committee is the yardstick for all activities of the project and is responsible for the following:

1) Setting terms of reference, outlining general guidelines for the project and presenting an annual review to the funding agency;

* The project manager and counterpart from ICE became members of the management committee from March, 1989.

2) Defining and clarifying the revised roles to be performed by extension officers on the project;

3) Organising small expert groups to perform specific functions for the project in each task area in order to:
   - plan and implement suitable development programmes in co-operation with project villages
   - collect baseline data on village situations and people
   - establish on-going monitoring and review procedures.

4) Arranging the implementation of the project through the expert groups, the local extension service and the project manager.

This committee is required to meet at least twice a year at the Institute of Continuing Education. The Chairman for this committee is the Director of the Institute of Continuing Education.

Expert Groups

The expert groups were intended to create an environment in which the special expertise and experience of small numbers of people would be made available to the project. There were three different expert groups, namely, monitoring and evaluation, development and programming and in-service training. Each of these expert groups report annually to the Project Management Committee and give advice on key matters in its area of expertise.

Expert Group on Monitoring and Evaluation

This expert group consisted of interested people with expertise in monitoring and evaluation. Its members were two representatives of the two universities (UCD and SUA), the DALDOs for Kilosa and Morogoro and the Project Manager.

The group was responsible for arranging the collection of basic data on village people and situations. It emphasised an investigation into local resources and opportunities for development and how these relate to the local extension system. The data collected would be used as a basis from which to develop local extension programmes. It was the responsibility of this group to monitor on-going programmes, prepare an annual programme review and to assist the Project Management Committee in preparing an impact assessment on a small number of villages and the annual review of the project.

Expert Group on Development Programming

The members of this group included an appropriate staff member from UCD and ICE, the Project Manager and the DALDOs for Kilosa and Morogoro. This group was responsible for developing annual and long term (3-4 year) village development programmes which were implemented with the help of the village level extension workers. The activities performed during the implementation phase of these programmes formed a basis for the extension training curricula which was designed by the Expert Group on In-Service Training.

Expert Group on In-Service Training

This group was responsible for identifying training needs and developing curricula to meet these needs. Another major responsibility for this group was to brief and train an ICE training team which was responsible for implementing the training curricula. The group was also responsible for developing appropriate packages of extension materials and for presenting a review of the annual in-service training programme to the Project Management Committee. Members of this group consisted of an appropriate staff member from UCD and ICE, the Project Manager and the DALDOs for Kilosa and Morogoro. This group was expected to meet at least 4 times per year or once every three months after an in-service training module was completed.

The Project Manager/Extension Specialist

The Project Manager or Extension Specialist was a key figure in the successful implementation of the project in the villages. This person was required to have expertise in the areas of extension programming, data collection and analysis and in training and communications. The responsibilities of the project manager included to operate in a liaison position with the field staff and provide them with specialist support in data collection, programme implementation and evaluation, report preparation, linking with subject matter specialists and the preparation of extension packages. He was a member of each expert group and acted as a link between each group and the field staff. He reported to the Project Management Committee.

The Project Manager was to be appointed as a temporary staff member to the Department of Agricultural Extension at UCD and seconded to the

Sokoine University of Agriculture on a 2-3 year contract. The Institute of Continuing Education at SUA provided a counterpart to the Project Manager who acted as his understudy and worked hand-in-hand with him in order to ensure that the ICE would be able to build up the capability to manage the project. The Project Manager and the counterpart needed to work very closely with the local district extension officers in order to reorient the local extension service so that it operates more effectively with local communities.

The Sokoine Extension Project Strategy

The basic aim of the training programmes of the Sokoine Extension Project (SEP) has been to bring the University, the Extension Service and Village Governments together in solving the food and cash crop production problems of village households. The SEP strategy involved three logical steps. These steps addressed three main questions (see Figure 6) as follows:

(i) *What* is needed to be done? This question involved establishing, selecting facts, problems and causes of problems and implementing plans of action.

(ii) *Who* is to be involved in the project strategy? This question attempted to identify the various groups of people who needed to participate in the project.

(iii) What is the ultimate *goal* for the project? The project goal was made clear and known to all those involved in the project.

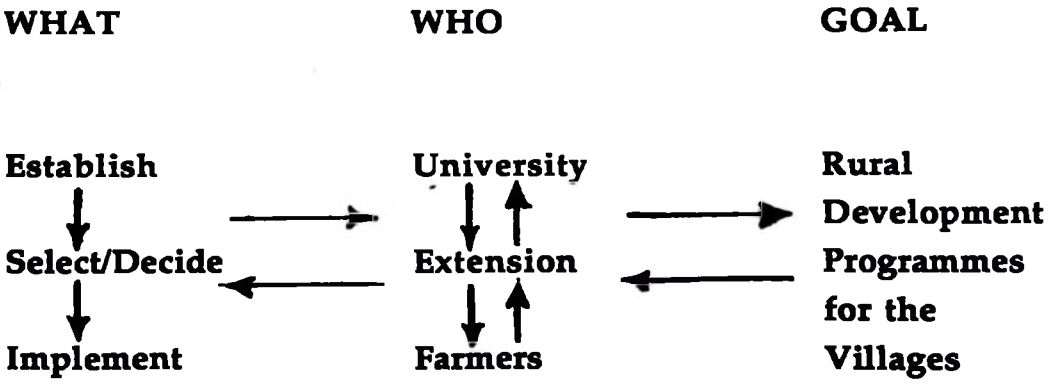


Figure 6: The Development Sequence of the Sokoine Extension Project Strategy.

The relationship between the three questions is presented in Figure 6. It suggests that the components of the SEP strategy start with what is to be

done and lead to who is to be involved and to the goal of the project and vice versa. In order to meet the project aims there is need for a logical step-by-step procedure to guide the development and implementation of the village programmes. According to the SEP strategy in Figure 6, the first step involves answering the question: what is needed to be done? This involves the following three main procedures.

1. The establishment of facts, problems and causes of problems related to the key factors and resources that can influence what needs to be done and can be done in the rural areas. According to the concept of needs for different situations and individuals we would consider what the farmer needs to know at a particular time. This stage involves asking and answering all questions about the key factors or resources in the village. These could include: the land and farm resources, people and skills available, village or district resources that could be exploited or developed, the financial resources available from both local and outside sources, and environmental factors such as markets, technology, transport, support services and government policy.

2. The second procedure was to select and decide on:
   i) The priority problems and target groups of farmers for the rural development projects. There are many problems which farmers and extension workers can identify but it is necessary to prioritise these problems and select which groups of farmers will be the target. Each category of farmers experience different kinds of problems in farming.
   ii) The possible solutions for these problems. It was not enough to select priority problems, but deciding on the possible solutions to these problems was equally important as well as whether the programmes to be developed are within the abilities of the project or the farmers.
   iii) The most suitable options for farmers in the area. The project strategy emphasised the importance of selecting suitable and workable options for farmers. This was a key to success in programme implementation.
   iv) Specific objectives for the project. The project or programme developed thereafter must be guided by very clear and specific objectives.

v) The plan of action needed to implement the project objectives. In each of these steps all the people concerned are involved. The plan of action was developed through these premises making sure that it focused on the project objectives. It is by involving farmers, extension workers and university project staff that a clear plan of action is reached which can be implemented by farmers.

3. The third procedure was to implement the agreed plan of action. It was advised to use procedures to monitor the progress of the project activities and to determine the impact of the rural development project in the villages.

The second question to be answered concerns ***who*** needs to be involved in the project. In the SEP, three groups of people were involved and these were the University (and other agricultural related institutions), the Extension service and the Farmers in the project area. Each of these groups were involved in answering the key questions related to ***what*** and determining the project activities that would bring about development in the villages. The ***goal*** of the SEP strategy was to promote agricultural activities that bring about development in the rural areas. The type of activities and development promoted depended on the choice and the participation of all relevant groups in the area. This ensured development of a strategy that was acceptable and could be implemented by a majority of the farmers.

In the Sokoine Extension Project, the specific skills and procedures followed in applying this strategy were developed through a series of workshops during the in-service training programmes. Also, the training programmes for the village extension workers were based on current problems that exist in the villages related to food and cash crop production. The strategy focused on technological packages and extension methods that enable the extension workers to help their village farmers to solve agreed priority problems.

One important feature of the project strategy was that the process of problems identification started at village level and followed a democratic procedure of discussion and decision making. An example of this problem analysis procedure is shown in Figure 7. It was used by the Farming Systems Research team at Ilonga Agricultural Research Station and extension workers in the project villages.

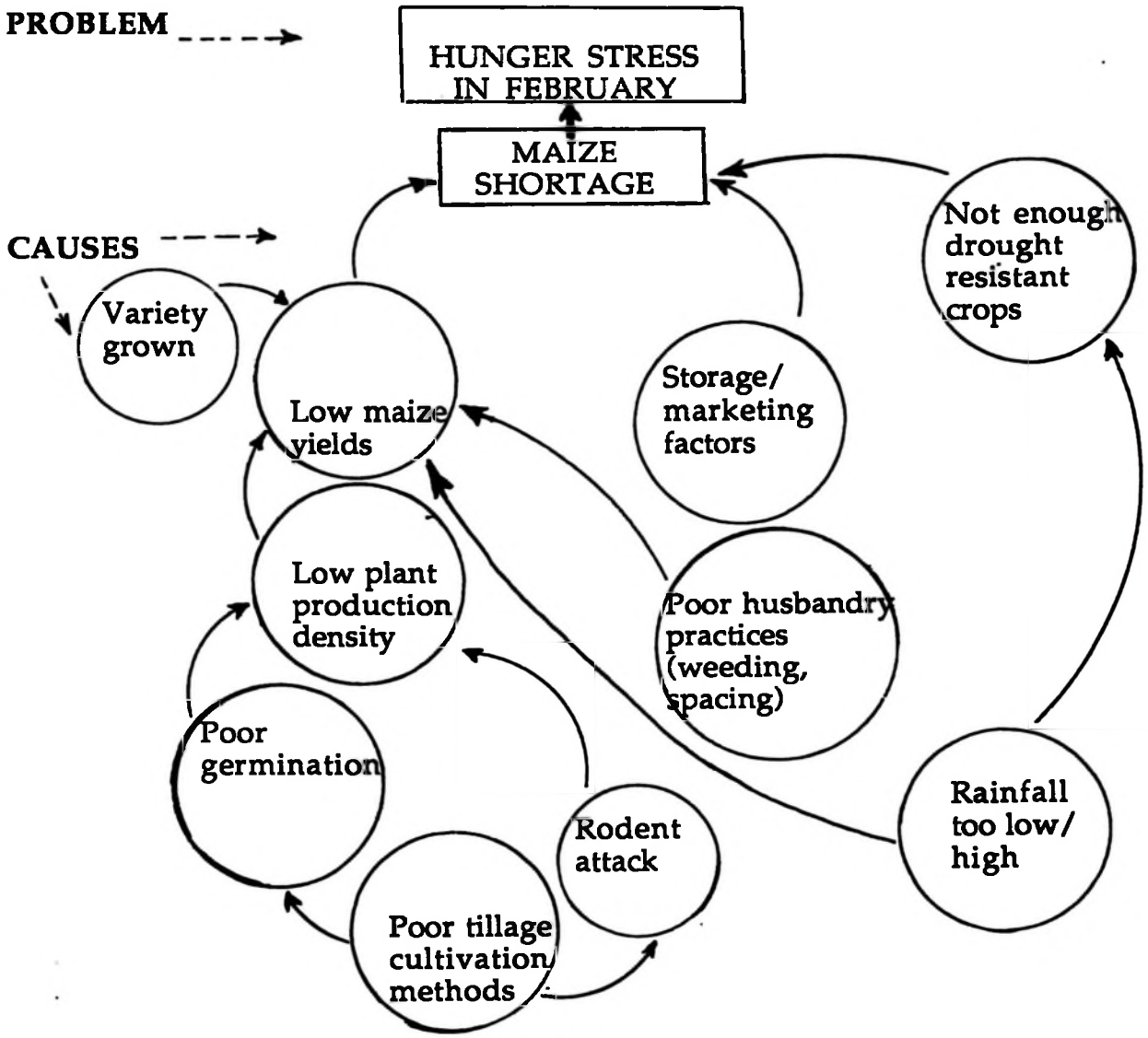


Figure 7: Problem analysis in the SEP involving farmers, research and extension workers.

In the above example, it was necessary to identify the major problem and the causes to this problem. The causes turned out to be many and prioritisation became necessary. It was important that the problems selected for attention in the initial period of the project should be of concern to a large number of farmers in the village. These problems should be those which which can be solved by technology and practices within the capacity of a majority of farmers. At the end of each training course/seminar the village extension workers were expected to have competencies in both the technical and extension methods needed to implement village programmes designed to solve causes of the problems. However, a major thrust of this project was

that the district extension staff in the project area should be fully involved and informed on the training projects. This would lead them to providing support and help to village extension workers in implementing their extension projects or programmes.

It is therefore right to emphasise that the overall programme strategy of the village extension workers in the project involves linking all the relevant agricultural sectors and organisations in an integrated research and action programme (Reidy and Keregero, 1987, p.7 and Mannion, 1989, p.1). Figure 8 shows the model of project participation of the institutions involved.

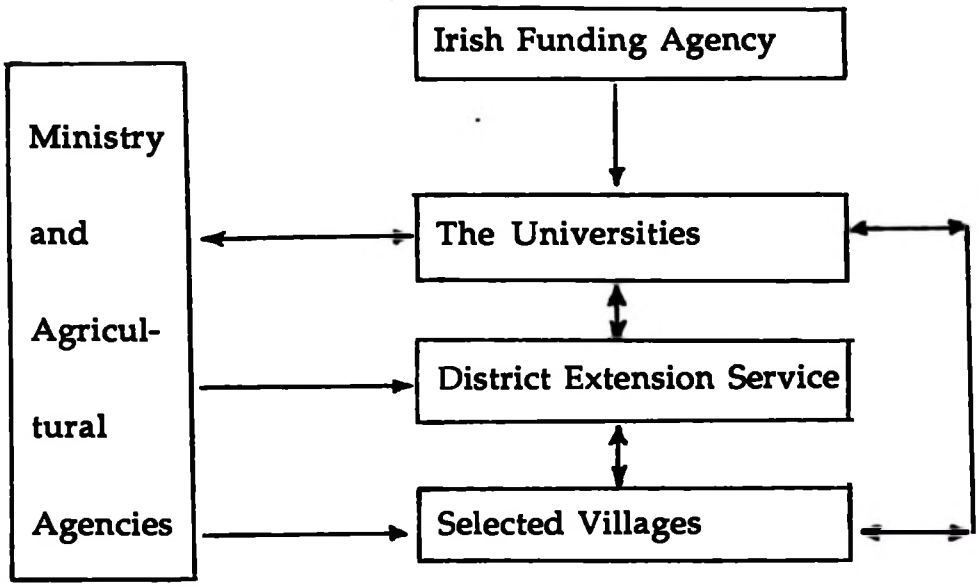


Figure 8: Model of the SEP Participation.

The Irish Funding Agency

The Irish input into the Sokoine Extension Project involved the provision of some basic facilities by way of transport and other support materials for the extension workers in the villages, districts and Sokoine University personnel. The Irish funding agency provided technical assistance and training for the village extension workers, district extension staff, Sokoine University personnel, village government leaders and farmers.

The Universities

The responsibility of both universities was to develop a model which elaborated fully the operational procedures of the project. Also it was their task to facilitate the implementation of the project by identifying the

problems to be solved, the resources required, the objectives to be achieved and to design long range and annual development programmes. Hence, it was important for the universities to develop a suitable framework within which all the institutions in the model could co-operate effectively in the operation of the project.

The District Extension Service

According to the model of project participation, the district extension services were responsible for selecting villages, providing one extension worker in each village, support for the extension workers, farmers and programmes developed for these villages. The district extension service also selected one officer to be responsible for all SEP related activities.

The Selected Villages

The village government leaders and farmers in the selected villages were involved in the development of all the village programmes. The village governments and leadership support in the project activities was a critical factor in the success of this project. There were 20 villages under the Sokoine Extension Project which were selected for the pilot project (see Table 9 and map, Appendix B).

According to the data in Table 9 it is evident that there was considerable variation among the number of households per village. It ranged from 105 in Msufini to 1,517 households in Mvomero village. Also, each village, on average, had more women than men in the workforce. The mean male workforce per village was 503 while the mean female workforce was 530. In general, each extension worker had a different set of problems to deal with for each village and this was reflected in the SEP village programmes and activities (see Table 11).

The Ministry and Other Institutions Dealing with Agriculture

The SEP success also depends on how it is linked with other institutions dealing with agriculture. These institutions assist in the provision of transport, appropriate innovations, inputs, supplies, equipment, markets, credits and incentives for farmers. It is therefore necessary that these various organisations (banks, co-operatives, extension service, SUA, etc.) are involved and know the programmes for the project and that such a network would serve as a springboard for disseminating agricultural innovations.

TABLE 9

DISTRICT, VILLAGES, HOUSEHOLDS AND WORKFORCE FOR SELECTED PROJECT VILLAGES

District	Project Villages	No. Households per Village	No. of Workforce	
			Male	Female
Morogoro	Mkindo	524	616	677
	Mbogo	366	455	394
	Dihombo	400	420	397
	Hembeti	544	296	311
	Msufini	105	161	167
	Mvomero	1517	1393	1410
	Dibamba	136	148	127
	Mgudeni	302	221	249
	Milama	313	296	277
	Makuyu	613	507	622
	Mlali	531	332	424
	Melela	765	785	815
Kilosa	Mkundi	279	187	178
	Magole	729	676	818
	Dumila	676	799	810
	Madudu	320	291	348
	Kitete	289	210	260
	Msowero	1040	874	991
	Mvumi	899	1103	1203
	Rudewa-Gongoni	320	290	127
	Mean	534	503	530

Source: Phelan, J. and P. Wims (1989)

The Sokoine Extension Project Progress and Activities

After about two years of SEP's (1987-1989) operation in Morogoro and Kilosa districts the following activities and programmes had been initiated.

1. Village extension workers' training needs survey was conducted. This data has been continuously used in deciding on curricula for the various training activities.

2. Village problem identification exercises and survey have been carried out in all twenty villages. The findings from these exercises have also been used to guide the content of the training courses for the village extension workers.

3. Orientation and briefing meetings have been held with resource people from the Sokoine University, agricultural research institutions and district extension staff. This is geared towards integrating the appropriate technology and extension methodology in the in-service training programme for the village extension workers.

4. Village government leaders have participated in two extension staff training courses held at the Institute of Continuing Education and have participated in many other non-residential courses held in the villages. The involvement of village leaders helped to get their views and support for the proposed village programmes.

5. Eight in-service training courses, each of two weeks duration have been conducted for the 20 project village extension workers and six regional and district extension service support staff. The course content was developed following the model in Figure 9.

From the information in Figure 9 it can be seen that the course content was designed as follows.

i) The identification of the Bwana Shambas' problems in advising farmers in the villages. This was accomplished by considering four factors: (a) the village extension workers training needs; (b) data from problem identification exercises and the survey carried out at the beginning of the SEP; (c) expert group recommendations on in-service training; and (d) the project manager's / counterpart's recommendations.

ii) The problems identified above are compared with the medium term project objectives, then a screening process takes place dropping some of the problems that do not meet these conditions.

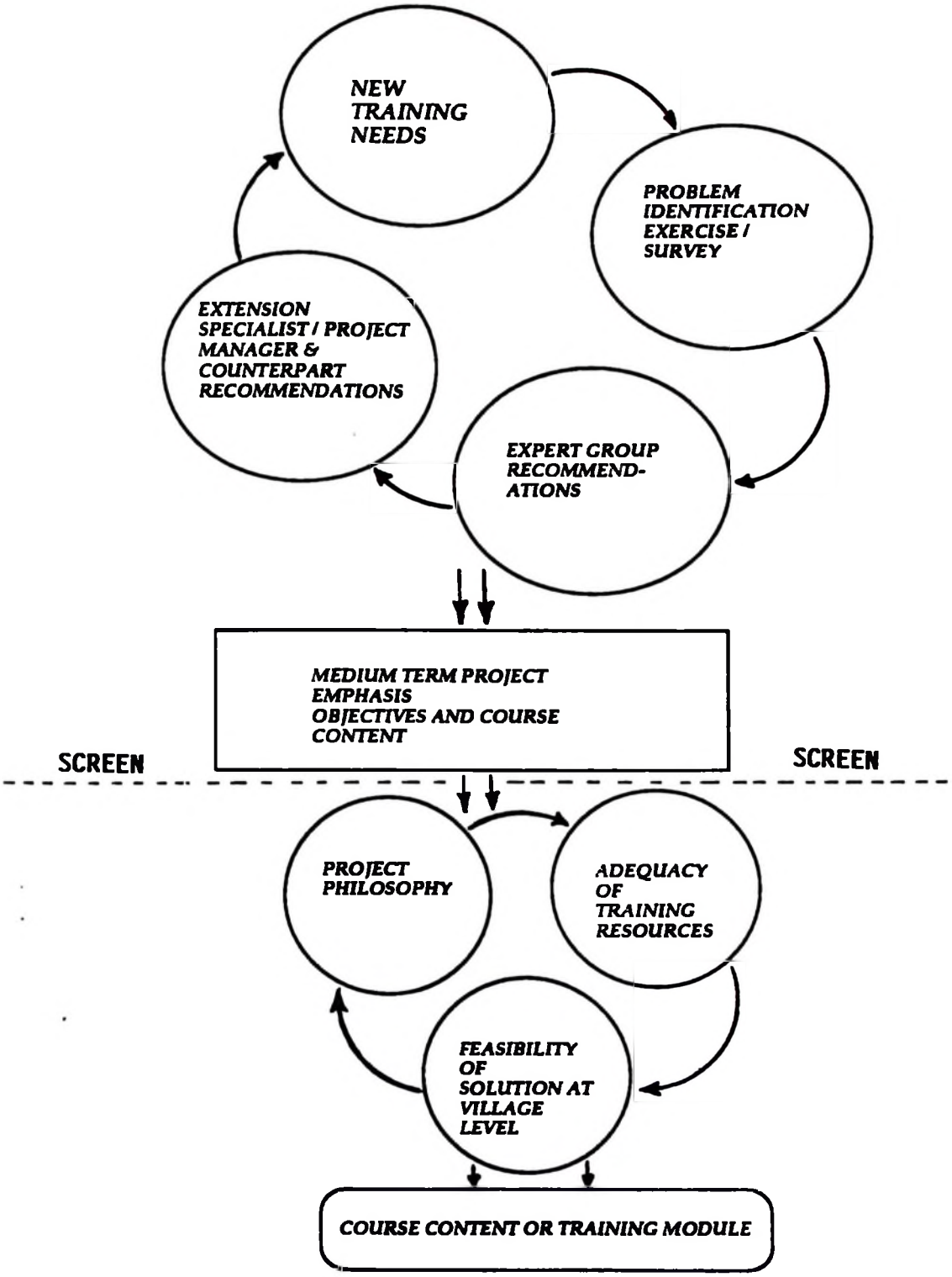


Figure 9: Model for Development of the Course Content (Training Module) under the SEP.

iii) In the next step, the problems and possible solutions are outlined to meet the project philosophy, adequacy of training resources and feasibility of the solutions at the village level.

iv) The problems and solutions that pass this stage then form the training module or the course content that was followed.

6. Twenty village agricultural development programmes dealing with priority village problems had been developed and implemented. The main focus of these programmes was on the improvement of food and cash crop production and storage practices. These programmes were developed to cater for the short and long rain seasons in Morogoro and Kilosa districts. In this project emphasis had been placed on the introduction and improvement of low cost crop production and post harvest practices. To achieve this goal more than ten centrally co-ordinated symposia and demonstrations were held at which all project villages were represented. The central themes of these events centred on post-harvest practices, composting, growing nitrogen-fixing plants, agro-forestry, oxenisation and oil (sunflower) extraction (see Table 11 for list of village programmes).

7. Staff development

Six key staff from the Institute of Continuing Education and the Morogoro Region Extension Service were completing postgraduate studies at the Department of Agricultural Extension, University College Dublin by the end of 1990. Also two other staff, one from the ICE and the other from the district extension service attended short term training in extension/visual aids at UCD.

Four Irish postgraduate students undertook short term research work under the project in Morogoro region. The Department of Agricultural Extension at UCD continued to participate in the VEW courses and project meetings at ICE. This exchange programme provided a good staff back-up at the Institute of Continuing Education. The information on staff developed for the first three years of the SEP project is summarised in Table 10.

TABLE 10
SUMMARY OF PARTICIPANTS IN THE STAFF DEVELOPMENT PROGRAMME OF THE SEP (1987-1990)

Name	Originating Institution	Course/Activity
Miraji Ngetti	ICE (SUA)	MAgrSc degree
Emmanuel Rwambali	DAEE (SUA)	MAgrSc degree
Edith Shayo	RALDO - Morogoro	MAgrSc degree
Omari Juma	DALDO - Morogoro	Short course
Emmanuel Mafipa	ICE (SUA)	Short course
Ian Achimpota	ICE (SUA)	Diploma Agr. Ext.
Naftalli Remtulla	RALDO - Morogoro	MAgrSc degree
Sizya Lugeye	ICE (SUA)	Ph.D degree
Prof. K.J.B. Keregero	ICE (SUA)	Consultancy
Martin Flatley	DAERD (UCD)	MAgrSc degree
Josephine Killalea	DAERD (UCD)	MAgrSc degree
Anne Markey	DAERD (UCD)	MAgrSc degree
Doirin Graham	DAERD (UCD)	MAgrSc degree
Dermot Linehan	DAERD (UCD)	Project Manager
Michael Kenny	DAERD (UCD)	Project Manager
Dr Jim Phelan	DAERD (UCD)	Consultancy
Dr Joe Mannion	DAERD (UCD)	Consultancy
Dr John Reidy	DAERD (UCD)	Consultancy

Key:

ICE	Institute of Continuing Education
DAEE	Department of Agricultural Education and Extension
RALDO	Regional Agriculture and Livestock Development Officer
DALDO	District Agriculture and Livestock Development Officer
DAERD	Department of Agribusiness, Extension and Rural Development
SUA	Sokoine University of Agriculture
UCD	University College Dublin

8. The SEP Village Micro-Projects

A major aim of the village micro-projects was to improve the food and cash crop production in the villages. In order to achieve this, seven different village micro-projects were initiated (see Table 12 for a list of these SEP micro-projects).

TABLE 11

SEP VILLAGE PROGRAMMES (1988/1989)

Programme Description	Major Problem Identified	Programme Objective	Villages Implementing the Programme
Increasing maize production in the short and long rainy periods following a proper timing of the rains and crop husbandry practices, spacing, weeding, harvesting	Food shortage in February due to low yields of maize	To increase the yields of maize from 8 to 22 bags (900-2000kg) per hectare in the long rains and from 400-1350kg for the short rain period	Hembeti, Msufini, Mvomero, Makuyu, Milama, Dibamba, Magole, Dumila, Mgudeni, Dihombo, Madudu, Msewero, Kitete, Mvumi, Rudewa-Gongoni, Mlali
Increasing rice production in the long rains by use of irrigation, high producing varieties and weed control by use of azolla	Low rice yields due to poor crop husbandry practices	To increase rice yields from 1100-2700kg/ha (12-30 bags)	Mkindo
Increasing cotton production in the long rains by following recommended practices	Low farm income generated from low cotton yields	To increase cotton yields from 700-1100 kg/ha	Mkundi, Magole, Mvumi, Mvomero, Dibamba, Hembeti, Melela, Msowero
Growing sunflower as a cash crop and the extraction of sunflower oil	Lack of cash crops to generate income for farmers	To increase the income of farmers from selling crops	Mbogo
Reducing losses of maize during storage	Loss of maize grain in the stores due to pest and rodent attacks. Farmers lose 4-5 bags per hectare harvested	To reduce maize crop losses due to pest damage after harvest	Madudu
Establishing agro-forestry nurseries for firewood and nitrogen fixing plants and trees	Lack of firewood and poor soil conditions	:To increase the amount of firewood for villagers :To improve the soil fertility using nitrogen fixing plants	Madudu, Milama, Rudewa-Gongoni, Melela
Improving the production and preservation methods of vegetables and citrus fruit crops	Loss of vegetables and citrus fruit crops due to poor production and preservation and marketing procedures	To improve the production and preservation methods of vegetables and citrus fruits	All 20 SEP villages

Source: ICE, Sokoine University of Agriculture, Morogoro, Tanzania, 1989.

TABLE 12

SEP VILLAGE MICRO-PROJECTS (1988-1989)

Low Cost Input Project	Year Started	Target Population	Village
Sunflower oil extraction	1988	Whole village	Mgudeni Mbogo Hembeti Msufini Makuyu Milama Mkundi Kitete Dihombo
Oxenisation	1988	Whole village	Mkundi Kitete Mvumi Dihombo Mbogo
Storage structures	1988	Whole village	All 20 SEP villages
Marejea	1989	Whole village	All 20 SEP villages
Leucaena	1989	Whole village	All 20 SEP villages
Azolla	1989	Whole village	Mkindo
Compost	1988	Whole village	Dumila Mududu Mvomero Rudewa Gongoni Melela Dibamba Magole

There were two or more projects in each village. The number of these projects depended on the enthusiasm and interest of the farmers and village extension workers in solving the village problems. As shown in Table 12, seven SEP village projects were implemented in the 1988/89 season. These included:

(i) *The sunflower oil extraction project*

This project was implemented by nine SEP villages. These villages were: Mgudeni, Mbogo, Hembeti, Msufini, Makuyu, Milama, Mkundi, Kitete and Dihombo. Bwana shambas in these villages encouraged farmers to grow sunflower. Also each of these villages was provided by the SEP with an oil press machine which was used by villagers for sunflower oil extraction. According to Bwana Shambas it was more profitable to grow sunflower for oil extraction than cotton.

ii) *Oxenisation micro-project*

One of the major problems in food production in Morogoro region is the lack of farm machinery. Tractors for hire are not readily available and the few available are costly. Hence, farmers cannot afford to pay for this service. Farmers in the Morogoro region also experience a lot of problems in carrying out cultivation and land preparation especially when they depend on the handhoe and scarce tractors. They cannot carry out timely farm operations. It was against this background that the SEP initiated the oxenisation micro-project. However, this was a new idea for the majority of the people in the region. They traditionally do not own and use livestock for cultivation. In the first two years of the SEP, five villages had expressed interest in trying the idea. These villages were Dihombo, Mbogo, Mkundi, Kitete and Mvumi. Each of these villages were provided with a team of oxen to train and use for cultivation.

According to the RALDO (pers. comm., 1989), this micro-project needed a great deal of encouragement and support. He projected a more difficult time for farmers in the coming years because the existing donor-assisted tractors were worn out and there was no further funding for the mechanisation project. The oxenisation micro-project was a low cost, intermediate technology project that was suitable in moving farmers from the handhoe to the tractor. This transition is necessary in the Morogoro region.

iii) *Storage structures*

The storage structures micro-project was started in 1988 and all twenty SEP villages participated. A number of symposia and seminars were held in the villages where farmers who had experience in using

these structures talked to other farmers. The aim of the storage micro-project was to promote traditional storage structures which farmers used before sacks (gunny bags) were introduced. According to the SEP experts, the use of traditional storage structures together with pesticides was an effective storage system for farmers.. The traditional structures used by farmers which received project support included: **Kihenge, Kilindo, Kibuyu** and **Chungu** (pot). The **Kihenge** and **Kilindo** were used for storing large amounts of grain while the **Kibuyu** and **Chungu** were suitable for small quantities of produce. These traditional structures when properly sealed are known to store grain for many years without pest or rat damage. In improving this indigenous technology, farmers were advised to mix the grain or produce with a recommended pesticide. Also, in order to control rats farmers were advised to use traditional methods such as keeping cats or putting the storage structures on raised platforms (see photograph in Figure 10).

iv) *Green manure plants*

This micro-project involved the growing of plants which could be used as sources of nitrogen. These plants are capable of fixing nitrogen in the soil, hence, improving the soil fertility. The green manure plants used were marejea, leucaena and azolla. The marejea, and leucaena plants were being grown as part of the agro-forestry programme for all the SEP villages which was begun in 1988. Azolla is a green plant mainly used in the rice fields. This mirco-project was a new idea in the Morogoro region which the village extension workers learned from a study tour to Zanzibar. It was been implemented on a pilot basis by Mkindo village from 1989.

v) *Compost micro-project*

A majority of villages in Morogoro region are involved in vegetable production either as a backyard garden or as a major enterprise. However, because fertilizers were expensive and sometimes delivered too late to the villages, farmers were advised to make compost at their homes. They were advised to use all kinds of waste from the home, chicken faeces, grass and food remains to make compost for their gardens. Interestingly, however, it was found that this was not a new idea to farmers as it was being used for growing

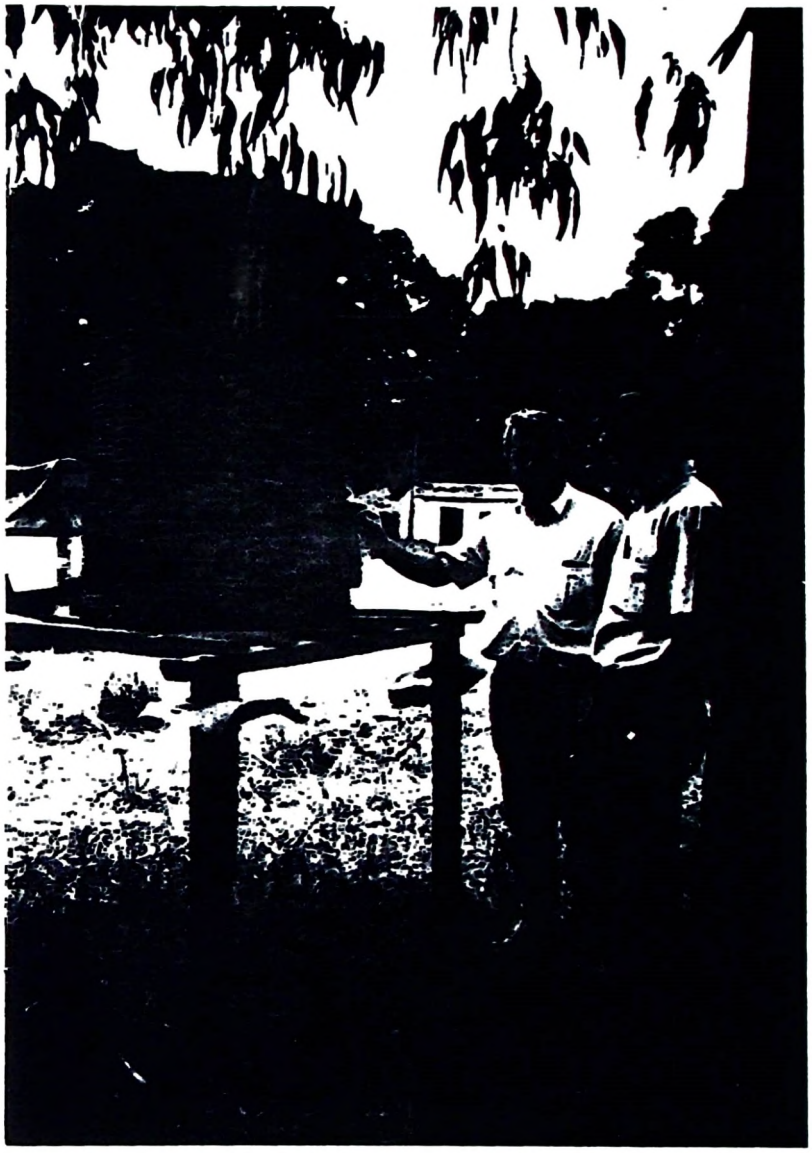


Figure 10: Kihenge for storing large quantities of gain.

plants at the homesteads and in their backyard gardens. The SEP villages which implemented this micro-project in 1988 as part of the SEP activities were Dumila, Madudu, Mvomero, Melela, Dibamba, Magole and Rudewa-Gongoni.

Summary

The purpose of this chapter was to describe the evolution of the Sokoine Extension Project, its aims, objectives and strategy. In this chapter, the author discussed why and how Sokoine University of Agriculture was involved in the project. The major role of the extension service of helping farmers to change their way of farming, increase farmers' productivity and improve their living standards has not been realised. The traditional extension service has been unable to reach the majority of farmers and they have not changed their traditional agricultural production practices. The food, cash crop and livestock production has continued to decline. This situation led to a wide criticism of the way the extension service is organised and functions, thus, it was classified as an ineffective government service.

The discussion in this chapter revealed that the Irish-Tanzanian contacts about assistance in agriculture and rural development started in 1985 and was finalised in 1987 by the acceptance of a project proposal which initiated the Sokoine Extension Project. The project developed was funded by the Irish government as part of Irish Bilateral Aid Programme to the United Republic of Tanzania. The major aims of the project were: to develop from the local situation an effective extension system by upgrading the extension workers through in-service training; demonstrating effectiveness of intensive extension programmes in accelerating agricultural development; providing the support necessary for effective performance of extension workers and co-operating with village governments, research, universities, the extension service and other agricultural institutions in solving the food and cash crop production problems of a majority of the farmers.

The SEP operational structures were important variables in meeting the tasks of the project. These structures included: the project management committee, expert groups, the project manager/counterpart, village extension workers, village governments and the universities. The SEP strategy was based on the Management and Marketing Approach (MMA) to extension. It involved three logistical steps addressing three main questions: What is to be

done? Who is to be involved? What is the ultimate goal? In answering these questions the project developed an integrated research and action programme. However, a major thrust of the SEP was the involvement and participation of all relevant institutions (i.e. Irish funding agency, the universities, district extension service, selected villages, the Ministry and other agricultural agencies) in solving the village problems.

After almost two years of project operation, 8 major SEP activities contributing to solving farmers' priority problems had been initiated and implemented. The project activities included:

- Survey of village extension workers' training needs,
- Survey and village problem identification,
- Orientation and briefing of resource personnel from SUA, research and extension service,
- Orientation and briefing of village government leaders on the project and its programmes,
- Eight in-service training courses conducted at ICE,
- Twenty village programmes developed and implemented,
- Staff development programme implemented,
- Seven village micro-projects developed and implemented.

The main purpose of this study was to assess the major aspects of the SEP approach to improving the extension service in Tanzania and ultimately determine its impact on the crop production at village level. This task formed the basis of the analysis of the study data which are presented in Chapter VII.

CHAPTER IV

THEORETICAL ORIENTATION

The Concept of Agricultural and Rural Development

Tanzania's problems are not unique to Africa; indeed, they are more the norm than the exception throughout the continent. In most developing countries, the government's policies are formulated to address the country's problems and to bring about development. However, to help put these problems in perspective and to appreciate more fully their implications it is necessary to understand their main causes.

The purpose of this chapter is to review relevant literature on development and the concepts of agricultural and rural development which were used in guiding this study. The main areas that will be covered are:

- Development, what does it mean?
- The concepts of agricultural and rural development,
- Issues and problems in developing countries,
- Models and approaches to agricultural and rural development.

Development: What Does it Mean?

Every nation strives after development. This is why it is difficult to come up with one definition. In order to understand development we take the notions proclaimed by Weitz (1986) and Oakley and Garforth (1985) that development is a type of social change in which new ideas are introduced into a social system in order to produce higher per capita incomes and levels of living through improved production methods and improved social organisation. Furthermore, it can be described as a gradual evolution, improvement or growth in the social, political, economic, environmental conditions of a state, region, district, city, village or rural people. A review of literature on development reveals that it is a process which has to deal with three elements, economic, social and human, together and not in isolation. The economic element involves the development of the productive base of any society which will produce the goals and materials required for life. In the social element, Seers (1981) and Oakley and Garforth (1985) include the provision of social amenities and services, education, water, health, welfare, etc. which care for the non-productive needs of a society. The human element (Nyerere, 1974) concerns the development of the people themselves

both individually and communally to realise their full potential, to use their skills and talents, and to play a constructive part in shaping their own society thus ensuring active participation of the people in the process of development. Seers (1981) concludes by asking three questions: (1) What has been happening to poverty? (2) What has been happening to unemployment? and (3) What has been happening to inequality? If all three of these have declined from high levels then beyond doubt there has been a period of development for the country concerned. Hence, Brehony (1989, p.26) outlined four key ingredients of development:

i) a change from an undesirable state of living to a more desirable state;
ii) freeing people to decide what priorities and values they want to pursue;
iii) affording opportunities for development to all people irrespective of their economic status, creed and colour;
iv) not only economic development of people or geographic areas but also cultural, social, political, personal and religious development.

However, in most developing countries, development depends on what happens with their agricultural sector and rural areas.

Agricultural and Rural Development

There are many definitions of the term agricultural or rural development. These definitions vary depending on the experts and specialists' field. For example, the economist, sociologist, geographer or agricultural expert would define rural development relating it to their own field. Since agriculture is the basis of the livelihood of the rural families in the developing countries, the concept of agricultural or rural development must therefore be considered with particular reference to agriculture. Agriculture is a vital part of the economy of many developing countries (Lele, 1985; Lea and Chaudhri, 1983) and its development is critical to the development of the country's economy as a whole. Agriculture's important role is one of production both of food for the rural and urban population and cash crops for the export market to earn foreign currency. In view of this, Lea and Chaudhri (1983, p.12) and Chambers (1983, p.147) defined agricultural/rural development to be:

> a strategy designed to improve the economic and social life of a specific group of people - the rural poor. It involves extending the benefits of development to the poorest among those who seek a livelihood in the rural areas. The group includes small-scale farmers, tenants and landless.

This means that the objectives of agricultural and rural development will have the following attributes:

i) To improve the living standards or 'well being' of the mass of the people by ensuring that they have security and their basic needs such as food, shelter, clothing and employment;

ii) To make rural areas more productive and less vulnerable to natural hazards, poverty and exploitation and to give them a beneficial relationship with other parts of the regional, national and international economy;

iii) To ensure that any development is self-sustaining and involves the mass of the people;

iv) To ensure as much local autonomy and as little disruption to traditional custom as possible.

Issues and Problems in the Developing Countries

Real development in the developing countries like Tanzania cannot be attained until the major problems affecting the people are solved. It is evident that the development situations in the Third World countries are complex and their problems consequently are multifaceted. Lele (1985, p.438), discussing the crucial role of peasant agriculture, noted that as in many parts of Asia, in Africa concern for economic development is primarily a concern about agricultural and rural development. There are between 80 and 90 per cent of people in Africa living in rural areas whose major preoccupation is agriculture. This situation repeats itself in many other developing countries. This means that the major problems facing these countries are related to agriculture. In this section we shall start by discussing the agriculture-related problems and later outline the non-agricultural issues influencing the development of these countries.

Problems of Agricultural Development

Adams (1982) and Bunting (1987) emphasised the importance of agriculture for the developing countries when they observed that development will depend on what is happening with the six functional components of its agricultural system (see Figure 11, adapted from Adams, 1982).

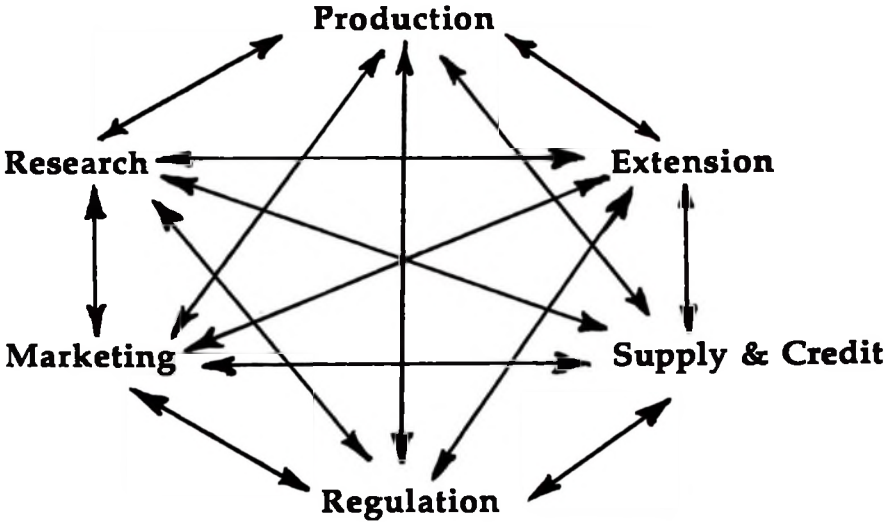


Figure 11: The Functional Components of an Agricultural System

In Figure 11 it is shown that six factors must be properly organised and coordinated in order to achieve agricultural or rural development. These factors are explained as follows:

1. **Production.** This is the production resource base for farmers. It includes farmers' farming system, their knowledge base, skills involved in farming and other related income generating activities. In the developing countries it can be stated that agricultural production is heavily dependent on the large numbers of small subsistence resource poor farmers. In Tanzania, for example, 80 per cent of the staple cereals and 70 per cent of exported crops are produced by small holders and the average yield of all crops is lower than accepted standards (Kyomo et al., 1987, p.63). There exists a wide gap between the levels of yields at research stations and at the farm level. This observation led Odhiambo (1988, p.31) to suggest that:

> Only when new technologies for sustainable agricultural production are adapted by resource poor farming households will the action affirm that research and development efforts have been worthwhile.

The outstanding characteristic of small-scale farmers in the developing countries is their low yields in each crop. This could be influenced by the quality and effectiveness of factors like land, labour, capital and technology. Similarly other factors contributing to low production include: low and unattractive prices offered for farmers' produce, lack of irrigation, insufficient selection of suitable crop varieties, large post-harvest losses, poor research-extension-farmers linkage, poor extension service coupled with poor supply of inputs especially seeds and fertilizers (Shao, 1987). The efforts should be geared to overcoming these constraints and to increase both total agricultural output and agricultural productivity. These increases can be achieved only if the economic structure of the farm, its technology, its physical layout and supporting system are all geared to breaking away from the prevailing low levels of agricultural production.

2. **Extension.** This includes all the activities that contribute to the transfer of knowledge in agriculture. There is need to have an extension system that strives at communicating knowledge, attitudes and skills that help farmers improve their standard of living. According to Bunting (1987) extension's task is to comprehend the social, economic and technical environment of the producers and their objectives, resources, existing methods and difficulties, to represent their needs to the administrative apparatus as well as the rest of the knowledge system and to help convey the products of that system to the producers. Because the extension worker becomes an active participant close to the frontline in the process of change in agriculture and in rural areas, the extension function has received world wide criticism (Rolls et al., 1986, p.14). However, Adams (1982) observed that agricultural extension should not be seen only in the context of increasing agricultural output. Extension is part of the effort to achieve a balanced social and economic development of rural areas. Despite this, most extension services in the developing countries have been categorised as ineffective organisations. These services are ineffective due to problems related to management, poor plans and programmes, extension training, leadership and lack of effective extension-research linkages (Adams, 1982; Russell, 1986; Axxin, 1987). Furthermore, most extension services in developing countries

were established by colonial powers based on western style conventional models. The extension workers in these services are government officials and professionals who should be trusted friends of the farmers, but they often find themselves forced to promote messages that are not best for the farmers. If extension is to be effective and successful it will have to take the interests of the clients as perceived by the clients themselves, as a point of departure (Haverkort et al., 1984). This situation has led the developing countries to turn to experimental sites for models which try to seek acceptable and effective extension approaches (see section on extension approaches p.80).

3. **Research.** This is the agency concerned with knowledge creation activities related to agriculture and rural development. Agricultural production can be substantially and efficiently increased by the application of modern science and technology. Many of the problems in the developing countries are related to food production and require increased research attention to basic food crops. The research efforts must consider who grows the food crops because in many countries women are the primary producers of the food crops and need to be involved in this process. However, one of the major problems in the developing countries is the lack of effective linkages between research and extension (Byerlee, 1988, p.21). These organisations are usually separated with extension in the Ministry of Agriculture and research in a parastatal organisation, but their complementarity is unavoidable and crucial to the development of agriculture. It is also important that research be farmer-based and allow farmer participation in the problem identification. Russell (1986) supports the farmer participation notion when he observed that extension and research programmes have to be designed with farmers, not for them, if we are to be certain they are relevant to their needs. To disregard the farmer is to guarantee that research and extension will be irrelevant. The farmer-scientist gap (Chambers et al., 1989, p.9) must be closed or we will remain in the situation one Nigerian farmer described in his own country: "This *scientist* is as distant to the *farmer*, who the scientist claims to be benefiting by his research, as the *moon* is from the *earth*". In view of this it has increasingly been recognised that resource-poor families have been less well served by agricultural research than the resource-rich farmers. This has led to a growth of changes in approaches of research and extension. Hence Chambers et al. (1989) remarked that the new modes of research should start with knowledge,

problem analysis and priorities of farmers and farm families. The farm and families should be made the main locus of all research programmes.

4. **Marketing.** This includes those agencies and services involved in the storage, transport, processing and sale of farm output. It is not surprising in the developing countries to see food crops abandoned or rotting by the roadside for lack of transport to market, while at the same time these crops are both scarce and expensive in a distant city. Watts (1984) claims that the marketing system often can be as significant to the welfare of the farm family as the efficiency or inefficiency of the production activities themselves. Also, it is true that one of the most important components of the marketing system is storage. Storage on the family level, district or large scale at national level in many nations is very poor. There is need to improve the storage methods and structures and supply of pesticides to reduce crop losses. Significant marketing problems for small farmers in some developing countries are caused by the unavailability of trucks and organisations able and willing to collect crops from villages or central collection points (godowns or stores). Processing is another important component of the output delivery system that can facilitate transport, storage and marketing and it can substantially lessen the burden on urban as well as rural people. However, one of the weaknesses in the marketing systems in the developing countries has been the unattractive low price for farmers' products. The prices given for farmers' crops and livestock products are too low to encourage increased production. Hence, many farmers in the developing countries see no point in growing cash crops without a definite market outlet.

5. **Credit and Supply of Inputs.** This refers to the supply of physical and financial farm inputs and other functional support organisations that enable farmers to develop their business. The supply of seeds, fertilisers, agricultural chemicals, machinery, repair parts and other inputs are critical to the success of an agricultural programme. It is a common phenomena in the developing countries to see delays of up to 6 months for inputs like fertilisers, seeds and farm implements. This type of delay and inability to provide the inputs is a serious disincentive for any agricultural programme (Watts, 1984).

An almost universal requirement in agricultural development is financing. Credit for farming operations is provided in a variety of ways including private money lenders or financial institutions such as banks or

government subsidised credit services. In many countries, the private money lender is preferred by small farmers maybe because their service is a handy, flexible, personalised source of credit and maybe more tolerant of local hardships from weather extremes than large and distant banks. Despite this, experience has shown that credit is available only to a few progressive farmers while most poor and small farmers (who are in real need) are not aware of its existence nor cannot qualify for credit even if they were informed. The existing structures of the agencies concerned with credit must be changed to include the majority of farmers who are the very poor, the small-scale farmer and, in particular, women.

The co-operatives have operated in Tanzania on a formal basis since 1925 and the concept of what a co-operative is has undergone a considerable change. The earlier co-operatives were owned by members who organised them on a voluntary basis and controlled them democratically. However, in the mid-1960s the government of Tanzania began to use co-operatives to implement its social as well as economic policies. This resulted in co-operatives being given monopoly power to perform nearly all of the marketing, input distribution and credit functions. Later, in 1976, these co-operatives were abolished by the government for reported malfunctions. The co-operatives were re-established by the government in 1984 (not by the farmers – a top-down approach) and their main duties were: (i) to sell and deliver needed inputs to primary societies; (ii) to market crops; and (iii) to provide credit to farmers. The Co-operative Rural Development Bank is the major source of village input loans. It provides loans to the co-operatives and they are in turn expected to provide credit to all types of farmers but this does not happen. Experience shows that many farmers are not involved in the co-operatives because they see them as government organisations and have no benefits to farmers.

6. **Regulation.** This is concerned with allocation of resources such as land schemes, grants, subsidies and price support services. It includes policies, mandates and funds for agricultural and rural development support services. Government policy in most developing countries is the main factor which affects the whole development process. These government policies need to emphasise investment in agriculture and this should be reflected in their annual budgets or national development plans. For example, in Tanzania agriculture received only about 9 per cent of government budgetary

spending (Kahama et al., 1985, p.334). This situation is not different from other developing countries. There are other policies that hinder progress in agriculture such as cheap food prices for urban people at the expense of low crop prices for farmers in the rural area, limited choices of cash crop to be grown, availability of credit and input supplies for farmers. All these policies are centrally prepared in favour of the policy makers and government without farmers' participation (the periphery). In many instances developing countries do not have any agricultural policies and when they do exist nobody follows them. Some countries rely heavily on directives and campaigns to address farmers problems but in general these turn out to be temporary measures and do not help the farmers in the long term. It is essential to point out here that these regulatory services need to be geared to encouraging higher production among farmers in the developing countries. Basically, this demands a shift in policy formulation and power from a centralised top-down approach to consultation with the masses; the planners and policy makers must cease telling the farmer what is good for him and instead listen and work with the farmers.

As agrued in the sections above, and as economic development proceeds there is greater specialisation of activities and there is a corresponding need to develop, expand and co-ordinate the six functions of an agricultural system. Commenting on this, Adams (1982) pointed out that a weakness in any one function or the essential linkages between them can hold back development of the whole agricultural system. For example, it would be pointless for a research station or an extension system to produce and promote a high yielding crop variety if there is no market or storage facilities to cope with its production. These six factors must all be working and complementing each other together with other non-agricultural factors which are outlined in the following sections.

Non-Agricultural Problems of Development

Development in the Third World countries is mainly influenced by the performance of their agricultural sectors. However, there are other intervening variables which can be categorised as non-agricultural factors that add to the existing agriculture-related problems. These factors include weather, poverty, income distribution, politics and the involvement of women in development.

Weather

Weather is an important factor in agricultural production over which no one has control. Shao (1987) noted that the most frequently quoted cause of low yields and overall low production is unreliable rainfall and/or poor distribution. Furthermore, Shao (1987) stated that failure of the farmer to adapt to the changing environmental conditions and also to adopt new techniques have greatly contributed to the low yields. However, the author is of the opinion that farmers are not to blame because it is the task of research to develop drought resistant varieties, develop irrigation systems that farmers can use in different weather conditions. In most developing countries the weather is unreliable and rainfall is either too much causing floods or too little leading to drought and resulting in loss of crops.

Poverty

There are many people in the developing countries who are poor because of a number of internal factors that affect their lives. In many countries people are poor because they do not have access to essential services like education, health, roads, water and good housing and therefore survive in poor living conditions. On average, Tadaro (1985) claimed that in Africa and Asia about 70-80 per cent of all target poverty groups are located in the rural areas as are about 70 per cent in Latin America. It is interesting to note that in developing countries government expenditure is still mainly directed to the urban areas. Another important generalisation about poverty is that it affects a disproportionate number of women. Hence, Tadaro (1985) remarked:

> Any policy designed to alleviate poverty must necessarily be directed to a large extent toward rural development in general and the agricultural sector in particular.

Income Distribution

The incomes of people in the developing countries are very low and unevenly distributed favouring the rich elite, manufacturing, commercial sectors and those in decision-making positions. The inequality in income among people leads to other groups becoming poorer. The only solution to this problem is positive government policies designed to help economic activities of the poor. This can be achieved by providing access to land, good price incentives for labour and agricultural products from small farmers and subsidising essential social services to the poor.

Political Environment

In the developing countries whose economies depend on agriculture, it is clear that to engage in rural development means to engage in agriculture. A poor agricultural sector leads to less food available for the people in the country. In most developing countries food policy is of paramount concern and it is too important to escape politics (Watts, 1984). If agriculture is perceived as a primary industry then it needs to be strongly supported by government policies. However, involvement of politicians in agriculture does not always have desirable effects. In Tanzania, for example, the party is supreme (Kahama et al., 1986) and politicians have been highly involved in mobilising farmers to improve their agricultural production through numerous campaigns and directives (Siasa ni Kilimo, Kilimo cha Kufa na Kupona, Kilimo cha Umwagiliaji, etc.)* The politicians issued directives without consultation with agricultural experts and the Ministry of Agriculture and Livestock Development. This confused farmers because some of the directives were contradictory to their local extension workers' advice and it left extension workers frustrated. Experience in Tanzania clearly suggests that the involvement of politicians in agricultural advisory work has not been complementary to existing research and extension service efforts (TNAP, 1982).

The political environment can also disturb a country's stability and farmers can fail to devote more time to farming. For example, the villigisation programme in Tanzania is known to have caused a reduction in agricultural production because farmers were moved away from their farms to areas not suitable for agriculture. The land tenure and farming system was disrupted and this is still a problem to date. The villagisation policy in Tanzania aimed at placing farmers in accessible areas with sufficient resources for production and where services could be easily provided. However, where such services, financial and technical assistance could not be supplied, farmers became more subsistent instead of increasing production (Yeager, 1982). In countries like Uganda, Sudan and Ethiopia, lack of political stability is the major cause of famines and poverty.

In Tanzania, the politicians also control the price for farmers' produce and farm inputs. The country's policies favour a cheap food policy suitable

* Siasa ni Kilimo - Politics is Agriculture; Kilimo cha Kufa na Kupona - Produce or perish / Agriculture as a matter of life or death; Kilimo cha Umwagiliaji - Irrigation agriculture (for details see a review of policies in Tanzania in Chapter I).

for the urban population. This policy leaves small farmers in rural areas poor because they cannot make a living from agriculture. With the pricing policy, governments have to be careful not to discourage farmers from producing. Where pricing has not kept up with inflation, farmers went back to subsistence rather than a cash economy (Raikes, 1986). It is therefore correct to state that the political environment is crucially important to the success or failure of any rural development effort. The political environment has to be supportive to changes and must allow research and extension and other relevant organisations to implement technological advancements without interference.

Involvement of Women in Agricultural Development

A major and often overlooked feature of the agriculture systems in developing countries is the crucial role played by women in agricultural production. It is estimated that women's labour produces almost half of the world's food (Farmar et al., 1988). In Africa, for example, three-quarters of agricultural work is done by women and they constitute half of the agricultural labour force in Asia. Food crops are their responsibility from sowing to eating. Women also do considerable work on 'men's' crops (cash crops) like coffee or tobacco, particularly in cultivation, weeding and harvesting. Men's work, on the other hand, is often limited to land clearing and ploughing. As with their domestic work, much of women's agricultural work tends to be overlooked because it is unpaid. Although the most essential needs of families and communities are met by women, their work is rarely recognised in economic terms. Subsistence agriculture, marketing and trading or the nutrition, health care and formation of a new generation are not considered nor rewarded in the country's economic statistics. Rural development should be based on growth with equity. This is an important focus and would require a full integration of women into the development programmes. This approach would include equitable access to land, water, inputs and services, agricultural education, training, credit and extension services, etc. Hence, Farmar et al. (1988) quoted the Food and Agricultural Organisation commenting on this issue:

> In the Third World agricultural productivity cannot be substantially increased nor can rural poverty be alleviated, unless women's access to the key productive resources and services is substantially improved.

The consequences of patriarchy for agricultural productivity are very expensive. Developing countries can not bear their heavy cost.

Therefore, given the major role played by women in production of agricultural output, whether in food crops or cash crops, it is imperative that women share in the improvements in labour productivity that arise as developing countries' agriculture undergoes a transition from subsistence to commercial and specialised farming. However, we believe that it is important in the future that we design programmes which would involve the participation of both men and women rather than any one of these groups in isolation. In a recent study on women's contribution to agricultural production in the Morogoro region, Tanzania, Killalea (1990) found that women had a dominant role in the households in relation to both agriculture and household maintenance. Women contributed 60 to 90 per cent of the labour involved in these tasks both for cash crops as well as food crops. Although women are the main producers it is mostly the men of the villages who take part in the agricultural education, learn new techniques and use the new tools and equipment that are provided by the government and through development aid programmes (URT, 1988, p.8). The planners and extension personnel have assumed that women would get extension information from their menfolk. In practice, however, this rarely has been achieved (Isinika et al., 1989).

Models and Approaches to Rural and Agricultural Development

For the last three decades many different approaches have been used to improve the different national agricultural extension systems. These approaches serve as alternative models in organising agricultural extension in the developing countries. In this section, eight extension approaches will be reviewed and analysed. The review will present an outline of the main features, objectives, organisation, advantages and limitations of these approaches with special reference to developing countries.

The Conventional Agricultural Extension Approach

The Conventional Approach is probably the most common and widely used model in many developing countries. It is normally run by a government ministry in a hierarchical structure from the headquarters, region, district and village. Directives and policies are usually issued from the headquarters of the ministry to be implemented at the lower levels.

• **Objectives:** There are three major objectives for the conventional agricultural extension approach and these include: (1) increasing agricultural production (food and cash crops and livestock production); (2) increasing farm incomes for farmers; and (3) improving the quality of life of the rural population. However, due to policy conflicts and conflicts between farmers and national objectives in operation, in many developing countries these general objectives are never attained.

• **Clients:** This approach aims at reaching all farmers in rural areas. In most countries it is difficult to reach all the rural population due to lack of well trained agricultural extension personnel and lack of transport facilities for extension workers. As a result of this, Swanson and Claar (1984) observed that instead of reaching all the farmers, target groups are identified. Contact or demonstration farmers and large or progressive farmers are the main clients for this approach.

• **Organisation:** For this model, the agricultural extension system generally operates out of the Ministry of Agriculture or a sectoral ministry (Adams, 1982; Swanson and Claar, 1984; Bunting, 1987; Weidemann, 1987). In some countries extension is organised by different ministries and there maybe separate extension organisations for forestry, livestock production, crop production and youth programmes.

• **Methods:** In general in the developing countries, extension workers concentrate on individual extension methods especially farm, home and office visits. Also there are some countries which use radio, meetings, bulletins and posters. Despite the great availability of extension methods, most village extension workers use only one method because they lack the materials and finances to invest in a variety of effective extension teaching methods.

• **Advantages:** The role of the extension worker is that of an educator and communicator of agricultural information that would lead farmers to increase production, incomes and their standard of living. The extension workers help identify farmers' problems and constraints and close the gap between researchers and farmers. It is clear that the role of the extension worker is very important, complex and diverse. This means that the extension worker must study the farmer's situation, analyse the problems and adopt a position which is relevant to solving those particular problems by closely working together with researchers and the farmers.

• **Limitations:** The extension worker under the conventional extension approach cannot perform their roles and achieve the objectives of the extension services in developing countries for a number of reasons.

– There is usually a conflict between the farmer and national objectives. Most governments pursue a cheap food policy for the urban population, but such a policy defeats the objective of increasing incomes for the rural people. It is therefore essential that the goals of national agricultural development be consistent with and supportive of the extension service and farmer objectives.

– Small farmers, women and young farmers receive little or no attention from both research and extension. The extension workers have a limited focus.

– There are multiple and role-conflict problems for extension workers. This leads to neglect of extension activities and instead extension workers carry out ministry programmes and activities. He/she becomes a government representative and policy implementor.

– There is duplication of organisation/service (two or more agents serving the same clientele) - thus the scarce resources and funds are sparcially distributed leaving no major impact.

– There is a weak supply and support service with no incentives, no in-service training, weak linkage between research and extension and no message to take to the farmers.

– It is a top-down approach with no farmer participation and is based on "have the technology - look for the farmer" model.

Agricultural Extension Organised by Universities

The United States of America has the most comprehensive example of an extension service which is organised by universities. In this system the extension service is a co-operative effort among federal, state and local governments using the land-grant universities. India and The Phillipines are some of the countries that have adopted this model. The extension service is organised outside the regular government bureaucracy and it relies on research to identify and solve problems.

• **Objectives:** The primary goal is to conduct educational programmes in selected subject matter areas to help clientele solve their problems. The specific objectives of this approach include:

– improving efficiency of agricultural production, farm incomes and rural life,

– high production of farm and ranch outputs,
– working with youth, the home and family, and
– enhancing the environment and the use of natural resources.

• **Clientele:** Includes all people who are interested in the subject matter. The audiences are targeted for each type of programme, for example, home economics, youth work or home horticulture. The extension service also co-operates with many other organisations and firms which are involved with providing services to agriculture.

• **Organisation:** In this model the extension system is organised at the state level under a land grant university and all extension personnel are staff members of the university. The extension personnel under this model include extension workers and assistants (or para-professionals) at the local level, subject matter specialists at the state level, administrative and supervisory personnel at the state and regional levels. The subject matter specialists usually have joint appointments in either teaching or research and sometimes including extension. In this model the local and county clientele are included in financial and all operational processes of the extension programme (e.g. selecting personnel and evaluation of personnel performance).

• **Method:** It is educational and relies on research to help people identify and solve problems. This approach uses extension advisory groups to determine major problems to be given priority each year. There are a variety of teaching methods used and they include lectures, discussion group, computers, distance learning systems, mass media, visual aids, meetings, demonstrations and tours. The approach is clientele-oriented and stresses a bottom-up process.

• **Advantages:** Such an approach plays an important function of coordinating and developmental role especially by working in co-operation with input supplies who in turn produce products more appropriate to farmer needs. The approach involves local and county personnel in selection and evaluation of the extension programmes. It is autonomous from political forces hence concentrates on locally relevant extension activities.

• **Limitations:** This approach has not been adopted by many developing countries because it requires a country to have well established universities before introducing the extension service. In most developing countries, they have a shortage of extension personnel and their agricultural universities are fairly young and few in number. These universities do not have sufficient

status and funds to link research with a dynamic extension service in the surrounding communities (Adams, 1982).

Commodity Development and Production System

The extension function of this approach is well integrated with other aspects of technology transfer such as input supply and other agricultural services, and has good links with researchers and farmers. The commodity approach focuses on an individual commodity and is characterised as a vertically integrated system. In the commodity approach a parastatal usually controls technology development, transfer and marketing process.

•**Objectives:** The commodity extension approach aims at producing and marketing high quality commodities efficiently and effectively. The commodities are mainly produced for export and sometimes for domestic consumption. In the successful cases the farmers are encouraged to participate by profit sharing which increases their farm incomes and re-investment in the technology development and transfer.

•**Clientele:** This extension approach usually deals with selected farmers in a particular ecological zone of a country. It focuses only on the farmers growing that particular crop, for example, coffee, tea, tobacco or cotton.

•**Organisation:** The commodity extension approach is normally directed towards a single commodity. The technology development, transfer and marketing functions are usually handled by a parastatal body. The parastatal also provides research, extension and input supply and credit facilities to farmers.

•**Methods:** In this approach quality control of the products is critical and extension agents frequently provide technical advice and inputs simultaneously. This approach is sometimes known as contract extension because the farmers have a contract to produce the crop using the recommended practices. The responsibility of the parastatal organisation in this contract is to buy the crop at a specified price.

•**Advantages:** The commodity extension approach has the following benefits:

- the extension message (technical recommendations), inputs supply and other agricultural services are closely related to the commodity system,
- the extension worker specialises in one commodity,
- the farmers receive advice more promptly,
- it generates foreign exchange by selling the crops promoted.

• **Limitations:** This approach has a narrow focus as it deals with one commodity. By following this approach a few farmers as reached and only in a specific area. In the commodity approach farmers have no choice but are expected to follow prescribed recommendations. In contract extension such as practiced in the commodity approach, farmers can be exploited by the system and it can lead to reduced output.

Management and Marketing Approach

According to Mannion (1989, p.4), the Management and Marketing Approach (MMA) has been successfully used in the development of both agricultural and rural development projects in Austria, Yugoslavia, Poland and East Africa. Its basic philosophy is derived from experiences in Ireland. This approach involves an analysis of the village (its on-farm and off-farm opportunities and constraints), identification of problems, causes and possible solutions. It identifies precise statements of what action can be taken to solve these problems and must reflect resources of farm families and rural communities as well as support services.

• The main feature of this approach is to 'sell information' that farmers can use. This means providing information that is saleable to the target groups. The extension workers' role is to determine the rural community's needs and develop information or advice to meet these needs. It is important under this approach to select target areas and groups of farmers, setting objectives together with clients and development plans of action or strategy that can be used for implementation and evaluation of the rural development project. The involvement and participation of villagers (target groups) in all stages of the programmes and projects is emphasised. The people are involved in the identification, prioritisation, selection and design of possible solutions to the problems and implementation of programmes to solve the causes of agreed priority problems. The advantages and limitations of this approach will be presented in the following chapters.

The Training and Visit System

The Training and Visit System (T&V) is an attempt to improve the effectiveness of the conventional extension organisation in developing countries. This approach is being promoted by the World Bank and has been introduced to over 40 developing countries (Weidemann, 1987). It is an

attempt to develop a relatively low cost but effective extension system by making use of available resources. The T&V system involves a continuous training and frequent visits by extension staff, supervision, and continuous up-grading of staff, comprehensive monitoring and evaluation and minimal office and paper work for the extension staff. The village extension workers receive regular training, supervision and support by the subject matter specialists. A major characteristic of this system is that the village extension workers adhere to a strict village visitation schedule and advise groups of contact farmers on specific agricultural practices. The contact farmers are expected to serve as examples to other farmers and to pass on the information from the village extension workers to other farmers in the group or village.

•**Objectives:** T&V has similar objectives to the conventional extension system. Its primary objective is to increase the individual farmer's farm production and incomes of rural people. As a reform system from the conventional extension model, other purposes and problems it attempts to solve include:

i) to improve the technical support and control of the extension workers and their activities – a single and direct line of command is established (Van den Ban and Hawkins, 1988);

ii) a single-purpose role for extension workers is instituted to deal with education and communication activities;

iii) to improve the ratio of farmers/extension workers to about 800:1 by concentrating on contact farmers;

iv) to improve mobility by providing transport facilities to each extension worker;

v) to provide regular in-service training sessions which will improve the technical skills of the extension workers;

vi) to improve the links between research, extension and farmers' problems and ensure that there is a continuous flow of information between these groups;

vii) to improve the status of extension workers by clearly defining the job and having reasonable expectations from their work.

•**Clientele:** The T&V system is designed to reach a larger number of farmers in an area but in practice has shown to have a specific focus (or audience) on contact farmers in each village. The contact farmers normally represent 10

per cent of farmers in a village. The extension workers are instructed to select contact farmers who are representative of the major groups of farmers in the villages (Swanson et al., 1984).

•**Organisation:** Like the conventional extension system, the T&V system is usually organised within the Ministry of Agriculture. It is a top-down rigid approach with its structure starting from the national level or the Ministry of Agriculture to the regions, district and village level. There are subject matter specialists who provide regular in-service training for the village extension workers. Similarly, the extension officers meet with the village extension workers every two weeks to discuss organisational administrative matters. Every month the subject matter specialists meet research workers to discuss agricultural production problems for the following month. There are strict schedules to be observed with continuous monitoring and evaluation. The village extension workers relay the prescribed message to the contact farmers who in turn transmit this message to specific groups of farmers in their village.

•**Role of Extension Workers:** The Training and Visit system revolves around rigid fortnightly visits to contact farmers on a fixed schedule known to farmers, supervisory and technical staff (see Table 13 for a typical timetable for a village extension worker). The extension worker visits four groups of contact farmers in the first week and the remaining four in the second week.

TABLE 13
A TYPICAL TIMETABLE FOR T & V EXTENSION STAFF

Days	Mon	Tue	Wed	Thu	Fri	Sat	Mon	Tue	Wed	Thu	Fri	Sat
Groups	1	2	3	4	EV OW	T_1	5	6	7	8	EV OW	T_2

(Sunday = holiday)
EV = Extra visit
OW = Office work
T_1 = Training (first)
T_2 = Training (second)

Under the T&V system the village extension worker receives one day's training each week. The focus of this system is on transferring low cost and low risk technology to farmers. During each week the extension worker is required to keep a daily diary recording the contact farmers visited, training

imparted, problems encountered, recommendations made and any other important observations. This record provides issues and problems to be discussed during the weekly training sessions.

•**Problems:** The Training and Visit system has widely been criticised for inherent weaknesses some of which include:

i) Representativeness of contact farmers - a key assumption of the T&V system is that the best adviser for a farmer is another farmer. However, experience has shown that extension messages very often do not diffuse from farmers with close extension worker contact to other farmers. One important reason for this failure of the demonstration effect or trickle-down diffusion is that farmers selected for close extension contact are seen by neighbours as wealthy and well able to bear risks and are receiving special treatment from the extension workers. Hence, Van den Ban and Hawkins (1988, p.284) observed that contact farmers or opinion leaders are usually not representative of all farmers in the community, or even of the farmers of their own caste or social group. We therefore generalise that T&V cannot always depend upon a demonstration or trickle-down diffusion from contact farmers to others.

ii) T&V is too top-down oriented and does not allow farmer participation in programme planning. This approach relies on prescriptions given by subject matter specialists during in-service training which the village extension worker is supposed to relay to farmers without any modification.

iii) This system has a very rigid visiting and training schedule which most farmers and extension workers fail to integrate into their life styles.

iv) T&V can be very expensive to implement because it is too labour intensive, and requires a large number of extension workers which most developing countries cannot afford. From their experience, Van den Ban and Hawkins (1988) claimed that the cost of the system maybe too high for some countries, especially where it is expensive to reach farmers because of their scattered or remote locations.

v) To reform existing extension organisations in the developing countries is difficult. In most developing countries it is difficult to change attitudes and procedures in the extension service which have developed over generations. Change of established procedures such as promotions will cause resistance because changes for the extension service may have implications for the civil service in a country. By T&V advocating changes in the Ministry of

Agriculture (or extension and research) alone, it re-affirms its unsustainability after funding by the World Bank ends.

Farming System Research (FSR)

Farming System Research is a strategy designed to respond to needs of a specific target group of farmers. It is research that views the farm in holistic manner and considers the interactions in the system. According to Flora (1983), FSR is an inter-disciplinary approach to problem identification which is aimed at increasing the agricultural welfare of the farm family by understanding the whole farm in a comprehensive manner. This approach tries to systematically understand the complexity of the total farming system (Chambers and Jiggins, 1986). These systems may include the farm household and its needs, objectives and biological, economic and human dimensions. The FSR (Denning, 1985) requires researchers to examine more closely the components of a farming system and their interactions, to identify constraints to, and opportunity for, increased farm productivity and to design, test and evaluate technical innovations under actual farm conditions. The farmer, the farm and the surrounding physical biological and socio-economic environments become the foci of research efforts.

By design, FSR involves the interactions of researchers and farmers in tackling problems of high priority to farmers (Acker and Sungusia, 1985). Farming System Research represents a shift in emphasis away from the research stations to on-farm research with active farmer participation. The main features of FSR can be summarised to include:

- a holistic approach to the farm,
- a direct farmer participation,
- use of appropriate technology,
- a multidisclipinary collaboration of agricultural scientists, social scientists in a team effort,
- selection of target groups and research area, and
- on-farm research and analysis.

The concepts, forming the basis of this approach were crystalised in 1975 and a methodology was outlined to allow its implementation. Furthermore, the methodology has been refined in the course of demonstrations on the approach to interested National Agricultural Research Programmes by CIMMYT Regional Economics Programmes operating in the Andes, Eastern Africa, Central America and the Indian sub-continent (Collinson, 1981, p.435).

•**Objectives:** The FSR approach can have many objectives. The major objectives, however, are as follows.

i) To increase productivity of farming systems by generating appropriate technology. A research process involving collaboration among scientists as well as between scientists and farmers is essential for rapid development of technologies that are appropriate to farmers' circumstances and that help to meet national goals.

ii) FSR complements on-station research by identifying farm problems which need investigation both on and off-station and by adapting technologies developed on station to the conditions of farmers.

iii) The FSR approach involves the interaction of researchers and farmers in tackling problems of high priority to the farmers.

•**Advantages:** FSR has the following advantages.

i) It ensures that a socio-economic perspective is considered in the diagnostic process of identifying constraints and opportunities at the farm level. Also, it allows an understanding of how and why the farmer, in managing several enterprises, makes compromises on the optimum technical management of any one enterprise.

ii) FSR ensures adherence to conditions of farmer reality when reviewing new technology design especially by on-farm experimentation using farmer resources. This approach allows the application of wider, more relevant, productivity criteria in the design of new technology than the limited criterion of physical yield per unit of land area beloved of classical agricultural research (Collinson, 1981).

iii) It caters for a diversity of small farmer situations - season, rainfall pattern, marketing, farm labour and resources available.

iv) Results from FSR usually meet farmers needs and are satisfactory to farmers, researchers and extension workers.

v) FSR deals with a household problem entirely as it affects the farm family. This leads to very high farmer involvement, and it is location specific to a target group of farmers.

vi) By involvement of extension personnel in the farming systems research process (Acker and Sungusia, 1985) it ensures that a wider area of impact can be covered, utilising trained manpower existing in villages and districts within the extension service.

•**Limitations:** While FSR has made major contributions to the understanding of small farming systems and to improving agricultural research, the following weaknesses commonly found in the use of FSR suggest that it is not a final answer.

i) Multidisciplinary teams could cause conflicts. The multidisciplinary collaboration between various agricultural scientists and social scientists have proved problematic (Chambers et al., 1986; Hoare, 1986). The difficulty has been on how to maintain good relations in a team and work together constructively. There are also different perspectives between the research scientists and the farmers to consider. Chambers and Ghildyal (1985) noted this problem and remarked that it is difficult for a social scientist to learn to think like an agronomist, and even more so for either of them to learn to think like a small farmer.

ii) Staff for FSR could be a limiting factor. The shortage of both research scientists and extension personnel is a common feature for most developing countries. It is likely that research stations could not have the required and interested staff who would be willing to go to villages to conduct research in farmers' fields. The approach although is cost effective, it cannot be carried out effectively without adequate resources. In order for researchers and farmers to interact effectively, transport, travel funds and village based manpower are required (Acker and Sungusia, 1985).

iii) Danger of lecturing to farmers. There is a danger of researchers adopting superior attitudes, lecturing to farmers in the villages instead of learning from them. Scientists need preparation for face-to-face dialogue with farmers and to be able to listen to farmers. This observation led Haverkort et al. (1988) to state that the present researchers have been insufficiently trained to communicate with and learn from farmers and to co-operate with them.

iv) There are difficulties communicating the knowledge gathered by FSR based scientists to their colleagues in commodity and disciplinary programmes. Thus, Chambers and Jiggins (1986) observed that the idea that FSR insights should determine agendas is resisted, and in practice the gap may widen between agricultural scientists' control over research programming in basic and applied science and FSR-based scientists who are relegated to an adaptive role.

Integrated Agricultural Development Programmes (IADP)

This approach is usually produce-oriented and all of the institutional components that affect the agricultural development process are coordinated and applied to achieve increased output. The programmes under IADP are often donor-assisted projects with their own management and technical support systems. The projects are specific to a geographic area and are focused on a common set of production problems. In addition, the input supply, credit, extension, marketing and other agricultural services are provided. Hence, the projects tend to create an artificial environment for the extension personnel by increasing salaries, providing transportation, inputs and other factors considered essential to a well co-ordinated agricultural development project.

•**Objectives:** To increase agricultural output and farm incomes; and to demonstrate that agricultural development can occur with an integrated approach.

•**Clientele:** Integrated Agricultural Development Programmes are generally intended for all farmers in the project area, but more progressive farmers take advantage of new inputs, credit, market services and other services.

•**Organisation:** This may be of, or associated with, the Ministry of Agriculture with a parallel or, in some instances, a separate management and technical support system. In the developing countries it is often managed by the donor organisations in association with an appropriate government agency in the host country. Similarly, financing comes from the Ministry of Agriculture and/or the donor organisation.

•**Role of Extension:** In this approach the extension service is involved in introducing existing and new technology to farmers involved in the project; co-ordination of inputs and the delivery of appropriate services to farmers, for example, at local level a farm service centre (co-operative, etc.) is sometimes established where a farmer can get inputs and advice.

•**Problems:** Larger and progressive farmers tend to get most of the benefits; an artificial environment is created that often cannot be replicated on a wider scale, especially on farm input provision, quality of extension personnel and

other professionals involved, provision of transport and implementing extension programmes; project personnel often end up being directly involved in supplying inputs and services rather than agricultural advice.

Integrated Rural Development Programmes (IRDP)

These participatory rural development schemes blend the community development and 'animation rurale' approach (Swanson and Claar, 1984). The underlying philosophy of this approach is participation by the rural poor in planning, implementing and evaluating the programmes. The approach represents a broader concept of rural development promoting both economic and social factors. IRD is based on the belief that basic services and income generating activities depend on one another and must therefore be developed together. IRD for developing countries is based on three assumptions: that agricultural growth is the key to rural development; secondly, that the development of agriculture required concomitant development of the secondary and tertiary agricultural and agriculture related sectors; and thirdly, that social forces play an important role in agricultural development (Weitz, 1979). In countries like Tanzania agricultural production is a mass activity, their willingness and ability to participate is necessary. Agriculture does not develop by itself but requires a complex institutional mix to support it like markets, supply of inputs, credit and professional advice. The rural community also needs many services - water, health, education, public facilities and commercial outlets. The IRDP are therefore necessary to bring about the required development.

Other features of this approach include:

- IRD is a multisectoral approach including agriculture, industry, services and infrastructure;
- In IRD there is decentralisation of institutional structures and decision-making;
- IRD involves co-ordination of policy measures and activities as coherent packages;
- In IRD the involvement of intended beneficiaries in selecting the priority local investment are emphasised;
- It is area specific and has a focus on the poor and development goals emanate from within rural areas (Conway and O'Hara, 1987, pp.70-72).

•**Objectives:** Improvement in levels of living including income, employment, education, health, water, nutrition, housing and related social services; decreasing inequality in the distribution of rural incomes and a lessening of urban-rural imbalances in income and economic opportunities; and improving rural life and reducing poverty (Hodge, 1986; Commins, 1988; Conway and O'Hara, 1987).

•**Clientele:** IRD focuses on the masses of people in target rural area; the poor and specific local communities; small scale farmers, women, youth, tenants and the landless.

•**Organisation:** The approach is usually multisectoral involving local people, government, regional planners and donors from outside the country working together; it is based on a package approach to address different problems of a community; funding may come from central government or donors and is usually administered through a project manager.

•**Role of the Extension Staff:** They are responsible for the development of the agricultural sector and co-ordination of agricultural activities with other personnel in the project. They also implement government support services and policies.

•**Problems of IRD:** Integration of various activities and sectors involved in IRD for an area is hard to achieve. Resource competition by different departments, ministries and personnel leads to staff conflicts. Other problems include the difficulty of measuring poverty and evaluation of the IRD projects.

An Extension Model for Tanzania

It is a common phenomenon in the developing countries to find that four or more extension approaches are being followed by an extension service of the country. This can happen during the same period or in subsequent years. By following the discussion in the preceding sections, we find that there are at least eight extension approach which serve as menus for extension services in the developing countries. In Tanzania, for example, all these eight extension approaches have been tried and some abandoned after failure.

Most extension services in the developing countries were established by colonial powers based on western style conventional models. These newly independent governments wholly inherited and copied the extension models without any adaption to their particular needs and resources. The extension services in these countries therefore continue to function as regulatory bodies for the government. Many extension organisations in the developing countries are known for their promotion of nation-wide production campaigns being propagated by the politicians. The extension workers at the field level are always caught up into a crisis of being government agents on one hand and professionals who should be helping farmers to improve their agricultural production.

Why are there so many approaches in extension in the developing countries? These extension approaches have been formed as a result of the ineffectiveness of the conventional approach. However, because of lack of resources (both financial and personnel) most developing countries seek assistance from donor agencies. In response to these requests each donor agency develops an extension recipe and baptises it with some name and imposes it on the recipient government. Consequently, Tanzania being no exception from other developing countries is currently following five extension approaches, the Conventional, Integrated Rural Development Programmes, Farming System Research, Management and Marketing Approach and the Training and Visit System. The Conventional extension approach has been widely criticised but it has served as the base-line for all the other approaches. This approach is practised in all the regions in Tanzania. A few years after independence in 1961, the Integrated Rural Development Programme and Integrated Agricultural Development Programmes were tried in almost all the regions in the country but all failed and were abandoned (Kahama et al., 1986). The Farming System Research approach was introduced by USAID in 1983 (Acker and Sungusia, 1985) and is functioning in a sterile way at Kilosa and Ukiriguru research stations. Most of the work initiated is at a standstill because the donor agency has stopped financing the programme. In 1987, the Management and Marketing Approach was introduced in the Morogoro region. This approach is being implemented on an experimental basis and as a project for Sokoine University of Agriculture in Tanzania. It is a pilot project under which the university is trying to find the most effective way in which the extension service in Tanzania should be formulated and operated. This study will (in

Chapter V) and in the proceeding chapters present an analysis of how this approach is functioning in the Morogoro region. It will provide answers to who has benefited, how and why. However, during the same period, the government of Tanzania signed a contract with the World Bank and the Training and Visit System has started mushrooming in many regions. It is beyond the scope of this study to provide an assessment of the Training and Visit System because it would require an independent study. However, we can only state that T&V, despite the World Bank's support, is an approach which will be abandoned as soon as its finances are withdrawn. An alternative explanation is that this approach works only on paper. In the real world is simply does not work since its assumptions are unwarranted, and many of its ideas have proved unimplementable (Axxin, 1988, p.7).

Summary

This chapter has provided an understanding of the meaning of development and concepts of agricultural and rural development. The discussion took the notion that development is a type of social change in which new ideas are introduced into a social system in order to produce higher per capita incomes and levels of living through improved production methods and improved social organisation. It involved change in three different elements - economic, social and human.

Furthermore, the literature reviewed pointed out the importance of agriculture in the economies of developing countries. The discussion emphasised that agricultural/rural development must be targeted to improve agricultural production, living standards of people, making rural areas more productive, ensuring development is self-sustaining and traditional customs are adhered to as changes are introduced. However, the dependence on agriculture for most development countries leads these countries to face a number of agriculture related and non-agricultural problems. The agricultural problems refer to the factors which affect the agricultural system and they must be well co-ordinated for improved production and agricultural development to be realised. Likewise, the non-agricultural problems have to be solved before social change is achieved. In addition, the literature discussed and compared the models and approaches used by the agricultural extension systems in developing countries. We have seen that in order to improve agricultural production and for rural development to be realised an extension model for Tanzania needs to be developed. The proposed

extension model will be used in the following chapter as a basis for developing a study framework for understanding the study data.

CHAPTER V

A FRAMEWORK FOR UNDERSTANDING THE IMPACT OF THE SOKOINE EXTENSION PROJECT AT VILLAGE LEVEL IN MOROGORO, TANZANIA

Introduction

The purpose of this chapter is to review relevant literature which would help understand what impact the Sokoine Extension Project (SEP) has had on extension work at the village level. The overall aim of the project is to accelerate agricultural development in Tanzania (Reidy and Keregero, 1987). We have already reviewed the meaning of development (in Chapter IV). It was defined as a social change in which new ideas are introduced into a social system that produce higher per capita incomes and level of living through improved production methods and improved social organisation. Therefore, in the following sections we present an overview of how this process may be achieved.

What do we mean by impact? In all the sections of this study the term impact will be used to mean the change in farmers' overall situation in villages that could lead to development. What effect has SEP had on farmers' lives? Are there improvements in agriculture, ideas, social or cultural and economic environmental conditions of the rural population? The measurable impact will be reflected in the society as a change. However, change in any society is very slow (Oakley and Garforth, 1985) and therefore in measuring this change we shall deal only with factors that are indicators of change.

I have taken the view that agricultural or rural development will be determined by the indicators of change. It will be easy in the short term to identify development as a change. These indicators of change will be compared with the existing situation in the villages prior to SEP being introduced in 1987 and to the nearby villages which were not involved in SEP. However, the expected change or development in the villages will be influenced by three other major factors: (i) the indicators of change or farmers' selected performance in the SEP; (ii) the factors affecting the extension workers' performance in the SEP; (iii) the factors affecting change or farmers' selected performance variables used in the SEP. According to this view of development, the following sections are organised to review relevant

literature for this study. By following these guidelines the framework for the analysis of the impact of SEP on extension work at the village level was developed in the latter part of the chapter.

Indicators of Change or Farmers' Selected Performance Variables Used in the Sokoine Extension Project

Agriculture is the backbone of the Tanzanian economy (TNAP, 1982, p.viii) and improvements or change in this sector will lead to agricultural or rural development. Hence rural development will be shown by the identified indicators of change. In the SEP the variables that were considered to indicate change included the following:

i) the farmers' contact with the extension service;
ii) the participation of farmers in the SEP projects and programmes;
iii) the involvement of farmers in extension activities;
iv) the changes in agricultural practices and levels of technology in farming;
v) the selection of farmers' priority problems;
vi) the changes in levels of food and cash crop production.

The Farmers' Contact with the Extension Service

Agricultural extension can be considered as advice and assistance for farmers to help them improve their methods of production and marketing (Adams, 1982). However, farmers differ in their orientation in farming and these differences have implications for their need for, perceptions of and preferences concerning agricultural extension programmes. The extent to which farmers perceive that the extension service is a valuable organisation largely depends on its extension programmes. An extension service whose programmes are relevant to the needs of a specific target group will be considered useful and appropriate. According to Sofranko (1984, p.67):

> Despite the many reports devoted to projects that have failed because farmers were opposed to them, it is probably true that people are more likely to accept change than resist it. Resistance is not a constant element in most cultures, but arises as a result of inadequate understanding, misperceptions, unrealistic expectations and poor relations between extension workers and farmers supposed threats to farmers' security or from farmers being forced to change.

In the SEP, the question to be answered will be: What have been the farmers' perceptions of the extension service? This will be a condition for achieving the required change in farmers which leads to development. Farmers' perception of the extension service is not easy to measure. However, in this study , it will be inferred by determining the total extension workers contact with the farmers and other perception factors. The factors that were used to measure the total extension contact were: (i) the number of extension workers' visits to the demonstration plot; (ii) the number of farmers' visits to the demonstration plot; (iii) the number of meetings organised by the extension worker and attended by farmers.

Another perception factor considered was the perceived changes in the extension workers' performance and the village involvement in special agricultural projects and programmes. The basic assumption here is that an increase in the total extension contact indicates a positive farmer perception of the extension service. However, it is also true that a positive perception of the extension service is likely to have an influence on the performance of the farmer in the SEP. In this study the farmers' contact with the extension service and the extent of its influence on the farmers' performance in SEP was examined. Similarly, an attempt was made to compare this situation for the SEP and non-SEP farmers.

Participation In Projects and Programmes

Participation is broadly understood as the active involvement of people in the making and implementation of decisions at all levels and forms of political and socio-economic activities (Lisk, 1985). The concept of participation relates to the involvement of the broad mass of the population in the choice, execution, evaluation of programmes and projects designed to bring about a significant upward movement in levels of living (Lisk, 1985; Oakley and Mardsen, 1988). In many instances in developing countries local people are not involved in the early stages of programme development. They are usually mobilised to implement programmes and projects that are decided at a district, regional or national level. The need for involving people is essential but is lacking as Ghai (1988, p.14) observed:

> Their participation in the preparatory phase, if they are lucky, may at best consist of hastily organised meetings with the *experts* and bureaucrats where they are *briefed* about the objectives and activities of the planned projects. In the implementation phase they are expected to carry out their *pre-assigned* roles.

Experience in developing countries shows that sustainable projects and programmes can be easily extended to other areas in the country. Some of the successful projects in Tanzania which were both sustainable and had high commitment from the people were the DANIDA Shallow Wells Water Project in the Morogoro region and the UNICEF Nutrition Programmes in Iringa. The Shallow Wells Water Project has been expanded from Morogoro to Dodoma and Shinyanga regions. In both the water and nutrition programmes, the local people and leaders in each community were involved in all phases of the projects and programmes. Therefore, participation ensured that a large population were covered and satisfied. The number of people participating increases as project and programme benefits are seen by the rural people. Also, as decision making and problem identification is carried out through village committees, groups or village meetings and a lot of people are kept aware of the projects. The involvement from the initial stages in project planning enhances the participation of a majority of rural people and is a prerequisite for development.

In a study of villagers' participation in projects in Iringa, Tanzania, Brehony (1989, p.41) identified the critical elements for farmer participation as power of the people to decide for themselves, and to have control over their own resources. This is important because they alone know their own needs and they know what they are prepared to do and are able to do to meet these needs (Sofranko, 1984; Van den Ban and Hawkins, 1988; Brehony, 1989; Chambers et al., 1989). Furthermore, Sofranko (1984) gave some recommendations on how an extension worker might get broader participation in agricultural programmes.

i) People are much more willing to participate in activities which meet their felt needs. Thus the performance of farmers in SEP will indicate if the felt needs or problems of the majority of people have been addressed.

ii) If farmers are encouraged to express their needs and provide some inputs into the structure of a programme, these should not be ignored.

iii) People are more likely to participate if actual benefits are directly tied to participation. What do farmers get as a result of being involved in the project?

iv) Farmers, especially those with low incomes, are more likely to participate and remain involved in a development project if the benefits are material, direct and immediate.

v) Extension workers should not expect that the participation of a small group of 'progressive' farmers will ultimately lead to broader participation.

Realising the importance of participation, it is necessary in the SEP to identify the groups of farmers who were selected as the contact farmers. Following on, the level of farmers' participation and its influence on the farmers performance in SEP is examined.

Agricultural Practices and Technology

Agricultural development is highly influenced by the agricultural practices and technology which farm families apply. In Morogoro, for example, the level of technology employed in agricultural production with regard to methods of cultivation and the use of improved inputs is very low and at most traditional (Ngetti, 1989). It has been reported that about 85 per cent of farmers (TNAP, 1982) depend on the handhoe for cultivation and only about one-third of the farmers in Morogoro used pesticides and improved seeds (Ngetti, 1989). Despite the widely advocated ox-plough as a step away from the handhoe towards tractorisation, farmers in Morogoro region do not use this technology. The farming system in Morogoro region is traditional and farmers use their own seeds, practice mixed cropping, do not use fertilizers, weed only part of their plots, do not follow recommended spacing and depth of planting and do not use insecticides, pesticides or fungicides (Ngetti, 1989 and Phelan et al., 1989). At meetings, farmers told the author that their fields were very fertile and did not need fertilizers but failed to get high yields because of unreliable rainfall. According to Kauzeni (1984), one of the bottlenecks of increased agricultural production was the lack of technical know-how of the recommended farming practices on the part of the farmers. The knowledge and adoption of the recommended farming practices are of vital importance to increased agricultural production as well as to increased quality of farm products. In addition, the timing for certain agricultural activities (planting, weeding, thinning, fertilizer and insecticide application) can seriously influence both quality and quantity of the product. There are no detailed studies of the economic implications of alternative technologies at farm level. However, in some areas particularly Sukumaland (Mwanza and Shinyanga regions) oxenisation led to a significant increase in cotton hectarages, farm incomes and possible employment opportunities (TNAP, 1982, p.48).

CODEL (1986, p.30) emphasised the importance of learning from local agricultural experience. This is important because agricultural practices in many countries are already well adapted to prevailing environmental conditions. Over many years of trial and error farmers have developed systems that work and many farming practices once regarded as primitive or misguided are now recognised as sophisticated and appropriate. Discussing the successful projects in southern region of Mali, Russell (1986, pp.161-166) remarked that there is no shortage of examples showing that when technically feasible, sociologically acceptable and economically profitable innovations are proposed to farmers the new practices are quickly adopted. The question to be answered is what agricultural practices have been adopted in the Sokoine Extension Project area? In addition, the performance of the farmers in SEP will be indicated by the use of the available technology and inputs in Morogoro. For example, it is essential to establish how much farmers have taken advantage of the low cost input crop production programme initiated by the SEP.

Selection of Priority Problems

The development activities must be structured to help farmers to deal with problems they consider to be of high priority. There are numerous problems which farmers and extension workers can identify but it is essential to prioritise these problems and select groups of farmers that will be the target. There is no debate that farming communities are heterogeneous and each category of farmers will experience different kinds of problems in farming. In view of this, farmers' participation in the selection and implementation of projects/programmes designed to solve their priority problems must be encouraged. Participation in this instance is a key issue and can be seen as (Haverkort et al., 1988, p.5):

- a means to facilitate the implementation of external intervention;
- a means to mediate in the decision making and policy formulation of external interventions;
- an end in itself, the empowerment of social groups towards access and control over resources and decision making.

In essence, participation in selection of priority problems by farm families emphasises the primacy of what people need, want and can achieve in their

environment. If resources are scarce it is important to involve local people in selection of their priority problems and possible solutions which are within their available local resources. Launching a massive programme for all problems in a village will be costly and might not attract active participation from the majority in the community.

Food and Cash Crop Yields and Increases in Income

The food and cash crop yields in Morogoro region are below the standard district averages. A large number of farmers in Tanzania are characterised as following subsistence farming by small self-contained family units who consume the majority of their produce and depend on the surpluses to make an income. In a study of farm family households in Morogoro region, Phelan et al., (1989, p.9) stated that:

> A common feature of all crops grown was dismally low yields. On average, these were less than one-third of the estimated potential yields under existing smallholder on-farm conditions.

Supporting this view, Kyomo and Keswani (1987) and Shao (1987) report of the same situation of low production and low yields in all crops which are lower than the potential on-farm yields. There are many reasons for low yields in Tanzania. The most commonly quoted causes include: unreliable weather or poor rainfall distribution, low and unattractive producer prices, lack of credit, lack of irrigation facilities, large post-harvest losses, poor pest and disease control methods, inadequate and untimely supply of inputs (e.g. seeds, fertilizers and pesticides), poor research-extension-farmer linkage and poor extension service (Shao, 1987; TNAP, 1982). Similar major causes for low production in Tanzania were reported by the World Bank (1989) and Cortas (1988). However, Phelan and Wims (1989) in the baseline study for the SEP in the Morogoro region found that farmers' major production problems included: supply of inputs (inadequate, too late or very costly) and poor method of payment (low prices and late payment). The co-operative purchased the crop on credit from farmers thus delaying payment. Other constraints to crop production included the use of the handhoe as a basic tool for farming. In most cases this is a limiting factor to expanding acreage and timely cultivation. The small acreages result in low output and small quantities of marketable surplus. Yield increases will be brought about by increased allocation of fertilizers, use of improved seeds, improved cultivation practices and irrigation (Cortas, 1988).

Another constraint to increased food and cash crop production is the type of crop grown. What type of crops are grown in the SEP villages? In the Morogoro region and other parts of Tanzania farmers are normally told what crops to grow. The regional government policy dictates that farmers grow two acres of food crops (i.e. for food requirements and food security) and one acre of a specific cash crop chosen by the government. In many parts of the country farmers have performed very poorly in these crops chosen by the government. In Morogoro villages, for example, farmers told the author that they preferred to grow sunflower, maize or vegetables for a cash crop but instead were forced to grow cotton. Farmers are very rational and it is no miracle that the crops imposed have been poorly managed and the yields below the expected standards.

It is important in this study to identify the trend and changes that have taken place in the food and cash crop production. Which among the constraints above have been addressed by SEP? What is the impact of SEP on food production? If the food situation in the villages in Morogoro has not significantly changed, it will be necessary to know the reasons. In an agricultural dependent country like Tanzania, development cannot be achieved if the farmers are unable to feed their families and are living in poverty.

If the yields of the food and cash crops have increased then we need to ask if there were any increases in the farmers' incomes. Because a large number of farmers depend on the sales from the crops for their incomes it is essential we determine the amount of yields and its effect on the generated incomes. The yields for major crops in Morogoro for 1986/87 and 1987/88 cropping seasons are shown in Table 14. According to the data in Table 14 farmers in the Morogoro region got yields which were lower than the regional estimated average yields for two consecutive seasons. It can also be stated that their incomes for this period were very low. According to the FAO (1986) food production in Tanzania increased by 2.3 per cent but the population growth rate for the same period was 3.6 per cent. The total agricultural growth for this period was only 1.8 per cent per annum. The general trend of agricultural production is obvious, that of declining agricultural sector relative to a rapidly expanding population. It can be said that farmers in Tanzania are trapped in a vicious poverty circle of low productivity and inadequate foreign exchange.

Experience in developing countries has shown that increased

TABLE 14
THE YIELD OF MAJOR CROPS IN KGS/HECTARE FOR THE MOROGORO REGION

	Actual Farmer Yields		Estimated Average Yields for the Region	
Crops	1986/87	1987/88	1986/87	1987/88
Maize	835	538	1,400	1,770
Paddy	900	320	1,600	2,170
Sorghum	327	368	1,450	1,350
Cotton	770	846	900	558
Legumes	453	83	700	480

Source: Ngetti, 1989, p.53; PMD, 1989, pp.43-75.

agricultural productivity is a prerequisite for national economic development and as a prelude to industrial growth (Arnon, 1981). A major reason for the widespread low productivity (Lele, 1985) is the failure of successive African governments to develop appropriate technological packages to suit the highly diverse conditions and reduce the risks encountered in their adoption by low income farmers. Increased agricultural productivity is critical in facilitating economic transformation. Improved technology increases productivity per unit area and per labour unit; thereby releasing resources for the development of the non-agricultural sector. What is often forgotten in modernisation efforts in agricultural led economies is that agriculture remains the major source of employment, food and raw materials for the expanding urban and industrial sector. In the developing countries it provides the scarce foreign currency from exports, the initial development capital and revenue for the public sector, and most important, increased farm incomes generate new demands for an ever widening assortment of goods and services, both agricultural and non-agricultural.

The farmers' average yields for the major crops in the Morogoro region (Table 14) obtained from a study conducted by Ngetti (1989) were far below the national estimates for the region. This means that these farmers were living in poverty and did not have crop surpluses for sale. It will be interesting to see the results of crop yields in 1988/89 season when the SEP was in full operation. For most farmers in the Morogoro region, the lower the yields the smaller the income which can be made from agriculture. However, it is

necessary to determine how much other activities like carpentry, masonry, weaving baskets and mats, petty trading and providing labour in other farmers' fields could be alternative sources of income. According to Ngetti (1989) 80 per cent of farmers got their incomes from agriculture and less than 7 per cent from skills or petty trading and less than 4 per cent from employment or labour in other farmers' fields.

Factors Influencing Extension Workers' Performance in the SEP

In understanding the framework of this study, the factors influencing extension workers' performance in the SEP were grouped together as intervening variables in promoting change or development. Van den Ban (1989, p.292) discussing extension research needs identified eight major decision areas that have to be made by agricultural extension services if they are to improve their effect on the confidence of the farmers. These decision areas include:

i) the goals to be achieved by the extension service;
ii) the target groups to be reached;
iii) the content of extension programmes;
iv) the choice of extension methods to be used;
v) the organisation of extension work;
vi) the plans for extension programmes;
vii) the system of monitoring and evaluation of the extension service;
viii) use of the information on the impact of extension work.

However, this study will examine the following seven major variables that influence the extension workers' performance. These are:

- Personal characteristics of the extension workers,
- Extension policy,
- Extension management support and monitoring system,
- Research-extension linkages and other institutions,
- The extension methods used by the extension workers,
- The activities carried out by extension workers.

In general, all village extension workers in Tanzania are supposed to have a two-year certificate in agriculture. In practice due to shortage of manpower there are some extension workers without this minimum qualification. According to Adams (1982) age, experience and educational background are important selection criteria for extension workers. These

criteria are not considered when posting extension workers to the villages in Tanzania. Other important aspects to consider are the personal qualities of the extension workers. The major personal qualities considered in selecting extension workers for the SEP villages were (i) ability to communicate with farmers; (ii) ability to get on with people in the village; (iii) enthusiasm on the job; and (iv) extension workers' initiative. Realising the importance of extension workers, Oakley and Garforth (1985) concluded that the effectiveness of the extension agent can often determine the success or failure of an extension programme or project. Therefore, in the SEP, each village was provided with one extension worker who would work and live in the village with the farmers. In this study the personal characteristics for SEP and non-SEP extension workers will be compared and an attempt will be made to determine the association of these background characteristics on the farmers' selected performance variables used in the SEP.

The extension methods used by extension workers will differ from place to place and will depend on the situation in question. The primary responsibility of the extension worker is to provide education. There are many educational methods or techniques from which the extension workers may choose in setting up learning situations and maximising the transfer of information or skills. The task of the extension worker is to choose the teaching methods that will be most effective in achieving the objectives. People learn through their own activity (Kang and Song, 1984) and through what they do. No one can learn for the clientele. In the Sokoine Extension Project, extension workers used meetings, seminars, symposia and individual home and farm visits in reaching farmers. The question here is how effective were these methods in achieving the objectives of the extension programmes?

As a prerequisite for improving extension workers' performance a regular in-service training programme was provided for all the SEP extension workers. There were eight in-service training courses provided in two years. Malone (1984) generalised that in-service training was a programme designed to strengthen competencies of extension workers while on the job. In-service training was a problem centred, learner oriented and time defined series of activities. Subsequent progress in technical matters of the extension workers would depend on in-service training (Adams, 1982). The aim of the in-service training programme in the SEP was to provide the extension workers with competence in both technical and extension methods needed to develop

and implement village programmes and projects which are designed to solve the causes of agreed priority problems. The extension service in Tanzania has many problems (see Chapter II). However, experience working with village extension workers shows that their performance was affected by the following specific problems:

i) Lack of in-service training;
ii) Poor housing or lack of housing in the villages;
iii) Lack of transport;
iv) Extension workers have very poor salaries;
v) Lack of technical messages to extend to farmers;
vi) Lack of support and management;
vii) Lack of essential teaching and communications equipment;
viii) Lack of effective linkage between research and extension.

By attending regular in-service training programmes the extension workers were able to meet with researchers, regional extension staff and trainers who participated in providing the technical messages. The SEP through collaboration with the district and regional extension officers helped to improve the logistical support and management and linkages between researchers and the extension service in the region. Van den Ban and Hawkins (1988) observed that field level extension personnel in many developing countries lack adequate transport facilities (mobility) to reach farmers effectively. Explaining the gravity of this problem in Tanzania, Reidy and Keregero (1987) gave an example where there were 143 villages and only 34 extension officers, none of whom had a bicycle. In addressing this problem in the SEP area, all 20 extension workers were each provided with a bicycle, sprayer and protective clothing. Hence, we need to determine whether the support facilities have improved the work efficiency of the extension workers. It is important that we compare the effect of provision of these basic work facilities in the SEP and non-SEP villages. In the process of analysing this effect we need to identify the weaknesses of the SEP project in meeting the needs of the village extension workers.

The management support and monitoring system and supervision of extension workers from the district and region extension service and from the University has been the basis of most activities of SEP. This is one of the major weaknesses in the traditional extension system. The support/ monitoring system and supervision in the SEP started with the establishment of project expert groups, SEP team at SUA and by the appointment of an

officer at each district to deal with the SEP extension workers on a daily basis (see project structures in Chapter III). The establishment of these structures assisted in delivering a management support and monitoring system that helps village extension workers in implementing their programmes and projects.

The University and research stations, particularly Ilonga research station, played a leading role in providing the technical support and some of the inputs for the projects and programmes. The SEP team at SUA was a vital source of action in reviewing extension workers programmes of work and on-going activities related to the SEP. The team's support of the extension workers' activities in the villages was important in the continuation of the project at the University.

The district and regional extension services provided the necessary support and supervision and made sure that village leaders and governments were informed and understood the importance of the projects and programmes initiated by their bwana shambas. The involvement of village leaders at an early stage would enhance their support and that of the ten cell leaders and target group of farmers. According to the administrative structure and organisation of village governments (see Table 1 and Figure 2), this procedure would ensure more active participation of the farmers in the project. The extension workers' programmes and projects would therefore secure a rapid support from the village leaders and interested target groups. However, the extension policy in the country and the region in this instance needs to clearly spell out what extension workers are expected to do in the villages.

The performance of the extension workers will also be influenced by the linkages established for the extension service with other organisations. According to Claar (1985, p.13) linkage is not a naturally occurring phenomena in organisations. It has preconditions for co-operation and these include:

i) Agreement on roles, boundaries and common missions of co-operating organisations greatly helps the process;

ii) Agreement on philosophy and approach to the task is needed by all the co-operating organisations;

iii) A workable balance of power and dependency is needed; each organisation needs to see the benefits from co-operation.

Linkage is important in providing support and information for the extension service. It helps to bring about efficient exchange of information and technology between organisations. In this study it will be useful to determine the extent to which linkages have been established and how they influenced the activities of the extension workers in the Morogoro region. It is therefore important in this study to determine the impact that the SEP approach has had on the work of the extension workers. Is there any difference in their performance in extension related activities especially as compared to the non-SEP extension workers in Morogoro? These activities include all the projects and programmes initiated by the extension workers. Has the implementation of these improved the impact of the extension work in the villages? Also, for successful extension work the government policies need to be supportive of the extension efforts. It is important to determine if the agricultural policy and other relevant government policies were supporting the extension service in the country.

Factors Affecting Change and Selected Farmers' Performance Variables Used in the SEP

Most farmers have valuable experience with farming under their ecological and socio-economic conditions (Van den Ban, 1989). Since the earliest stages of agriculture, farmers have been active in developing technologies for the production, processing and storage of food. Farmers discovered, selected and domesticated all of the major food crops and animals (Haverkort et al., 1988). A common complaint among extension workers is that it is difficult to get farmers to participate in meetings and projects but most difficult to get the interest and involvement of the smaller and poorer farmers (Sofranko, 1984). In the Sokoine Extension Project, four main factors that influence the performance of the farmers were considered. These factors were: (i) involvement of farmers in problem and solution identification; (ii) involvement of farmers in selection of projects and programmes; (iii) awareness of the SEP project; and (iv) farmers' characteristics.

Involvement of Farmers in Problem and Solution Identification

The vital importance of securing active involvement of farmers for the long term success of any rural development effort is now recognised and accepted. Broad based rural development in Tanzania must focus on the small-scale farmers and particularly on the role and situation of women and

youth. If we accept that this development must take place through the people with their active involvement in the improvement of their own economic and social situation, then programmes and projects must be designed in reasonable conformity with people's present priorities and perceptions of their problems, environment and with local leadership patterns. In the identification of problems and solutions for rural people, one method used in Thailand was the use of workshops (Jones, 1986, p.269). At these, villagers, initially in groups were asked to note their farming problems on large sheets of paper. These were then shown to everyone and all were asked to rank the problems in order of importance and for those which were dominant to analyse what they consider to be the underlying reasons for the difficulties. Finally, farmers were asked to suggest how the problems might be solved using locally available or obtainable resources. In the Sokoine Extension Project in the Morogoro region, a similar approach was adopted. It was a scenario of the SEP to identify village problems by starting at the village level and followed by a democratic procedure of discussion and decision making. The criteria was to select problems that would be of concern to a significant number of people in the village and that could be solved by technology and practices within the capacity of a majority of farmers. This procedure will be compared for the SEP and non-SEP villages. It is also vital to determine the use of this procedure and its effect on farmers' performance in the SEP.

Farmers' Involvement in Selection of Projects and Programmes

People often know what is best for themselves. In most successful projects people come first and they are involved in all stages of the development projects that affect their lives. In the SEP, the micro-projects and village programmes already discussed in Chapter III were used in addressing specific village problems that were identified. However, the selected projects and programmes have an influence on the performance of farmers in the SEP. In the study of Harambee schemes in Kenya, Rasmusson (1975, p.268) observed that:

> Leadership, participation in projects, choice and implementation and subsequent maintenance are major determinants of perceived outcome of a project.

Discussing the notion of change, Sofranko (1984) outlined five conditions that can reduce resistance to change. The following conditions must be fulfilled:

i) When the farmers are made to feel that an activity is at least partly their own, not one devised and operated by outsiders. It is important that people participate because they alone know their own needs and know what they are prepared to do and are able to do to meet these needs (Brehony, 1989).

ii) If there is support from influential people and leaders in the village. Farmers and their families are members of the society in which they live and proposed change must be seen as acceptable by the village leaders (i.e. village government, village chairman/secretary, customary leaders and ten-cell leaders).

iii) If farmers and villagers see the proposed changes as reducing rather than increasing their burdens, materially improving their lifestyle and in general having some practical benefits.

iv) If the farmers are involved in the diagnosing of prevailing conditions and the programme reflects their demonstrated needs, objectives and fears.

v) When there is a group consensus on adoption of a new practice or on participation in a particular change related activity.

As a strategy for improving the efficiency and effectiveness of the extension service under the SEP, participation of farmers in projects and programmes was greatly encouraged. A number of micro-projects and programmes (see Tables 11 and 12) were initiated based on the farmers' problems in the area. In this study we shall look at the extent of the farmers' involvement in the projects and programmes and their reasons for participation. What farmers problems and solutions have been identified?

The level of farmers' performance in SEP will be indicated by problems being tackled by the project. The farmers will identify themselves with the project if it is dealing with problems that they consider to be important. If farmers are encouraged to identify their own problems and develop their own solutions using indigenous resources then they can change at their own pace and continue their own village research long after official village projects have ceased (Gorman, 1989).

Awareness of the Sokoine Extension Project

Another important factor that will affect the change or performance of farmers in the SEP is their awareness of the existence of this project. The farmers need to be aware of all the activities of the project in the village. It is

important also to determine the sources of information about the project. However, as already discussed in the sections above, involvement of farmers in problem and solution identification and the selection of projects and programmes are likely to promote their awareness of the project. In this study the awareness of the SEP by both SEP and non-SEP villagers will be compared and its effect on the selected farmers' performance variables will be documented.

Farmers' Characteristics

The farmers characteristics are important variables that have influence on the farmers' performance in the SEP. In this study the personal, social and farm situational factors were considered. The personal and social characteristics examined included: age, gender, religion, education, marital status, number of people in the household, number of adults and ability to read newspapers or access to information. These were considered to have an influence on the levels of participation and the changes that a farmer can make. For example, a decision to participate in projects and programmes of the SEP was taken by the head of each household. It was not until the decision had reached the household level that the personal and family characteristics started to operate. Depending on the type of project or programme these characteristics will have a varying degree of influence on the proposed changes.

Another set of factors that influenced the performance of farmers' in the SEP were the farm situational factors. These were farmer situational variables or factors of the environment with which the individual lives. They included the physical aspects of the production situation, sources of income, farm size, labour force available, farm fragmentation, the distance of farms from homesteads and livestock ownership.

Despite the fact that most farmers in Morogoro region are heavily engaged in food production activities they do need money for their household expenses. In many parts of rural Tanzania agricultural related activities form the main source of income for rural people. Therefore, the economic activities of farmers can have a significant influence on their performance in the SEP. It is one of the purposes of this study to identify the sources of income of farmers and to determine the extent to which they affected their performance in the SEP. It is also true that farmers' sources of income vary from village to village and depend on certain periods of the year.

For example, in the Morogoro district, vegetable and fruit production are a major source of income in the rainy season but during the dry season other activities like brewing, crafts and skills become more predominant sources of income. In this study farmers' views on their sources of income were asked and comparisons were made between the SEP and non-SEP villages.

In a study of farm family households, Phelan et al. (1989) found that situational factors played an important role in determining how households responded to planned intervention. Similarly, Brehony (1989) in his study of three small projects for farmers in the Iringa region found that farm size was one of the factors that affected farmer participation in the projects. In the Morogoro region, Phelan et al. (1989) reported that individual farm size varied considerably and significantly from village to village. The distance from homesteads to farms was big, fragmentation of holdings was common to all families and labour force for each was inadequate and these were major constrains to the expansion of farms in many villages. Hence, the overall farm situation could influence the level of performance of farmers in the SEP. Furthermore, Morogoro region is not considered to be a livestock keeping area but for the farmers who own livestock it can be stated that this has an influence on their performance in the SEP. For example, in Iringa region, Brehony (1989) found that possession of livestock affected the farmer participation in projects. Therefore, in this study farm situational factors were examined to determine the extent at which they were associated with the farmers' performance in the SEP.

The Study Model

So far in this chapter I have been arguing for an understanding of the impact of the SEP on extension work at the village level by examining the different factors that bring about the change in the farmer's overall farming situation. The outcome of the interventions will lead to agricultural or rural development which can only be identified by what happens with the indicators of change. The framework for the analysis of the impact of the SEP on extension work at the village level for this study is organised in the model shown in Figure 12. This model suggests a framework within which to study the development process based on participation of villagers in all the stages of the project.

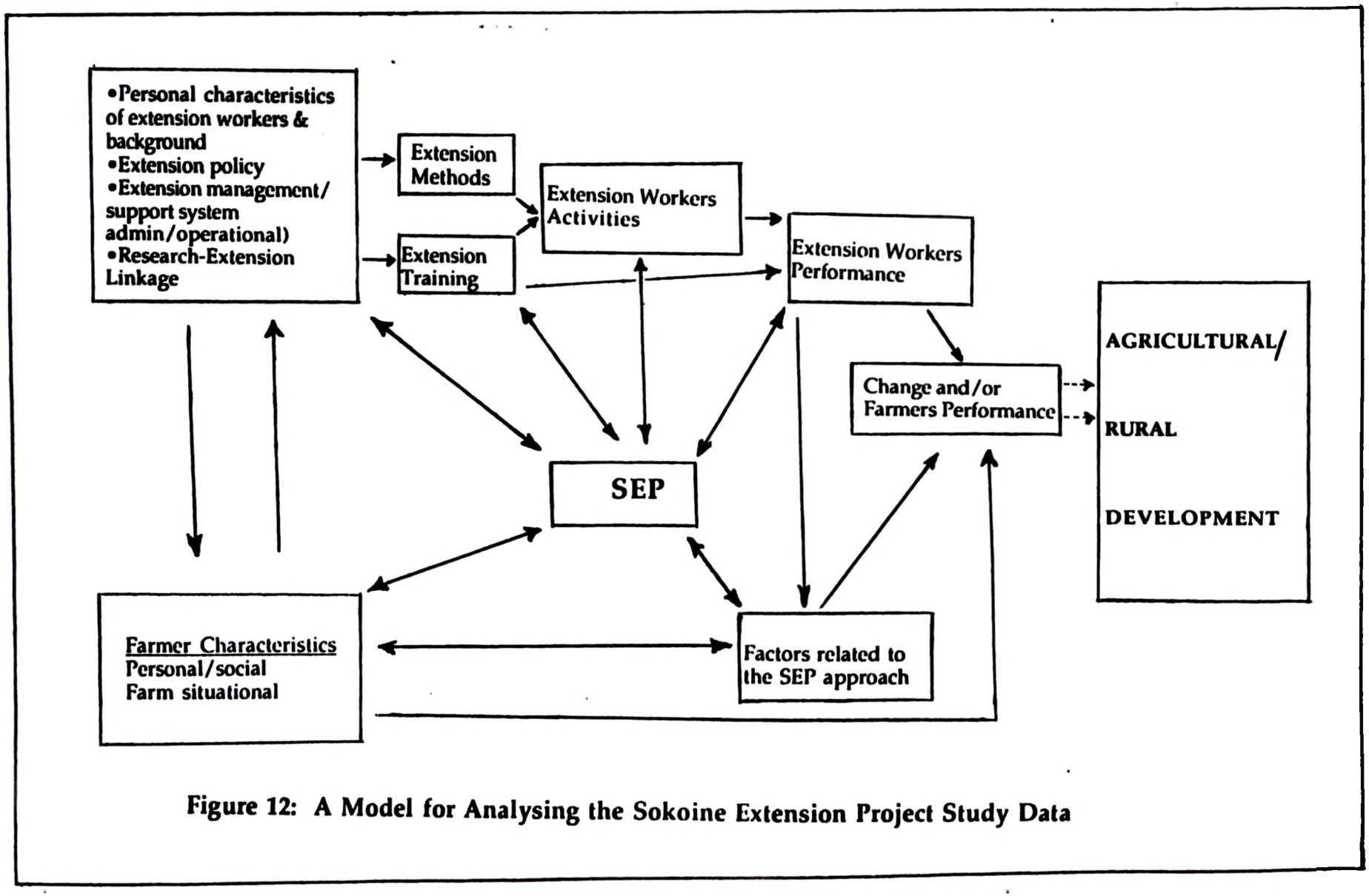


Figure 12: A Model for Analysing the Sokoine Extension Project Study Data

It is important at this point to state that I have all along argued for development efforts to be directed to the farmers. The farmers cannot change their situation or adopt new ideas unless they participate in the planning and implementation of the projects designed for their improvement. The process of bringing about change will be influenced by factors that affect the farmers' performance in the project (SEP) and by the individual farmer factors like personal or family characteristics and farm situational factors.

It is worth noting at this point also that I have taken the view that the extension worker and his/her activities are considered as intervening variables to this process of change or rural development. However, the role of the extension workers is vital in linking the activities for the farmers, research and other agencies. The projects and programmes initiated for this project must allow for the farmers involvement in all stages. It is the argument of this study that success in the SEP will be greatly determined by how much the farmers are involved in leading the project to their desired end. However, in order for the extension service to be effective in influencing rural development in the study area, the factors affecting the performance of the extension workers in SEP must be considered. These factors involve the extension worker's background characteristics, the extension workers methods, training, research-extension-farmer linkage, management and support services, policy of the extension service and activities performed by the extension workers. In making an assessment of the SEP the study will identify the changes taking place in the project villages and compare them to the nearby non-project villages.

Therefore, the framework suggested in Figure 12 should help us understand the extent to which procedures followed by the extension workers played an important part in establishing effective change in the farmers' agricultural situation. Also, this framework should assist in the identification of inadequacies or problems in projects, programmes or activities initiated by the SEP extension approach which was geared towards bringing about agricultural or rural development in the country.

Study Hypotheses

The study research model shown in Figure 12 was developed to assess the impact of SEP at village level. The model and related literature reviewed suggests that farmers' performance in SEP can be used as indicators of agricultural/rural development. The model also indicates that farmers'

performance in turn was influenced by farmers' characteristics and the extension workers' performance in the project. Arising out of this part of the research model the following overall hypotheses were developed.

1. **That the participation of farmers in the SEP had significantly increased their food and cash crop production during the study period.**

   However, this overall hypothesis was further broken down into five sub-hypotheses which contributed to the total impact of the extension work on food and cash crop production and determined the farmer performance. These sub-hypotheses are:

   a) that the SEP farmers' contact with the extension service and its programmes was higher than for the non-SEP farmers;

   b) that the SEP farmers' level of involvement in extension activities was greater than for the non-SEP farmers;

   c) that there were more SEP than non-SEP farmers who had changed their agricultural practices;

   d) that there were more farmers' priority problems addressed by the extension service in the SEP than non-SEP villages;

   e) that the SEP farmers' level of food and cash crop production was greater than for the non-SEP farmers.

2. **The Factors Affecting Farmer Performance in the SEP**

   Several factors affected the farmers performance in the village programmes and projects. The hypothesis to be tested under this section is stated as follows.

   That the farmers' performance in SEP was influenced by the farmers' characteristics which included the personal and farm characteristics:

   – personal/social characteristics tested were age, religion, gender, marital status, number of people in the households, number of adults, education and newspaper readership;

   – farm characteristics identified include sources of income, farm size, farm fragmentation, livestock ownership and labour force.

The testing of these hypotheses forms the central core of the research conducted for the study. The research methodology employed for this study is outlined in Chapter VI.

CHAPTER VI

THE PROJECT, THE METHOD AND THE MATERIALS

This chapter includes five sections. Section one provides a short discussion of why the Sokoine Extension Project was the focus around which the study was directed. The second section contains a discussion of the appropriateness of the methodology used for the kind of problem under study. This is followed in the third section by a description of the manner in which the study data were collected. The fourth section contains details of how the interview schedule was developed and implemented. In the fifth section the methods of data analysis used are explained.

Project Selection

The SEP used a new extension approach in Tanzania. It had been in operation for two years. In this study it was chosen to assess its contribution in improving agricultural production for farmers in the Morogoro region. The key questions to be asked about the project include the following: What was the impact of the SEP? What was the project's effect on extension workers' and farmers' programmes and in particular farmers' food and cash crop production practices?

It was felt by the author that there was a need to carry out an assessment of what had been happening in the project villages. The results of this inquiry would serve as a mid-term evaluation of some aspects of the project. The information would also help in directing the second phase of the project. Also, if farmers' food and cash crop production had changed, what were the major factors that caused these changes? Hence, in this study the farmer characteristics and factors related to the extension workers were examined. The study set out to discover the effect of these variables. It was therefore decided to select some of the project villages and non-project villages and compare the impact of the project.

Methodology Used

In developing the methodology required for the study it can be stated that two main sources guided the inquiry. These were (i) the author's experience with the SEP and working in other similar extension related projects in the country; and (ii) the concepts of development and

agricultural/rural development as described in Chapter IV and in particular as presented in Figure 12. The author was encouraged to pursue further the concepts of development and agricultural/rural development by examining what was happening with the agricultural sector in Tanzania. Despite the country's agricultural potential farmers were not getting the expected yields for all the crops. The National Agricultural Policy maintains that:

> Tanzania is predominantly an agricultural country. The social and economic development of the country in general and its people in particular hinges on the development of agriculture and agro-based production (TNAP, 1982, p.xv).

However, in Tanzania improvement in the agricultural sector is charged on the Ministry of Agriculture and Livestock Development especially the national extension service. This organisation is responsible for assisting and advising farmers on improved agricultural practices and to produce enough food for their families and the nation. But how this service is supported by other services and how it functions in order to bring about development is a major concern in this study. According to Adams (1982) unless all the components of an agricultural system function well, development would not occur as expected. Therefore, in this study the extension workers' performance, the farmers' performance and the SEP activities were used to determine the development in the villages.

Similarly, impact was considered to be the changes in farmers' overall situation in their life in the villages. This social change is indicated by the dependent variables which include:

- the farmers' contact with the extension service and its programmes,
- the farmers' participation in projects and programmes,
- the farmers' changes in agricultural practices,
- the farmers' priority problems.
- the farmers' changes in the levels of food and cash crops production.

These variables are indicators of change and serve as criteria under which the impact of SEP can be determined. The underlying assumption is that development (agricultural/rural) is an outcome of positive changes in these variables. However, according to Olsen et al. (1981, p.46) social impact assessment consisted of:

i) describing the social conditions existing in the affected community before the innovation or project;

ii) determining the social conditions existing in the affected community at a later date ... without the innovation or project;

iii) determining the social conditions existing in the affected community at a time ... with the innovation or project;

iv) assessing which of the changes introduced by the innovation are significant enough to constitute either beneficial or detrimental impact for the people involved and evaluating the effects of these impacts on them.

Such a social impact assessment methodology uses sets of social indicators to measure both predicted and actual impacts of new projects or other innovations. In this study, the non-SEP villages are used to represent the existing conditions in villages without the SEP. Hence, success in the SEP will be determined by comparing the situation in the SEP and non-SEP villages.

Collection of Data

The Study Population

The study population was composed of farmers and extension workers from the selected villages. These were the primary source of data for the study. The author decided to collect data from a total of 20 people from each village. There were 15 villages from which a total of 300 farmers were interviewed. Another primary source of data were the extension workers from the SEP villages and selected non-SEP villages. Hence a total of 25 extension workers were interviewed. The secondary source of data used were:

- the SEP staff at Sokoine University of Agriculture especially the project manager;
- the Regional Agricultural and Livestock Development Officer;

- the District Agricultural and Livestock Development Officer for Morogoro and Kilosa;
- the village government leaders;
- reports on the project;
- discussion with all those involved in the project and observation on the project activities in the villages by the author.

Sample Selection

It was decided by the author that both districts that had been involved in the SEP be included in the study. Therefore, the sample was selected from both Morogoro and Kilosa districts. The study included 10 villages involved in the SEP and 5 villages which were not part of the SEP area. For the SEP villages, 6 were from Morogoro and 4 from Kilosa districts. These villages were selected on the basis of their progress in projects and programmes of the SEP. Half of the SEP study villages (i.e. 3 from Morogoro and 2 from Kilosa district) were randomly selected from a list of villages which were progressing well in SEP activities. The criteria for village progressiveness was taken to be as perceived by the project manager and DALDOs for the two districts. The second set of study villages (5) were randomly selected from a list of project villages which were perceived not to be progressing well. After the villages were selected, then it was decided that equal numbers of farmers be selected from each of the villages. Ten farmers were selected from each village from a list of farmers who in the extension worker's judgement were involved in the project (target group farmers) and those not involved (non-target farmers). These farmers were selected one from each ten cell unit.* Hence, a total of two hundred farmers from the SEP villages were selected.

For the non-SEP villages a total of five villages (i.e. 3 from Morogoro and 2 from Kilosa district) were selected on the basis that there were similar ** to the SEP villages and that they could be suitable for inclusion in the SEP in the second phase when it would be extended to other villages. Twenty

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* Ten cell unit - is the samallest government administrative structure in the villages in Tanzania. Each ten cell unit consists of ten households. There are about 25 or more ten cell units in each village in Tanzania.

** Similarity would include: accessibility of village, each village to have one bwana shamba, village government willingness to participate in SEP, and same agro-ecological zone.

farmers were randomly selected from a list of farmers in each village obtained from the village government offices. Thus a total of one hundred farmers were selected. This information on selection of the study sample is summarised in Table 15.

TABLE 15
NAME OF VILLAGE AND NUMBER OF STUDY SAMPLE FARMERS SELECTED

	Type of Village			
	SEP Village		Non-SEP Village	
District	Name	No. Selected	Name	No. Selected
Morogoro	Msufini	20	Lusanga	20
	Mvomero	20	Mangae	20
	Hembeti	20	Kauzeni	20
	Milama	20		
	Mlali	20		
	Melela	20		
Kilosa	Mkundi	20	Chanzuru	20
	Kitete	20	Ulaya-	
	Madudu	20	Kibaoni	20
	Magole	20		
Total		200		100

Selection of Extension Workers

All the extension workers from the twenty SEP villages were interviewed. For comparison purposes, 5 non-SEP extension workers were selected for the study. The non-SEP extension workers were selected from the same villages as the non-SEP farmers. Therefore, a total of 25 extension workers were selected for the study.

The Interview Schedules

The data was collected by conducting personal interviews with the selected farmers and extension workers using structured interview schedules. There were specific interview schedules designed for each type of respondent. The personal interviews were conducted by the author with assistance from a

postgraduate student from University College Dublin who was a former DALDO for the Morogoro district.

The Interview Schedule Content

A detailed interview schedule was designed under the direction and supervision of Dr J. Mannion, Department of Agribusiness, Extension and Rural Development, University College Dublin (Appendix E1 - E 4). There were 5 interview schedules – one for each type of respondent who were:

i) SEP participating farmers – those considered to be progressing well in the SEP;

ii) SEP non-participating farmers – those not progressing well in the SEP;

iii) Non-SEP farmers - not involved in the SEP;

iv) SEP extension workers - those involved in the SEP;

v) Non-SEP extension workers - who were not involved in the SEP.

Each of the farmer interview schedules had questions related to: personal characteristics, extension contact, farm characteristics, storage, village projects and programmes, and the involvement of women. The extension workers' interview schedules contained questions that sought information on: personal characteristics, village population features, village farm characteristics, village non-farm activities, extension contact, the SEP approach, village projects and programmes, in-service training and involvement of women. These interview schedules contained a combination of closed, open-ended and tabular questions. However, only the relevant questions for SEP and non-SEP respondents were included. Hence the interview schedules were slightly different (Appendix E1 - E4). The interviews for farmers were conducted in Kiswahili, the national language of Tanzania while the extension worker interviews were conducted in English. A Kiswahili version of the farmers' interview schedule is included in Appendix E4.

Study Interviews

Prior to initiation of the survey in the villages, permission had to be obtained from both Sokoine University of Agriculture to which the project was based, and the regional and district administration. The regional administration informed the districts who in turn provided the researchers with letters of introduction to the ward and village authorities. Copies of the letters used are included in Appendix D. This arrangement was vital in ensuring that a conducive environment would be obtained at the village level. The village governments and village extension workers in turn notified the selected farmers to meet the researchers at the village CCM office for the interviews. A pilot survey test was conducted in three villages and it was found that the interview schedules were adequate and would provide the required information.

The farmers' interviews were carried out in July and August of 1989. The SEP villages were covered first followed by the non-SEP villages. At the end of each interview the village leaders were given a copy of the interview schedule for their village records. The SEP and non-SEP extension workers were interviewed while at Sokoine University of Agriculture during an in-service training course in July and September 1989 respectively. However, most of the extension workers could not complete the section on village population features and this information had to be collected from the villages during the research visits. After completing the personal interviews the author continued to make follow-up visits, discussion and observation in all the study villages for one month. During this period the author held discussions with village leaders, farmers, extension workers and project staff.

Field Experience

Experience from the field indicated that each farmer interview took an average of 45 minutes to complete. The interviewers recorded the information on the Kiswahili interview schedules. In many cases the researchers stayed in the villages for over 10 hours a day. On average it took two days to interview all the twenty respondents in each village. The extension workers' interview schedule took about 2 hours to be completed. The extension workers filled in the information on the space provided in the interview schedules under the supervision of the author.

Data Analysis

The data from the completed 325 interview schedules were transferred into IBM punching sheets with the aid of a coding key that had been constructed. The data were then entered on the VM/CMS computer system and were analysed using programmes from the Statistical Package for the Social Sciences (SPSS). The farmer interview schedules had 336 variables while the village extension worker interview schedules had 294 variables. The method of analysis involved a univariate, bivariate and multivariate analysis. It used frequency counts, cross tabulations, t-tests and breakdown programmes.

CHAPTER VII

AN ANALYSIS OF THE MAJOR ELEMENTS OF THE SOKOINE EXTENSION PROJECT

Introduction

This chapter contains three sections. The first section is concerned with identifying, analysing and comparing similarities and differences of the major elements and activities of the extension service in the SEP and non- SEP villages in the Morogoro Region.

The second section focuses on determining the impact of the extension work on the farmers' performance. The criteria for success involved the examination of: the farmers' contact with the extension service and their levels of participation in SEP; levels of involvement in extension activities; the types of farmers' changes in agricultural practices; farmers' priority problems; and farmers' changes in the levels of food and cash crop production. Also, in relation to the SEP villages, this section sets out to determine the relative impact of different combinations of extension activities and projects on the farmers' levels of participation, food and cash crop production and practices.

The third section has two parts. The first part deals with an analysis of the factors related to the SEP. This part identified and examined these factors in relation to how they affected farmers' overall performance in SEP. The second part of this section examined the farmers' personal/social and farm characteristics' influence on selected performance variables which were, the level of participation, involvement in extension activities, total food production and levels of food sufficiency of the households.

Section I

A Comparison of the Extension Service's Major Elements and Activities in the SEP and Non-SEP Villages in the Morogoro Region

The data used in this section were obtained from:

- The interview schedules completed with the Bwana Shambas in the twenty SEP villages and five Bwana Shambas from non-SEP villages.
- Discussion with SEP and non-SEP Bwana Shambas and village leaders.
- Project reports from the SEP Project Manager.

- Discussion with the Regional, and District Agricultural and Livestock Officers involved in the SEP.
- Observation and personal experience working in the villages as a counterpart to the SEP Project Manager.

This section examines the performance of the extension workers under the Sokoine Extension Project. The extension workers in the non-SEP villages are used for comparison purposes to determine the similarities and differences on the operation of the Sokoine Extension system and the traditional extension service. In order to carry out the comparison 7 major elements and activities were used and these include:

- the personal characteristics and background of extension workers;
- the type of extension projects and programmes at the village level and how they are developed;
- the extension management and support system used;
- the type of in-service training provided for Bwana Shambas ;
- the duties, work activities, and methods used by Bwana Shambas in their work;
- the transport and other support facilities provided for Bwana Shambas to carry out their work; and
- the links between Bwana Shambas and research, farmers and other institutions.

These elements were used to determine the impact of the SEP on the extension service in the study area. The major criteria for success or impact was the use of these elements to assess their effect on the extension service.

The Personal and Background Characteristics of Bwana Shambas

In this study 20 SEP and 5 non-SEP Bwana Shambas were interviewed. All the Bwana Shambas from SEP villages were interviewed while the 5 Bwana Shambas from non-SEP villages were selected following the criterion that their villages should be as similar as possible to the SEP villages. It was also expected that the non-SEP villages selected for study might be included in the list of additional villages for Phase II of the SEP. An examination of personal characteristics of the Bwana Shambas revealed that a majority of the bwana shambas from SEP villages were between 25 and 31 years of age. The age range of the Bwana Shambas from non-SEP village was from 22 to 30 years.

When the Bwana Shambas from SEP villages were asked about their level of education, 95 per cent stated that they had completed Form Four or secondary education in the last 6 to 10 years. They all had a Certificate in Agriculture as a minimum qualification. The level of education for the Bwana Shambas from the non-SEP villages was similar to that of the Bwana Shambas from SEP villages. Four of the five non-SEP Bwana Shambas had completed Form Four education in the last 4 years and had a minimum qualification of the Certificate in Agriculture. None of the Bwana Shambas had an agricultural degree.

An examination of the length of service in the villages revealed that 13 or 75 per cent of the Bwana Shambas from the SEP villages had worked for 2 to 3 years in the same villages. However, the Bwana Shambas from the non-SEP villages had just one year's service. In general, a comparison of these Bwana Shambas showed that there was no major difference between their personal and background characteristics.

The Types of Extension Projects and Programmes at the Village Level and How they were Developed

As part of the Sokoine University Extension approach a number of low cost input small village projects related to innovations that were considered appropriate to deal with the food and cash crop problems have been initiated and implemented (Table 12). According to the data in Table 16 seven extension projects were being implemented in the Morogoro and Kilosa districts. The distribution and comparison of the SEP and non-SEP Bwana Shamba's involvement in the different types of projects and programmes carried out in the villages is shown in Table 16.

A comparison of the types of projects carried out by Bwana Shambas in Table 16 show that 60 per cent of the non-SEP Bwana Shambas were involved only in one extension micro-project while the SEP Bwana Shambas were distributed among nine extension micro-projects. Most (85 per cent) of the SEP Bwana Shambas were involved in the marejea project. Other micro-projects, in order of frequency of mention were oil extraction, horticulture and vegetable production and agroforestry. Discussion with non-SEP Bwana Shambas revealed that no other micro-projects were implemented. They did not use this approach and mainly relied on farm visits to a few farmers.

The Development of the Micro-Projects

The village micro-projects were used by the SEP Bwana Shambas for demonstrations of innovations. These micro-projects were initiated after

TABLE 16

A COMPARISON OF THE EXTENSION MICRO-PROJECTS AND PROGRAMMES CARRIED OUT BY SEP AND NON-SEP BWANA SHAMBAS

Type of Project/Programme	Type of Respondent			
	SEP Bwana Shamba (n=20)		Non-SEP Bwana Shamba (n=5)	
	No.	%	No.	%
Long and short rain	7	(35)	0	(0)
Post-harvest practices/structures	5	(25)	0	(0)
Sunflower/Oil extraction	8	(40)	0	(0)
Horticulture/vegetables	10	(50)	0	(0)
Oxenisation	5	(25)	0	(0)
Marejea	17	(85)	0	(0)
Compost	7	(35)	0	(0)
Agro-forestry/leucaena	12	(60)	0	(0)
Grain storage	6	(30)	3	(60)

the Bwana Shambas had attended the in-service training modules. The micro-projects were selected following a democratic procedure involving the participation of the farmers, village leaders, Bwana Shambas , district

extension staff and Sokoine University project staff. The procedure involved problem identification, discussion and meetings of all the relevant parties in analysing and selecting the projects. The development of these micro-projects emphasised the use of available local resources, local expertise and solving priority problems. These micro-projects aimed to complement agricultural practices already being carried out at the village level, to reduce input costs for farmers and to add value to agricultural product produced by the farmers.

After the 8 two-week training modules conducted in 1988 to 1989, nine low cost input micro-projects had been developed and implemented. In general each village in the study area was implementing two or more micro-projects designed to solve the food and cash crop production problems. When asked about the usefulness of these projects and programmes, 68 per ent of the SEP Bwana Shambas regarded them as very useful in helping farmers adopt the recommended practices. However this extension approach of using low cost input micro-projects in demonstrating to farmers about innovations was not a popular techniques among the non-SEP Bwana Shambas and villagers (further information on micro-projects was included in Table 12).

Extension Programmes

In the SEP villages,agricultural development programmes had been used to improve the food and cash crop production situation. During 1988 and 1989 each SEP Bwana Shamba had developed and implemented two to four agricultural extension programmes. Two of these programmes were designed to coincide with the "short rain" period and the other two were for the "long rain" period. These programmes were designed and targeted towards solving food and cash crop production problems of village households. According to the data in Table 11 these programmes addressed seven priority village problems including:

- Food shortage in February due to low yields of maize;
- Low rice yields due to poor husbandry practices;
- Low farm incomes generated from low cotton yields;
- Lack of alternative cash crops to generate farmer's incomes;
- Loss of maize and other grains in the crop stores, due to pests and rodent attacks;
- Lack of firewood and poor soil conditions; and
- Loss of vegetables and citrus fruit crops caused by poor production and preservation methods.

When this situation was compared to the extension programmes for non-SEP Bwana Shambas it was found that all these Bwana Shambas did not implement specific programmes. Their work activities and schedule was guided by the directives from the region and district extension offices.

The Extension Management and Support System Used

The Sokoine Extension Project established as part of its strategy, project structures with specific functions for improving the extension management and support system (Figure 13). Fundamental to the SEP extension approach, the project structures outlined is that, the process of problem identification starts at village level and follows participatory and democratic procedures of discussion and decision making. The problems selected for attention should be of concern to a significant number of people in the villages. They can be solved by technology and practices within the capacity of a majority of farmers. It has been an emphasis in SEP that the

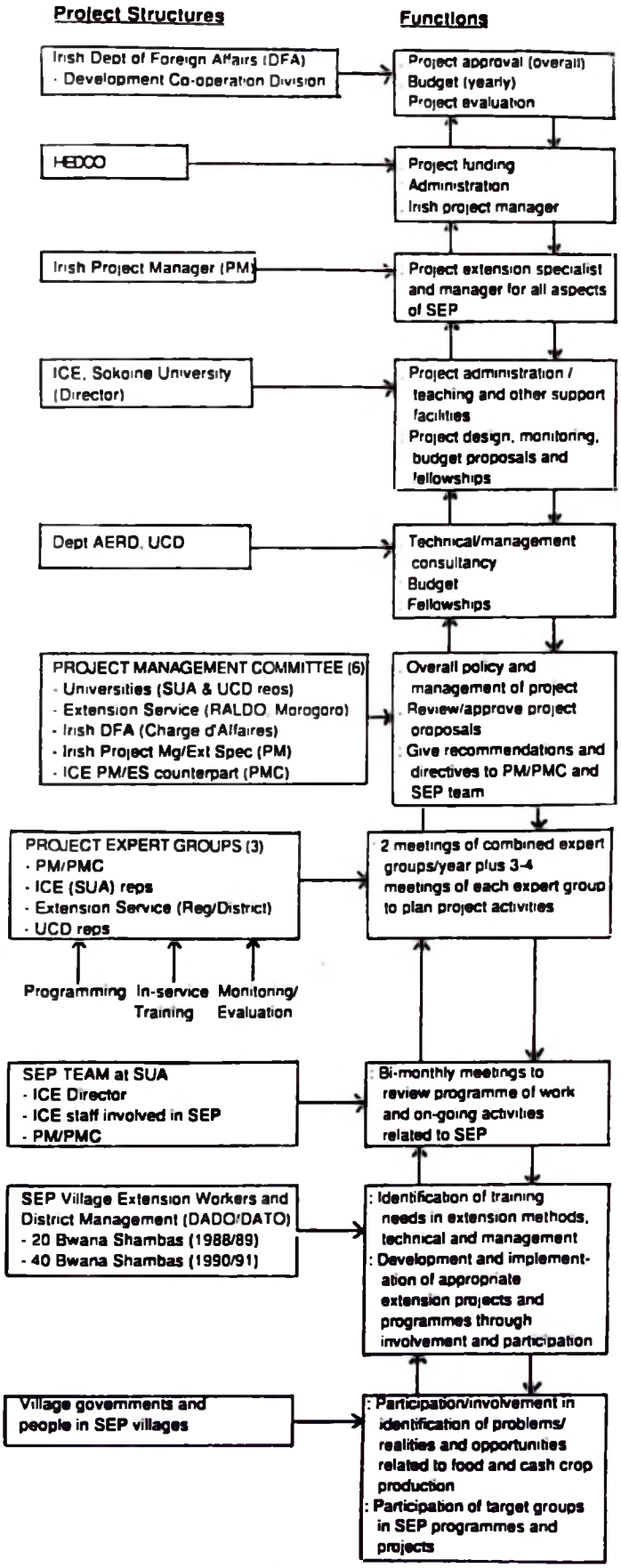

Figure 13: Outline of SEP structures and main functions of each

Source: Mannion and Lugeye, 1990

Ministry of Agriculture and Livestock Development district extension support staff would be capable of developing and delivering a management support and monitoring system to help village Bwana Shambas implement their programmes and projects. This has been facilitated by the appointment of a specific extension officer at each district (the DATO), to deal with project matters and by the provision of training and transport facilities for the DATOs. Also as part of this management and support system the development of an effective, efficient and sustainable extension training project team at the ICE is necessary to ensure that the SEP extension training will be used.

The key structures in SEP that helped in strengthening the management and support systems as outlined in Figure 13 include: the Project Management Committee, Project Expert Groups, SEP team at Sokoine University of Agriculture, SEP village Bwana Shambas , the district management (the DALDO/DATO), the village governments and people in the SEP villages. A detailed explanation of the functions of each of these structures was covered in the discussion of the project operational structures in Chapter III.

A comparison of the situation for the non-SEP Bwana Shambas revealed that such an operational structure did not exist. The District Agricultural and Livestock Development Officers (DALDO) and DATOs were unable to visit the villages because they did not have enough funds and transport facilities. The DALDO and DATO's knowledge and information about their village situations were highly dependent on the Bwana Shambas monthly reports. This led to a more top-down approach by RALDOs and DALDOs giving directives to Bwana Shambas without really being sure of the village situations.

The Type of In-Service Training Provided for Bwana Shambas

In the first phase of the Sokoine Extension Project, Bwana Shambas participated in eight 2-week in-service training courses. The contents of the course modules are summarised in Table 17. The in-service training course contents covered a wide field of extension and agricultural related topics. They included: crop husbandry practices, crop extension, communication skills, programme development, oxenisation, vegetable and fruit production, research methods and data collection, women issues in development, agricultural economics, agro-forestry, soil and water

TABLE 17
IN-SERVICE TRAINING COURSE CONTENT

Course No.	Date	Content
1	23/5 - 3/6/1988	- Rice husbandry - Rice extension - Maize husbandry - Maize extension - Extension communication and programming for maize, sorghum, cassava and coconut problems - Sorghum husbandry - Sorghum extension - Rice - Fertilizer use - Cotton husbandry - Cotton extension
2	11/7 - 22/7/1988	- Banana husbandry - Banana extension - Situation and problem analysis for extension programmes - Legume husbandry (peas, beans) - Legume extension - Resource survey to establish base data and facts for extension programmes - Coffee husbandry - Coffee extension - Resource survey in implementation and-operational procedures - Sunflower husbandry - Sunflower extension - Programme evaluation - Farming systems research - FSR/Extension linkage - Farm research systems extension programmes
3	12/9 - 23/9/1988	- Citrus fruits husbandry - Tomato husbandry - Tomato extension and marketing - Cabbage husbandry - Cabbage extension and marketing - Soil nutrients and fertility - Phosphate research and extension - Oxen use in village farming - Village oxen programme - Alternative sources of nutrients relative cost, efficiency and returns
4	7/11 - 18/11/1988	- Soil sampling, analysis, mapping - Fertilizer recommendation and extension - Data collection analysis and sources of errors - Extension data analysis - Introduction to marketing, private state and cooperatives - Agricultural marketing systems, functions of MDB - Economics of storage - Godown and on farm storage facility - Cooperatives, theory and practice aspirations and achievement - Agroforestry, afforestation - Forestry extension - Teaching methods overview, use and effectiveness - Urban agriculture extension - Cultivation, spacing seedling, thinning, spraying and other practices in short rains - Man women rural development programme - Rodent control

TABLE 17 (continued)

5	30/1 - 11/2/1989	- Study visit to Iringa (CONCERN) and Ruvuma (Peramiho) - Communication methods to change knowledge and skills - Package on composting and organic manures - Importance of nitrogen fixing trees and plants - Village soil analysis and low cost soil improvement - Village extension of nitrogen fixing trees and plants
6		- Village soils analysis data - How do we make each villagers understand the value of low cost crop nutrients - Sugarcane husbandry - Surgarcane extension - Programming skills practice - Fruits, vegetables and seed production - Fruit, vegetables and seed extension - New crops - castor, spices and condiments - New crops extension and programming - Coconut husbandry - Coconut extension- Study visit to Zanzibar - Current progress vis-a-vis required objective: Women in development - How do we optimise woman's participation in extension - Current progress vis-a-vis required objectives in agroforestry - How do we make each villager an agroforester - Current progress vis-a-vis required objective in nitrogen fixiation and cover cropping - How do we make each villager self-sufficient in soil fertility
7	25/6 - 8/7/1989	- Beans and their place in village farming - Groundnuts as a source of food and cash - Fingermillet in village farming - Participating skills in programming - Participating skills in teaching - The importance of nitrogen in light of soil analysis data - Financial implication of low cost practices, food storage, oxenisation - Record keeping for village level plans - Uses of records and production data in programme planning - Balanced nutrients using ingredients available at village level - Nutrition extension from village products - Relevant concepts of monitoring evaluation and supervision - Research methods, data collection and processing
8	18/9 - 30/9/1989	- Workshop preparation and use of graphics/visual material for each village - Programming workshop culminating in 2-3 years programmes for each village - Principles of farming as business at village level - How to prepare a project write up - Type/use of biological fertilizers to improve soil fertility at soil fertility - Economic importance of biological fertilizer at village/household level - Oxenisation practical - Making of animal farming importance at village level such as yoke making

Source: Institute of Continuing Education, 1989

conservation and rodent control. It can be argued that the courses were very intensive and Bwana Shambas were getting too much material over a short period of time. This observation is supported by the findings of this study on Bwana Shambas' perception of the course contents which are discussed in the following sections.

The course contents were developed following the model described in Figure 9 (page 58). The project expert group on in-service training was responsible for the planning and organisation of the training modules. This group of experts met at the end of each in-service training model to review the course relevance to the work of the Bwana Shambas and to study the evaluation comments given by Bwana Shambas. Following this procedure the group proposed the contents of the subsequent courses.

In this study each of the SEP Bwana Shambas attended all the eight in-service training courses provided at the Institute of Continuing Education. These were residential courses and the SEP Bwana Shambas stayed at the ICE for two weeks during the in-service training. When asked about the number of courses, a majority of the respondents (90 per cent) wanted the courses to be reduced from four to one or two courses per year. The Bwana Shambas preferred either two courses annually of two weeks duration or a one-month course for those who wanted to have one course per year. Most of the Bwana Shambas chose January, June and September as the months suitable for these courses. Sixty per cent of the Bwana Shambas selected September and January as the most appropriate months to conduct in-service training courses. September may have been selected because it is the beginning of the short rains preparations in Morogoro region. Also, Bwana Shambas chose January probably because it is the period at the end of the short rains season and they could get time off-the farm to attend a short course. This is true because these are dry periods when there are less agricultural activities. Similarly, 50 per cent of the Bwana Shambas selected June as a suitable period for an in-service training course. This could be explained by the fact that it is the end of the long rains period and is the beginning of the harvesting season in Morogoro and Kilosa districts when Bwana Shambas agricultural work is less intensive.

The data in Table 17 show that a lot of topics were covered during the in-service training courses over a period of 18 months. However, the most important subjects learned as identified by Bwana Shambas included: (1) programme planning, (2) use of low cost inputs, (3) crop husbandry practices and (4) communications (extension teaching methods). When asked about

the topics in which they would like more training in the future, 65 per cent of the Bwana Shambas identified the following as their areas of interest and weakness: (i) programme planning, (ii) evaluation and monitoring, (iii) use of chemicals (pesticides and herbicides), (iv) soil and water conservation and (v) food preservation. These weaknesses are seen more clearly if we look at the curriculum for the two-years Agricultural Certificate course which these Bwana Shambas had attended (Table 18). Programme planning, evaluation and monitoring are topics which are taught under the subject title of extension. Personal experience as a MATI-Tutor reveals that the time allocated for extension was not adequate to cover the subject. The information in Table 18 shows that extension was allocated 6 per cent of the instruction time for the certificate course. This was not enough for a trainee to be an efficient extension worker. The hours allocated for the subject did not give the students enough time to understand the principles and practice of extension.

TABLE 18

CURRICULUM SUMMARY OF THE CERTIFICATE COURSE IN AGRICULTURE

Subjects	Hours of Instruction			
	1st Year	2nd Year	Total	Percent
Crop husbandry	421	388	809	36.1
Landuse	171	193	364	16.2
Agro-mechanisation	126	171	297	13.2
Animal husbandry	71	72	143	6.4
Agricultural economics	55	81	136	6.2
Agric-home economics	119	0	119	5.3
Agricultural extension	93	49	142	6.3
Political education	65	0	65	2.9
Early morning and late evening practicals	-	0	-	-
Field practicals	0	106	106	4.7
Outreach programmes	0	60	60	2.7
Total	1121	1120	2241	100.0

Source: Ministry of Agriculture and Livestock Development (1986)

0 = Subject not taught
- = Subject taught - hours not specified

Furthermore, the use of chemicals as part of crop husbandry (crop protection) was not emphasised in the Agricultural Certificate course. Soil and water conservation was taught under Land Use. However, most Agricultural and Livestock Training Institutes experienced shortage of tutors to teach this subject. It is not surprising that MATI/LITI graduates are weak in this area. Another area of weakness identified was food preservation which was taught under Food Science and Nutrition. This subject was poorly taught because most tutors emphasised laboratory work which village people and Bwana Shambas did not need. The general picture in the MATIs and LITIs was to cover more theoretical information than practical skills. This was the situation because most tutors did not have a good farm background (Lugeye, 1986). It is against this background that the weaknesses identified in the competencies of Bwana Shambas existed.

How the In-Service Training Courses Helped Bwana Shambas in their Work

Most of the SEP Bwana Shambas identified four areas in which the in-service training courses helped them in their work. The areas identified were similar to the subjects which SEP Bwana Shambas stated they had learnt during the in-service training courses (see page 138). The SEP Bwana Shamba training needs had been used to design the courses. Despite this contribution of in-service training courses, some of the SEP Bwana Shambas felt that there was very little interval between courses thus they did not get time to implement some of the ideas learned. Therefore, SEP the Bwana Shambas suggested that the number of courses be reduced and they be given more time for preparation of village programmes.

For most (80 per cent) of the non-SEP Bwana Shambas in-service training was an area of greatest weakness. The non-SEP Bwana Shambas training needs were not identified when organising their courses. The number, length and period for attending the courses and topics to be covered were pre-determined by the regional extension service or course sponsors without the non-SEP Bwana Shambas' involvement. Training courses should be based on an analysis of the job extension agents are supposed to perform and their skills at performing these jobs well (Van den Ban and Hawkins, 1988, p. 26).

A Comparison of the Duties, Work Activities and Methods Used by the Bwana Shambas in their Work

Swanson and Claar (1984) in their study of the problems facing national agricultural extension organisations in developing countries pointed out that there was a severe shortage of trained agricultural personnel. The agricultural extension organisations were government services under the Ministry of Agriculture. The Ministry personnel were often assigned to operate at local level and generally became involved in many administrative and regulatory activities in addition to so called extension activities. In the Sokoine Extension Project one of the major aims has been to change the multi-purpose role of the Bwana Shambas to a more clearly defined, single purpose role involving a priority emphasis on education and communication activities.

In this study the Bwana Shambas were asked to estimate the amount of time per year they spent on agricultural and non-agricultural duties, the results are summarised in Table 19. The number of Bwana Shambas who reported that they were involved in a particular duty and the average percentage time devoted to each duty by those who said they were involved is shown. The data also compare the answers for SEP and non-SEP Bwana Shambas .

When asked to estimate the amount of time they spent on agricultural and non-agricultural duties it emerged that 12 of the 20 SEP Bwana Shambas spent 50 per cent of their time on advisory duties. However, all of the non-SEP Bwana Shambas stated that they spent 56 per cent of their time on advisory duties. Eleven of the 20 SEP Bwana Shambas spent 43.8 per cent of their time on farm and home visits while only one non-SEP Bwana Shamba spent 49.8 per cent of the time on farm and home visits. Furthermore, the data in Table 19 show that only the SEP Bwana Shambas spent time on demonstration plots, the village farm, planning and communicating with other institutions. Surprisingly, the non-SEP Bwana Shambas spent more than twice as much time as those involved in the SEP attending in-service training courses. The SEP Bwana Shambas spent on average 10.6 per cent of their time on data collection/report writing and this was almost half the time spent by the non-SEP Bwana Shambas.

TABLE 19

PERCENTAGE TIME ESTIMATED BY BWANA SHAMBAS SPENT ON AGRICULTURAL AND NON-AGRICULTURAL DUTIES (n = 25)

	SEP Bwana Shambas (n=20)		Non-SEP Bwana Shamba (n=5)	
Agricultural Duties	No mentions	Mean % time	No mentions	Mean % time
Advisory duties*	12	50.0	5	56.0
Farm/home visits	11	43.8	1	49.8
Demonstration/working on demonstration plot	6	30.8	0	0.0
Working on village/own farm	3	22.3	0	0.0
In-service training courses	6	13.3	3	28.3
Data collection/report writing	7	10.6	4	19.0
Planning and communicating with other institutions	1	10.0	0	0.0
Non-Agricultural Duties				
Private duties	10	23.0	4	17.5
Ward/village meetings	8	10.6	1	30.5
Other	7	14.0	0	0.0

* Agricultural meetings, office calls, informal contacts.

Most of the Bwana Shambas identified village and ward meetings and private business as the main non-agricultural duties. The meetings represented a variety of administrative and regulatory activities like, political celebrations, special CCM Party meetings "Vikao", campaigns, input supply and credit arrangement trips for farmers. The ward and village meetings took more than twice as much of the non-SEP Bwana Shamba's time as the SEP Bwana Shambas. Of the SEP Bwana Shambas' non-agricultural duties most time was spent on private duties. In general, the non-agricultural duties took almost 25 per cent of the Bwana Shambas' time in the Morogoro Region (RALDO, 1989). Likewise, in India before the initiation of the T and V system it was reported that field level extension workers spent over 75 per cent of their time on non-agricultural duties (Adams, 1982, p. 78). While these were only time estimations by the Bwana Shambas, it would appear that the SEP

has been effective in reducing the amount of time that extension workers spend on administrative, political and regulatory duties.

It is evident in Table 19 that the SEP Bwana Shambas were involved in more agricultural related duties than the non-SEP Bwana Shambas . In performing these duties the SEP Bwana Shambas used three major communication methods: (i) Farm visits, (ii) Meetings and Symposia and (iii) Demonstrations. However, the non-SEP Bwana Shambas in this study reported that they were using only the farm visits and meetings in reaching farmers. These findings are in agreement, in particular with the emphasis placed during the SEP in-service training courses on the communication methods discussed above.

Furthermore, this study reveals that, they were six major problems experienced by the SEP Bwana Shambas in advising farmers. These problems include: (i) social and cultural factors; (ii) farmers resistance to change; (iii) unavailability and cost of inputs; (iv) farmers poor attendance at meetings; (v) low level of education of farmers; and (vi) farmers living far apart and villages being too big for the Bwana Shamba .

When asked about the problems they face in advising farmers, the non-SEP Bwana Shambas identified farmer's poor attendance at meetings and farmers resistance to change as their major problems. They seemed not to be aware of the problems (i, iii and v) above mentioned by the SEP Bwana Shambas. All the identified problems are important observations which have to be addressed before the impact of the extension workers in the villages can be improved. The management and support system from the district extension service and the University (SUA) are essential in helping Bwana Shambas to deal with these problems.

The Transport and other Support Facilities Provided for Bwana Shambas to Carry Out their Work

In a study by Sigman and Swanson (1984) on perceptions of the seriousness of extension problems in 59 developing countries mobility of field extension workers was ranked as the most serious problem. In the SEP study area lack of transport was considered to be a major factor in reducing Bwana Shamba's impact in the villages. At the initiation of the project each Bwana shamba was provided with a bicycle as a measure of improving the mobility of these field agents. The study of Bwana Shambas reveals that 95 per cent of the SEP Bwana Shamba's found that the transport facility provided was very useful. They found that it helped in: (i) increasing the

number of visits to farmers, (ii) increasing mobility in the villages, (iii) keeping appointments with farmers and (iv) meeting more farmers and nearby extension workers. Also, as a result of transport provided to the DATO's, a majority (60 per cent) of the SEP Bwana Shambas reported that they were being visited 4 or more times by their district extension officers. The situation in SEP villages had improved. The author was told by the DALDO's for Morogoro and Kilosa that the district extension officers previously rarely made more than one trip to each village per year. They were able to visit only a few selected villages mostly near the main roads.

Support Facilities Provided

The Sokoine Extension Project provided a number of other support facilities to the village Bwana Shambas . Apart from the bicycles, each of the SEP Bwana Shamba received a sprayer and rain garment. Most of the SEP Bwana Shambas perceived that all these facilities helped in improving their work performance. These facilities were particularly useful in assisting in the control of pests and diseases (in cotton and maize), working in wet weather especially in rice fields and in enhancing the travelling of the SEP Bwana Shambas from different parts of the village. The sprayer helped the SEP Bwana Shamba in setting up village demonstrations in the use of pesticides especially for cotton and vegetable gardens. These support facilities made the field agents mobile, practical and accessible to more farmers in the villages.

A comparison of the transport and support facilities provided for the SEP and non-SEP Bwana Shambas reveals that, the traditional extension service did not provide field agents with similar assistance. The facilities provided for SEP Bwana Shambas were not available to the non-SEP Bwana Shambas. Almost all the Bwana Shambas felt that these services were necessary for their work. They pointed out that they could not reach their expected performance without these basic facilities being provided. In fact it was surprising that the requirements for the Bwana Shamba's from the district extension office were very demanding despite having no motivation in their work. The policy of "*one village one Bwana Shamba* " had been implemented only in the SEP villages while all the non-SEP Bwana Shambas were serving at least two villages each and some a whole ward (see Table 20).

TABLE 20
AVAILABLE FIELD LEVEL EXTENSION STAFF IN MOROGORO RURAL AND KILOSA DISTRICT, JUNE 1988

District	Number of villages	Population		Field level extension staff		
		Total	Age-between 15-64	AFO*	Other	Total
Morogoro Rural	215	443,100	217,110	53	16	69
Kilosa	132	360,940	176,860	35	27	62

* AFO-Agricultural Field Officer (usually a Diploma holder)
Source: - RALDO, Morogoro, 1989
- Morogoro. Regional Planning Committee of Experts (1984)

The Bwana Shambas from non-SEP villages carried out their visits on foot and the district extension officers did not regularly visit these villages. In general, according to the data in Table 20 each Bwana Shamba had a large area to cover, a minimum of 3 villages in Morogoro and 2 villages in Kilosa district. Supporting this observation Moyo (1987) stated:

> Despite the large area of jurisdiction the village level extension workers in Tanzania lack the necessary logistic support, especially transport to make them mobile.

It is not surprising under such circumstances that the majority of extension staff remain office bound and have little or no impact with the masses of farmers.

The Links Between Bwana Shambas , Research, Farmers and other Institutions

Linkage can be considered as a continuous two way flow of information between the extension service, agricultural research stations and the farming communities. The interaction between research and extension is necessary so that research and information can flow freely between these institutions. Extension agents help by keeping researchers informed of problems as they are identified by farmers and other clientele. Hence researcher's role is to develop practical solutions for these problems and transmit the new technologies to extension agents, who in turn transfer them to farmers. An effective linkage between research and extension, therefore, is critical to an effective technology development and transfer system.

The results of the study by Sigman and Swanson (1984) on perceptions of the seriousness of extension problems in developing countries indicated that, linkage was ranked as the 8th most important problem. In fact linkage was lacking for most extension organisations in the developing countries. In this study, all the SEP Bwana Shambas perceived that the project had improved the links between villages, research and extension. The SEP was reported to have developed closer association with a number of organisations that contribute to increasing the effectiveness of the extension workers. This information is summarised in Table 21.

The data in Table 21 show that 95 per cent of the SEP Bwana Shambas stated that Sokoine University of Agriculture, in particular the Sokoine Extension Project had developed more links with villages and the

TABLE 21

THE NUMBER AND PERCENTAGE OF BWANA SHAMBA WHO INDICATED THAT LINKS HAD BEEN IMPROVED WITH SPECIFIC INSTITUTIONS (N=25)

Institution	SEP Bwana Shamba (n=20)		Non-SEP Bwana Shamba (n=5)	
	No.	%	No.	%
Sokoine University of Agriculture	19	(95.0)	1	(20.0)
Cooperative Union	13	(65.0)	5	(100.0)
Ilonga Agric. Research	9	(45.0)	2	(40.0)
Tanzania Seed Company	4	(20.0)	0	(0.0)
MATI-LITI	4	(20.0)	2	(40.0)
Forestry Division	4	(20.0)	1	(20.0)
The Party (CCM)	3	(15.0)	3	(60.0)
Banks (CRDB)	2	(10.0)	0	(0.0)

district extension service. This was followed by an improvement in links with the Co-operative Union which was identified by 65 per cent of the SEP Bwana Shambas . The Co-operative Union was responsible for purchasing and marketing of the crops and the supply of inputs. Nine (45 per cent) of the SEP Bwana Shamba identified improved links with Ilonga Agricultural Research while 20 per cent of the SEP Bwana Shamba stated that they had

some links with Tanzania Seed Company, MATI/LITIs and the Forestry Division. Through increased association with these organisations, the SEP Bwana Shambas reported that these organisations were useful in: (i) providing training and technical knowledge, (ii) provision of inputs, (iii) provision of logistical support, (iv) the MATI/LITIs were using the villages for student placement (training and internships) and (v) providing loans for farmers.

The data in Table 21 further show that all non-SEP Bwana Shambas interviewed affirmatively saw the existence of linkages with the Co-operative Union. Other institutions which had improved their links and contact with non-SEP villages were Ilonga Agricultural Research, the MATI/LITIs and the CCM Party. A comparison of the situation in the villages showed that the non-SEP Bwana Shambas did not get similar assistance as the SEP Bwana Shambas. For example, most of the Bwana Shambas complained of lack of support from the District Extension Service. There was no meaningful communication with their superiors, inadequate supervision and advice. These factors created feelings of personal alienation and dislocation. It was obvious that the non-SEP Bwana Shambas had lost motivation and interest in carrying out their work. The weakness of the extension service in the non-SEP villages was characteristic of most areas under the traditional extension service (see Chapter II). Generally, linkage was considered inadequate and the interaction and integration between Research, Extension and Farmers were weak.

Section II

Farmers' Performance in SEP

This section is concerned with determining the impact of the extension work on the farmers' performance in SEP. Farmers' performance was examined using the following six factors:

- the farmers' contact with the extension service
- farmers' levels of participation in SEP
- farmers' level of involvement in extension activities
- the types of farmers' changes in agricultural practices
- farmers' priority problems
- levels of food and cash crop production

This section also determines the relative impact of different combinations of extension activities and projects on farmers' levels of participation and their food and cash crop production.

The following hypothesis already outlined in Chapter V will be tested:

1. **that the participation of farmers in the SEP had significantly increased their food and cash crop production during the study period.**

This hypothesis was further subdivided into five sub-hypotheses as follows:

(i) **that the SEP farmers' contact with the extension service and its programmes was higher than for the non-SEP farmers;**

(ii) **that the SEP farmers' level of involvement in extension activities was greater than for the non-SEP farmers;**

(iii) **that there were more SEP than non-SEP farmers who had changed their agricultural practices;**

(iv) **that there were more farmers' priority problems addressed by the extension service in the SEP than non-SEP villages;**

(v) **that the SEP farmers' level of food and cash crop production was greater than for the non-SEP farmers.**

Part 1: Farmers' Contact with the Extension Service and its Programmes

In the first part of this section farmers' level of extension contact was measured. The following indicators were used:

i) the number of farmers' visits to the demonstration farm;

ii) the number of meetings attended by the farmers;

iii) the number of visits by the extension workers to the individual farmers' farms.

The perceptions of farmers of the extension service are also examined.

The Number of Farmers' Visits to the Demonstration Farm

Respondents were asked to state the number of visits they made to the demonstration farm in the last year. A comparison between the SEP participating, SEP non-participating and non-SEP respondents revealed that the number of visits to the demonstration farm was not uniform. On average

each of the SEP participating respondents visited the demonstration farm 2.8 times in the last year. The comparable average number of visits to the demonstration farm for the other two groups of respondents were 1.7 and 1.6 visits respectively. The differences were statistically significant (p=0.0005).

A further investigation using a breakdown programme on the number of visits to the demonstration farm for male and female respondents for all three types of respondents was carried out. The results are presented and compared in Tables 22 and 23.

The data in Table 22 show that the difference between the average number of visits to the demonstration farm for the three types of male respondents was statistically significant. The male SEP participating respondents had carried more visits than both the SEP non-participating and non-SEP male respondents. The data show that on average the male SEP participating respondents visited the demonstration farm 2.7 times, while the male SEP non participating and non-SEP male respondents made 2.1 and 1.6 visits respectively.

TABLE 22
THE AVERAGE NUMBER OF VISITS TO THE DEMONSTRATION FARM BY MALE RESPONDENTS (n=228)

Type of Respondents	Number of Respondents	Average number of visits
SEP part	91	2.7
SEP non-part	67	2.1
Non-SEP	70	1.6

F-value = 3.9161 with two degrees of freedom.
Significance = 0.0213

Further analysis using a t-test procedure revealed that the difference between the average number of visits to the demonstration farm for male SEP participating and SEP non-participating respondents was not significant. This was also true for the male SEP participating and non-SEP respondents. Furthermore, the difference between the average number of visits by male SEP non-participating and non-SEP male respondents was found to be statistically significant (p = 0.007). The average number of visits to the demonstration farm for female respondents are compared in Table 23.

TABLE 23

THE AVERAGE NUMBER OF VISITS TO THE DEMONSTRATION FARM BY FEMALE RESPONDENTS (n = 72)

Type of Respondents	Number of Respondents	Average number of visits
SEP part	6	4.8
SEP non-part	36	1.0
Non-SEP	30	1.5

F-value = 6.3884 with two degrees of freedom
Significance = 0.0028

It is evident from the data in Table 23 that the difference between the average number of visits to the demonstration farm for the three types of respondents was significant. The data show that on average each SEP participating female respondent visited the demonstration farm 4.8 times while the comparable average number of visits for SEP non-participating and non-SEP respondents was 1.0 and 1.5 times respectively. Further investigation using a t-test procedure to determine the relationship between the average number of visits for the female groups of respondents was carried out. The results showed that the difference between the average number of visits to the demonstration farm for SEP participating and SEP non-participating females was statistically significant ($p = 0.001$). Similarly,the difference between the average number of visits for female SEP participating and non-SEP respondents was significant ($p = 0.008$). However, the difference between the average number of visits for female SEP non-participating and non-SEP respondents was not significant.

From the above findings it is evident that the male SEP participating respondents had carried out more visits to the demonstration farm than male and female SEP non-participating and non-SEP respondents. The findings also show that female SEP participating respondents had carried out more visits than all respondents in the study. However, these findings on female respondents need to be taken with caution because the number of SEP participating female respondents was small.

The Number of Meetings Organized by the Extension Workers and Attended by Farmers

The average number of meetings attended by all respondents in the study was 1.4. On average each of the SEP participating respondents attended 2.3 meetings per year. The comparable number of meetings attended by the SEP non-participating and non-SEP respondents was 1.1 and 1.0 meetings per year respectively. This means that on average the SEP participating respondents attended twice as many meetings as all the other respondents. The difference was statistically significant ($p = 0.0000$).

A further investigation and comparison between all male and female respondents in the study sample revealed that in general the males attended twice as many meetings as female respondents. However, on average each of the male SEP participating respondents attended 2.2 meetings while the SEP non-participating and non-SEP respondents each attended 1.3 and 1.2 meetings respectively. The difference in meeting attendance between the male respondents was statistically significant ($p = 0.0000$). A similar trend emerged for the female respondents. Each of the SEP participating female respondents attended 2.8 meetings in the year and each of the SEP non-participating and non-SEP female respondents attended only 0.7 and 0.5 meeting in a year. This difference between the female respondents was significant ($p = 0.0000$).

The Number of Farm Visits by the Extension Workers to Individual Farmers' Farms

The mean number of farm visits by the extension workers to the individual respondents' farms was 3.4 visits per year. The SEP participating respondents received an average of 3.95 farm visits in the year and this was significantly higher than for both the SEP non- participating and non-SEP respondents in the study. The latter two types of respondents received on average 2.9 and 3.0 farm visits respectively. The difference between the three types of respondents was statistically significant ($p = 0.0011$). These findings therefore suggest that the respondents who participated in the SEP received more farm visits by the extension workers in a year than any other respondents in the Morogoro and Kilosa districts.

From the information about extension contact in the section above it can be stated that, the SEP participating respondents visited the demonstration farm more often (1.6 times more) than all other respondents.

Similarly, both the male and female SEP participating respondents visited the demonstration farm more times than the male and female SEP non-participating and non-SEP respondents.

The SEP participating respondents attended more than double the number of meetings attended by SEP non-participating and non-SEP respondents. Also, gender had an influence in the number of meetings attended in a year in favour of the male SEP participating respondents. In addition, the SEP participating respondents received slightly more farm visits from their extension workers than either the SEP non-participating or non-SEP respondents.

Having examined indicators of extension contact with respondents, farmers' perceptions of the extension service were also considered.

The Observed Change in the Extension Workers' Performance

In determining perceptions of the extension service respondents were asked if they had seen any difference in the performance of the extension workers in the last year. Fifty nine per cent of all the respondents in the study stated that they had noticed some change in the extension worker's activities. However, a comparison of the observations for each type of respondent showed considerable differences. This comparison is presented in Table 24.

The data in Table 24 indicate that a majority (80 per cent) of SEP participating respondents noticed a change in the performance of their extension workers. An interesting feature of this data is that almost two thirds (64 per cent) of the non-SEP respondents did not notice any change in their extension workers performance. This was more than three times as much as the corresponding percentage for the SEP participating respondents.

TABLE 24

NUMBER AND PERCENTAGE OF FARMERS WHO OBSERVED CHANGES IN THE EXTENSION WORKERS' PERFORMANCE

Response	Type of Respondent					
	SEP Part (n=95)		SEP Non-Part (n=87)		Non-SEP (n=96)	
	No.	(%)	No.	(%)	No.	(%)
Yes	76	(80)	52	(60)	35	(36)
No	19	(20)	35	(40)	61	(64)
Total	95	(100)	87	(100)	96	(100)

Respondents who noticed change in the extension workers performance identified four major areas of change. These areas included: (i) more farm visits by the extension workers, (ii) more home visits by the extension worker, (iii) greater effort by the extension worker in setting a good demonstration farm and (iv) the extension worker was more informed and had better advice to offer to the farmers.

This indicates that the respondents in the study were benefiting more from the extension service than in years before the SEP was started. They also realised the importance of the extension worker and his/her advice.

The Village Involvement in Implementing Special Agricultural Projects

In order to improve the farmers rate of adoption of recommended agricultural practices the SEP initiated 7 micro-projects in the study area. Each SEP village was involved in 2 or 3 micro-projects relevant to the area and related to solving the food and cash crop production problems (see also Chapter III for a detailed discussion of the SEP micro-projects). The micro-projects aimed to complement agricultural practices already used at the village level, to reduce input costs for farmers and increase production. These projects included, green manures (Leucaena, Marejea and Azolla) and compost making.The extension workers worked with target farmers who implemented the micro-project in the villages.

When asked if their village was involved in special agricultural projects, 87 per cent of the SEP participating respondents stated that their village was involved in some of these projects. An interesting feature on this issue is that over five times as many non-SEP as SEP participating respondents stated that their village was not involved in any special agricultural projects. This was also more than three times the number of the SEP non-participating respondents. For the respondents who thought that their village was involved in special agricultural projects, they identified the following 4 micro-projects: (i) village farm, (ii) green manure-plants (Marejea and Leucaena), (iii) agro-forestry (tree planting) and (iv) oxenisation.

Personal experience in the SEP project village reveals that these are not the expected findings. It is surprising why the respondents did not identify storage structures, sunflower oil extraction and compost making. These micro-projects had received a great deal of attention from the SEP staff and extension workers in their village symposia and seminars. However, a possible explanation for such findings could be that respondents identified

these micro-projects as extension programmes or extension workers activities and not as special agricultural projects. However, from these findings it is evident that more SEP participating respondents were aware of the existence of the special agricultural projects carried out under the SEP. Also, more than half of the non-SEP respondents were certain that their village was not involved in any special agricultural project. This situation was expected in the non-SEP villages because most non-SEP extension workers did not use micro-projects for advising farmers to change their agricultural practices.

When respondents were asked about the features they liked about the project, the SEP respondents identified the three most important features of the SEP to be: (i) the extension workers advice (ii) more frequent visits by the extension worker and (iii) use of marejea as a green manure and low cost plant nutrient. Obviously the non-SEP respondents were not asked to identify features they liked about the Sokoine Extension Project.

Using the above information it is possible to make inferences on the perceptions of the respondents of the extension service and its programmes. The comparative analysis above suggests that the perceptions of respondents in the study area significantly differed between each type of respondent. The SEP participating respondents were more interested in the extension workers activities than other respondents in the study. Also, more male than female respondents were involved in the extension workers' activities for both the SEP non-participating and non-SEP respondents.

It has also been shown that the SEP participating respondents had more extension contacts in a year than any other respondent in the study. In addition a majority of the SEP participating respondents noticed change in the extension workers performance while almost two thirds of the non-SEP respondents did not notice any change. The number of SEP participating respondents who were aware that their villages were involved in special agricultural projects implemented by the SEP were more than the number of SEP non-participating and non-SEP respondents.

In summary, the findings just reported show that the SEP respondents: (i) made more farm visits to the demonstration farm than other respondents; (ii) attended more meetings organised by the extension worker than all other respondents; (iii) received more visits by the extension workers than other respondents in the study; and (iv) perceived the extension service as useful and implemented most of its programmes as compared to other respondents in the study. Therefore, these findings support the hypothesis that the SEP farmers had higher extension contact than non-SEP farmers.

Part 2: The Level of Farmers' Participation in SEP

In examining the level of farmers' participation in the SEP only the SEP villages were considered. The level of farmers' participation was determined by dividing the respondents in the SEP villages into two categories according to the extension workers view on their progress and involvement in the project. Therefore, when selecting the study sample of two hundred respondents from the SEP villages, 97 were categorised as participating (target group farmers) and 103 as non-participating (non-target group) respondents. The level of farmers' participation in the SEP was measured by the construction of a participation index.

The Construction of the SEP Participation Index

The purpose of the SEP participation index was to create a measure against which respondent's level of participation in the project can be measured. To measure the level of participation, a weighted index of the factors most associated with participation in SEP projects and programmes was constructed. The variables used were: (i) awareness of the village involvement in SEP projects and programmes; (ii) awareness of respondents of the SEP; (iii) respondents involvement in selecting village projects; (iv) involvement of women in SEP meetings and demonstrations; (v) number of meetings attended by respondents; and (vi) number of visits to the demonstration farm. The computation and weighting used in the construction of this index are shown in Appendix F.

After scoring the variables the SEP participation score was computed. The maximum SEP participation score that could be attained by any respondent was 26. The maximum SEP participation score attained by the respondents in the study was 25. A comparison of the mean SEP participation scores for each type of SEP respondent is presented in Table 25.

TABLE 25
AVERAGE SEP PARTICIPATION SCORE BY TYPE OF RESPONDENTS

Type of respondent	Average SEP participation score
All SEP respondents (n=199)	12.79
SEP participating (n=96)	15.33
SEP non participating (n=103)	10.43

F-value = 39.6356 with one degree of freedom; Sigificance = 0.0000

The data in Table 25 show that the average participation score of all respondents was 12.79. The average SEP participation score for the SEP participating respondents was greater than for SEP non-participating respondents at 15.33 and 10.43 respectively. The difference was statistically significant. Furthermore, the mean SEPparticipation score for all SEP villages in the study was compared. The results are presented in Table 26.

TABLE 26
RANKING OF THE SEP VILLAGES BY THEIR AVERAGE SEP PARTICIPATION SCORE

Rank	Name of village	Number of respondents	Average participation score
1	Hembeti	20	16.30
2	Madudú	20	16.05
3	Milama	19	15.74
4	Melela	20	14.30
5	Msufini	20	13.60
6	Kitete	20	12.30
7	Magole	20	12.05
8	Mvomero	20	10.00
9	Mkundi	20	9.05
10	Mlali	20	8.70

A comparison of the average SEP participation score for each village in Table 26 shows that it ranged from 8.70 to 16.30. Five of the villages fell below the mean for the whole population. The data show that Hembeti village had the highest average participation. Its average participation score was 16.30. In addition, the data show that Mlali village had the lowest average participation of 8.70.

In order to determine the different levels of participation of the respondents in the study, the participation score was divided into low and high categories. The "low" level category of participation was considered to range from a score of 1 to 10, while a score of 10 to 25 was considered to be a high level of participation. The relationship between type of respondent and SEP participation score is shown in Table 27.

TABLE 27

THE RELATIONSHIP BETWEEN TYPE OF RESPONDENTS AND LEVEL OF SEP PARTICIPATION SCORE

Level of Participation	Type of Respondent					
	All SEP Respondents (n=199)		SEP Part (n=96)		SEP Non-Part (n=103)	
	No.	(%)	No.	(%)	No.	(%)
Low (Score 1-10)	70	35.2	19	19.8	51	49.5
High (Score 10-25)	129	64.8	77	80.2	52	50.5
Total	199	100.0	96	100.0	103	100.0

Chi-square = 19.68191; DF = 1; Significance = 0.00005

The data in Table 27 show that almost half (49.5 per cent) of the SEP non-participating respondents were in the low level of participation category, while only 19.8 per cent of the SEP participating respondents were in this category. Just over 80 per cent of the SEP participating respondents had a high level of participation. The comparable figure for the SEP non-participating was 50.5 per cent. The relationship between the type of respondents and level of SEP participation scores was significant (Table 27).

A further investigation was carried out to establish the effect of gender on the levels of participation of the respondents. The average SEP participation score for male and female respondents in the study was examined. The number and average SEP participation scores for the male and female respondents are compared in Table 28.

The average SEP participation score for female SEP participating respondents was higher than that recorded for male SEP participating respondents (Table 28). This was more than double the average SEP participation score for female SEP non-participating and 1.6 times greater than the average SEP participation score for male SEP non-participating respondents. However, these findings need to be taken with caution because the number of female SEP participating respondents in the study sample was small.

TABLE 28

COMPARISON OF THE AVERAGE SEP PARTICIPATION SCORE OF RESPONDENTS BY TYPE AND GENDER (N = 199)

Gender	Type of Respondents			
	SEP Part (n=96)		SEP Non-Part (n=103)	
	Number	Mean score	Number	Mean score
Male	90	15.10	67	11.60
Female	6	18.10	36	8.25

Further analysis using a t-test procedure revealed that the difference between the mean SEP participation scores for male and female SEP participating and SEP non-participating respondents was significant ($p = 0.017$ and $p = 0.002$ respectively). The effect of age on the level of participation of respondents in SEP projects and programmes was also examined. Respondents with an age of less than 50 years were considered young, while those who had more than 50 years of age were considered old. The average SEP participation score for the young and older respondents was 12.3 and 14.0 respectively. This difference between the mean SEPparticipation score for the young and older SEP participating and SEP non-participating respondents was not significant.

In summary, the analysis of the farmers' participation in the SEP showed that:

- Hembeti and Madudu village had the highest mean SEP participation scores, while Mlali village had the lowest mean SEP participation score.
- Eighty per cent of the SEP participating respondents had a high level of participation. These findings were surprising because all SEP participating respondents were expected to be in the high level of participation.
- When all SEP villages respondents were compared it was found that the male respondents had a significantly higher SEP participation score than female respondents. However, female SEP participating respondents had a greater average SEP participation score than all other respondents.

- The difference between young and older respondents average SEP participation scores was not significant. However, older respondents had somewhat greater SEP participation scores.

Part 3: The Level of Farmers' Involvement in Extension Activities

The purpose of this part is to test the following hypothesis:

- **That the SEP farmers' level of involvement in extension activities was greater than for the non-SEP farmers.**

The Sokoine Extension Project has been greatly engaged in encouraging extension workers to involve farmers in planning and implementation of the extension programmes. The emphasis of the SEP was in the involvement of village governments and people in all the extension activities. In determining the level of farmers' involvement in extension activities the SEP micro-projects and programmes were not included in the list of extension activities because these factors were only relevant to SEP villages. Therefore, the section deals with the level of involvement in extension activities for all farmers in the study (n = 300).

To measure respondents' level of involvement in extension activities an extension activities' involvement index was formulated and an involvement score was computed as shown in Appendix G. The extension activities involvement index used was composed of the following factors:

i) the number of times farmers tried to contact the extension worker;
ii) the number of visits by farmers to the demonstration farm;
iii) the number of meetings organised by the extension workers and attended by farmers;
iv) the number of farm visits conducted by the extension workers; and
v) the changes made by farmers as a result of contact with the extension worker.

After the involvement index was weighted and calculated the maximum involvement score obtained by respondents was 21. The mean involvement score obtained by respondents was 7.7. In order to examine the different levels of involvement in the extension activities, the respondents in

the study were divided into two groups according to their involvement scores. A score of 1 to 8 was considered to be a "low" level while a score of 8 to 21 was considered as indicating a high level of involvement in the extension activities. The relationship between the type of respondent and level of involvement in extension activities is shown in Table 29.

TABLE 29

THE RELATIONSHIP BETWEEN TYPE OF RESPONDENT AND LEVEL OF INVOLVEMENT IN EXTENSION ACTIVITIES (N = 300)

Level of Involvement	Type of Respondent							
	All Respondents (n=300)		SEP Part (n=97)		SEP Non-Part (n=103)		Non-SEP (n=100)	
	No.	%	No.	%	No.	%	No.	%
Low (1-8)	159	(53.0)	21	(21.6)	68	(66.0)	70	(70.0)
High (8-21)	141	(47.0)	76	(78.4)	35	(34.0)	30	(30.0)
Total	300	(100.0)	97	(100.0)	103	(100.0)	100	(100.0)

Chi-square = 55.82856; DF = 2; Significance = 0.0000

The data in Table 29 show that over fifty per cent (53 per cent) of all respondents in the study were in the low extension involvement category. The data also show that 47 per cent of all the respondents had a high level of involvement in extension activities. A comparison of the level of involvement of the three types of study respondent shows that more than three quarters (78.4 per cent) of the SEP participating respondents had a high level of involvement in extension activities. They had a higher level of extension involvement than all other respondents in the study. However, less than one-third (30 per cent) of the non-SEP and 34 per cent of the SEP non-participating respondents had a high level of involvement in extension activities. It was also interesting to compare the respondents with low levels of extension involvement. The comparison showed that 70 per cent of the non-SEP, 66 per cent of the SEP non-participating and only 21.6 per cent of the SEP participating respondents were in the low level of involvement in extension activities. This means that over two-thirds of the non-SEP respondents had a low level of extension involvement.

From the information presented in Table (29) it is evident that a greater percentage of SEP participating respondents had a high level of extension involvement. Also, more non-SEP respondents were in the low level of involvement category but the SEP non-participating respondents did not differ greatly from the non-SEP respondents' level of extension involvement. The difference in the levels of involvement in extension activities between all types of respondents was statistically significant ($p = 0.0000$).

The data in Table 30 show the comparison in average extension involvement scores for the three types of respondents.

TABLE 30
EXTENSION ACTIVITY INVOLVEMENT SCORES BY TYPE OF RESPONDENT (N=290)

Type of Respondent	Number	Mean Score	t-Value	Significance
SEP Part	93	11.4 (t_1) t_1-t_2	6.83	0.000 xxx
SEP Non-Part	99	6.5 (t_2) t_1-t_3	7.78	0.000 xxx
Non-SEP	98	6.1 (t_3) t_2-t_3	0.59	0.553 NS

xxx = Significant at 0.1% level.

NS = Not Significant.

Using the t-test procedure, respondents who were participating in the SEP had a significantly greater average extension activity involvement score than both SEP non-participating and non-SEP respondents. No significant difference was found between the latter two types of respondents. From these results it is interesting to compare the differences in the average extension involvement scores between the villages in the study. Which villages were more involved in extension activities? This information is presented in Table 31.

The data in Table 31 show that the average involvement score for the study villages ranged from 3.75 to 11.55. The data also show that Madudu village ranked the highest while Mlali village was ranked the last. Madudu village's average involvement score was more than three times that of Mlali village. The data also show that 6 villages (all being SEP villages) had an average involvement score above 7.74, the average score for all villages. The non-SEP villages had lower involvement scores than most SEP villages.

Further investigation on the difference between the average involvement scores of the young and old respondents in the study revealed that it was not significant. This information suggests that age had no effect on the respondents' level of involvement in extension activities. In addition, the difference between the average extension involvement scores for male

TABLE 31
RANKING OF THE STUDY VILLAGES ACCORDING TO THEIR AVERAGE EXTENSION INVOLVEMENT SCORE

Rank	Name of Village	Number of Respondents	Average Involvement Score
1	Madudu	20	11.55
2	Milama	20	11.45
3	Hembeti	20	11.00
4	Melela	20	9.95
5	Msufini	20	9.55
6	Kitete	20	9.50
7	Mangae *	20	7.50
8	Ulaya Kibaoni *	20	7.35
9	Magole	20	6.90
10	Mkundi	20	6.45
11	Mvomero	20	5.80
12	Kauzeni *	20	5.30
13	Chanzuru *	20	5.15
14	Lusanga *	20	4.95
15	Mlali	20	3.75

* Denotes a non-SEP village.

and female respondents in the study was examined. The results show that only the difference between male and female SEP non-participating respondents was statistically significant ($p = 0.002$). These findings suggest that gender affected the level of involvement in extension activities for SEP non-

participating respondents. This can be explained by the fact that there were more female SEP non-participating and because women do more farm work than men.

In summary, the analysis of the level of farmers' involvement in extension activities revealed that:

- The respondents who were participating in the SEP had a significantly greater average extension involvement score than both the SEP non-participating and non-SEP respondents.
- There was no significant difference between the average extension involvement scores for the SEP non-participating and non-SEP respondents.
- Age did not have a significant effect on involvement in extension activities though the average scores for older respondents was higher than for young respondents.
- Gender did not have a significant effect on involvement in extension activities for SEP participating and non-SEP respondents. This relationship was found to be significant in favour of SEP non-participating respondents where the level of women participating in extension was higher than other types of respondents.

The overall finding on participation in extension activities and target farmer approach was that:

Farmers identified as target farmers for SEP programmes achieved higher levels of participation in extension activities than those who were not specifically identified as such by village extension workers. Thus the programme target group approach is an effective means of increasing the level of farmer participation in extension activities.

Part 4: Farmers Agricultural Practices

In this section the following hypothesis is tested:

- that more SEP than non-SEP farmers changed their agricultural practices.

Flatley (1989) and Ngetti (1989) observed that most farmers in the Morogoro and Kilosa Districts were still following traditional agricultural practices. In order to raise the level of crop and livestock it is necessary for farmers to improve the existing farm practices. In comparing the current farm practices for farmers in the study area the main farm practices are presented under five sub-headings as follows:

i) the cropping pattern for the main crop
ii) farm operations carried out
iii) inputs used
iv) farm implements used and
v) storage methods used.

The farm practices used by the three types of study respondents are compared in Table 32.

Cropping Pattern for the Main Crop

Intercropping or mixed cropping pattern is a long established traditional practice among African farmers. It has been experimented with and proved useful by farmers and passed on from one generation to another. This practice has received widespread criticism by researchers trained in the western hemisphere. Hence,the findings in Table 32 do not reflect the expected practices for most traditional farmers. A majority of farmers practiced an intercropping pattern for most of the crops. However, in the last five years agricultural researchers in Tanzania especially those involved with Farming Systems Research (FSR) have changed their emphasis and are encouraging intercropping. FSR is engaged in examining different intercropping patterns that farmers can continue to use or discontinue. The extension workers also have been advising

TABLE 32

COMPARISON OF FARM PRACTICES USED BY THE THREE TYPES OF STUDY RESPONDENTS

Farm Practice	Type of Respondent							
	All Respondents		SEP Part		SEP Non-Part		Non-SEP	
	No.	%	No.	%	No.	%	No.	%
Cropping pattern for the main crop								
Monocropping	165	(55.0)	53	(54.6)	44	(42.7)	68	(68.0)
Inter cropping	127	(42.3)	42	(43.3)	56	(54.4)	29	(29.0)
Farm operations carried out								
Timely operations	203	(67.7)	83	(85.6)	66	(64.1)	54	(54.0)
Recommended spacing	230	(76.7)	90	(92.8)	64	(62.1)	76	(76.0)
Planting inlines	236	(78.7)	93	(95.9)	68	(66.0)	75	(75.0)
Weeding	234	(78.0)	88	(90.7)	71	(68.9)	75	(75.0)
Inputs used								
Improved seeds	213	(71.0)	87	(89.7)	66	(64.1)	60	(60.0)
Insecticide/pesticide	114	(38.0)	53	(54.6)	32	(31.1)	29	(29.0)
Fertilizers	14	(4.7)	6	(6.2)	5	(4.9)	3	(3.0)
Marejea	5	(1.6)	4	(4.1)	1	(1.0)	0	(0.0)
Fungicide	5	(1.6)	1	(1.0)	2	(2.0)	2	(2.0)
Herbicide	5	(1.6)	0	(0.0)	1	(1.0)	2	(2.0)
Use of farm implements								
Hand hoe	286	(95.3)	92	(94.8)	95	(92.2)	99	(99.0)
Tractor	150	(50.0)	62	(63.9)	51	(49.6)	37	(37.0)
Ox-plough	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
Storage methods used								
Shell grain crops	221	(73.6)	82	(84.5)	66	(64.1)	73	(73.0)
Used storage pesticide	151	(50.3)	70	(72.2)	48	(46.6)	33	(33.0)
Used sacks stacked on logs/platform	120	(40.0)	38	(39.6)	29	(28.2)	53	(53.0)
Store crop on cob in ceiling	38	(12.7)	5	(5.2)	16	(15.5)	17	(17.0)
Store crop in "Kilindo"	24	(8.0)	9	(9.4)	10	(9.7)	5	(5.0)
Store crop on cob on platform	18	(6.0)	5	(5.2)	11	(10.7)	2	(2.0)
Store crop in Kihenge	13	(4.3)	8	(8.3)	2	(1.9)	3	(3.0)

farmers to intercrop following recommended patterns. In this study the main crops grown by farmers were maize, sorghum and cassava and the minor crops used for intercropping were pumpkins, cowpeas, groundnuts and other legumes. It was not surprising to find 3 or 5 crops in one plot.

The data in Table 32 show that over half (55 per cent) of all respondents used a monocropping pattern for the main crop. The data also shows that there were more non-SEP than SEP participating or SEP non-participating respondents who followed a monocropping pattern. The comparable percentages were 68.0 per cent, 54.6 per cent and 42.7 per cent respectively.

These results were expected because extension workers are still recommending a monocropping pattern for maize, rice, cotton and sunflower. The data in Table 32 further show that 43.3 per cent, 54.4 per cent and 29.0 per cent of SEP participating, SEP non-participating and non-SEP respondents respectively were using the intercropping pattern. As indicated earlier this is not what is commonly found or expected and the results need to be taken with caution. It may be that respondents gave the answer which they knew was expected and not the existing practices in their farms.

Farm Operations Carried Out

According to the extension service in Tanzania the critical factors that influence the crop yields in the country are the failures of farmers to carryout recommended farm operations (TNAP, 1982). The farm operations such as early planting, correct spacing, planting in lines and weeding are basic to increased crop production per unit area in Tanzania. These practices alone if followed can lead to doubling the existing crop yields in Morogoro region. According to the data in Table 32 over three quarters of all respondents carried out the major recommended farm operations in the 1988/89 season. The data also show that there were more SEP participating than SEP non-participating and non-SEP respondents who carried out the recommended farm operations. The implementation of the recommended practices should mean that the crop yields for 1988/89 ought to have increased when compared to the previous seasons (see Table 36 for average yields of the major crops). SEP extension workers having realised the importance of having their farmers use recommended crop production practices, initiated village programmes geared to advising farmers to increase food production. In the non-SEP villages these programmes were not implemented but extension workers were encouraging farmers to follow the recommended farm practices.

Inputs Used

The use of inputs in Morogoro region is generally low. According to the baseline study of the SEP, Phelan and Wims (1989) found that all the twenty SEP villages encountered problems with the supply of inputs in their villages. The most usual problem was that the inputs did not arrive to the villages in time. Similarly, in the study of agricultural production practices in the Morogoro region Ngetti (1989) stated that only one-third of farmers used pesticides or improved seeds. In this study the main inputs used were

improved seeds and insecticides/pesticides by 71 per cent and 38 per cent of all respondents respectively. The comparable proportions for the SEP participating and SEP non-participating respondents were 89.7 per cent and 64.1 per cent respectively for improved seeds and 54.6 per cent and 31.1per cent respectively for the use of insecticide or pesticides. For the non-SEP respondents 60 per cent used improved seeds and 29 per cent used insecticides/pesticides. This is an improvement in the percentage of farmers who used some of these inputs when compared to the results of the studies carried out in 1987/88.

The use of fertilizers, fungicides and herbicides had not increased as not more than 4.7 per cent of all respondents used these inputs (Table 32). Only marginal differences were noted between the three types of respondents in relation to their use of these inputs. The low use of fertilisers and in particular fungicides and herbicides can be atrributed to problems of late supplies to villages and high costs to farmers. Another input "Marejea", a nitrogen fixing plant introduced by the SEP in the project villages in 1988/89 season was not widely used probably because farmers were still testing its potential.

From the above information it can be said that improved seeds and insecticides/pesticides were the only inputs used by a larger proportion of SEP participating, SEP non-participating and non-SEP respondents. Inputs such as fertilizers, marejea, fungicides and herbicides were not adequately used and respondents need more encouragement to use them.

Use of Farm Implements

The level of technology employed in agricultural production with regard to methods of cultivation is still very traditional. The data in Table 32 show that land preparation and cultivation were done using the hand hoe and tractor by 95.3 per cent and 50.0 per cent of all the respondents respectively. A comparison of the use of farm implements shows that 94.8 per cent, 92.2 per cent and 99 per cent of the SEP participating, SEP non-participating and non-SEP respondents respectively used the hand hoe. The tractor was used by 63.9 per cent 49.6 per cent and 37 per cent of the SEP participating, SEP non-participating and non-SEP respondents respectively. The widely advocated ox-ploughing practice was not used by any of the respondents in the study. When asked about ownership of these farm implements a very small number of respondents and village governments said they owned tractors, while every respondent owned several handhoes, axes and matchets.

It is evident from this information that farmers in Morogoro and Kilosa will not be able to timely cultivate their farms and increase production if they continue to depend on the handhoe. It is probably important that the oxenisation micro-project initiated in SEP villages be studied further to see how it can be improved and encouraged. The successful experiences from other regions in the north of the country could be used by the SEP when introducing oxen cultivation in Morogoro region.

Storage Methods Used

All the major and minor food crops require storage after harvesting. The most difficult food crop to store is maize, because it is highly susceptible to pests especially weevils, the large grain borer and rats. Maize forms the basic daily meal for most Tanzanians and it is therefore a very important food crop. The most common methods of storage have been discussed in detail in the section on storage problems (Part 5). The extension service in the country stresses drying all grain crops, shelling and dusting with an appropriate pesticide. The data in Table 32 show that 84.5 per cent, 64.1 per cent and 73.0 per cent of the SEP participating, SEP non-participating and non-SEP respondents respectively shelled their grain crops. The extension workers adviced farmers to select an appropriate storage method (e.g. sacks or "**Kihenge**") depending on how long the crop will be stored. However, according to the data in Table 32 less than 10 per cent of the SEP participating, SEP non-participating or non-SEP respondents used the recommended traditional structures like "**Kihenge**" and "**Kilindo**". The most popular storage method used by all types of respondents was the sacks stacked on logs or platforms. This was used by 39.6 per cent, 28.2 per cent and 53 per cent of the SEP participating, SEP non-participating and non-SEP respondents respectively. The data also show that 72.2 per cent, 46.6 per cent and 33 per cent of the SEP participating, SEP non-participating and non-SEP respondents respectively used storage pesticides.

The major difficulty for all farmers has been to change from their traditional practice of storing crops without shelling to shelled produce and mixing the crop with a pesticide. The traditional practice does not require the extra labour of shelling and mixing the grain with pesticides. Unfortunately for crops that are stored without shelling it is difficult to evenly apply the pesticide, hence they are damaged by pests during storage. The information on the storage methods used suggests that respondents were using very poor

storage methods. It is therefore necessary that respondents are encouraged to improve on their traditional storage methods in order to reduce crop losses.

In summary, the findings in this section show that a number of farmers had significantly changed their agricultural practices. The farmers participating in SEP (target group farmers) had made more changes than non-SEP (and non-target group) farmers in: cropping pattern used for the main crop; following timely farm operations; using recommended spacing; planting in lines; weeding; and using improved seed and insecticides and shelling grain crops.

Part 5: Farmers' Priority Problems

The hypothesis to be tested in this section states:

- that more of the farmers' priority problems were addressed by the extension service in the SEP villages than was the situation in non-SEP villages.

A majority of the rural population in Tanzania are small farmers who grow most of the food that feeds the nation. However, these farmers use traditional agricultural practices and experience a lot of problems that influence their level of agricultural production. In the study area respondents were asked if they had any problems in their farms. They identified three major types of problems which included:

i) problems on their farms
ii) storage related problems in their homes
iii) problems that caused low crop yields.

The data in Table 33 show the distribution of respondents according to their perceptions of problems experienced on their farms.

The data in Table 33 show that all types of respondents in the study experienced the same nine farm problems. The major farm problems which needed to be addressed by the SEP and non-SEP extension workers included; the availability of tractors, inadequate labour and agricultural inputs (Table 33). Most villages in Morogoro and Kilosa districts do not own tractors but depend on nearby villagers and government institutions to provide tractors for hire. While tractors were in high demand for farming in all the villages they were expensive and it was difficult for village governments to own them. In providing a solution to this

problem the SEP embarked on introducing an oxenisation micro-project. The use of oxen was thought to be an appropriate intermediate technology for most villagers and can help reduce the shortage of family labour. However, reports from the villages show that this micro-project was not successful. All the oxen in five villages which were provided by the SEP are reported to have died of diseases.

TABLE 33
FREQUENCY DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR PERCEPTIONS OF PROBLEMS ON THEIR FARMS (N = 300)

Problems	Type of Respondent							
	All Respondents		SEP Part		SEP Non-Part		Non-SEP	
	No.	%	No.	%	No.	%	No.	%
Availability of tractors	238	(79.3)	79	(81.4)	76	(73.8)	83	(83.0)
Tractors too expensive to hire	216	(72.0)	75	(77.3)	81	(78.6)	60	(60.0)
Not enough family labour	203	(67.7)	65	(67.0)	70	(68.0)	68	(68.0)
Inputs too expensive to buy	184	(61.3)	69	(71.1)	64	(62.1)	51	(51.0)
Unavailability of inputs	169	(56.3)	54	(55.7)	60	(58.3)	55	(55.0)
Not enough family food	93	(31.0)	22	(22.7)	39	(37.9)	32	(32.0)
Not enough food to sell	82	(27.3)	22	(22.7)	44	(42.7)	16	(16.0)
Farm fragmentation	78	(26.0)	25	(25.8)	31	(30.1)	22	(22.0)
Lack of labour to hire	54	(18.0)	25	(25.8)	23	(22.3)	6	(6.0)

Also, discussion with village leaders and farmers revealed that farm inputs (fertilizers, seeds and pesticides) were expensive, scarce and usually were delivered too late to the villages. This led to most farmers using their own seeds and very little fertilizers and pesticides. Experience of working in the SEP villages, and from observations and discussions with village governments leaders and farmers shows that this problem has not been the focus of the SEP project activities.

Storage Problems

It was estimated by the RALDO of the Morogoro Region that more than one-third of the harvested crops were lost during storage. In this study respondents were asked about the storage methods they use for farm produce. The storage methods were different for most crops. The most common methods (see Table 32) identified by the respondents included: (i) Sacks (ii) Ceiling (iii) **Vilindo** (iv) Platform and (v) **Vihenge**. There was no major difference between the storage methods used by each type of respondent. However, an interesting feature was that only 40 per cent of all the respondents used sacks and 12.7 per cent stored maize on the cob in the ceiling. The other respondents stated that they stored smaller amounts of crop produce in traditional structures like **Vilindo, Vihenge, Vibuyu** and Pots. Similarly,when respondents were asked about the use of storage pesticides only 50 per cent said that they used storage pesticides and 40.3 per cent of the respondents used the recommended pesticide Super Dust.

Furthermore, respondents were asked to state their storage problems. The results showed that there were no difference between the respondents' storage problems. Hence, the frequency distribution of all study respondents according to their perceptions of crop storage problems was summarised and is presented in Table 34.

TABLE 34

FREQUENCY DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR PERCEPTION OF CROP STORAGE PROBLEMS (N = 300)

Problem	Respondents	
	Number	Percent
Rodents	285	(95.0)
Insects and pests	250	(83.3)
Lack of pesticides	78	(26.0)
Lack of traditional storage structures (Vihenge)	6	(2.0)
Moulds and fungi	5	(1.7)
Lack of sacks	3	(1.0)
High cost of inputs	3	(1.0)
Lack of traditional storage structure (Vilindo)	3	(1.0)
Termites	2	(0.7)

The major storage problems for the respondents in the study area were: (i) rodents, (ii) insects and pests and (iii) lack of pesticides (Table 34). Because storage is a serious problem in the Morogoro region the SEP initiated a storage micro-project which encouraged the use of traditional methods (**Vihenge, Vibuyu, Vyungu** (pots), and **Vilindo**). According to the rodent control unit at the RALDO, it advised respondents to adopt the use of traditional methods and use of rat traps in the fields and stores in order to minimise the crop losses due to rodents. The use of Super Dust chemical was also encouraged to control grain pests in the stores. For the non-SEP villages, extension workers had not started specific micro-projects and programmes related to storage problems. The farmers in these villages were still losing a lot of crops during storage.

The Problems that Cause Low Crop Yields in the Farms

According to the Regional Agricultural and Livestock Development Officer in Morogoro region and the agricultural research stations in Tanzania, the major causes of low crop yields for most farmers are as shown in Table 35(a). It is interesting to compare this list with what respondents in this study considered to be the causes of low crop yields in their farms. The frequency distribution of respondents according to their problems causing low crop yields is presented in Table 35(b).

TABLE 35(a)
CAUSES OF LOW CROP YIELDS AS IDENTIFIED BY NATIONAL AGRICULTURAL RESEARCH STATIONS AND THE EXTENSION SERVICE

1. Unavailability of improved seeds.
2. Lack of inputs.
3. Adverse soil and climatic conditions.
4. Unattractive prices.
5. Lack of irrigation.
6. Large post-harvest losses.
7. Poor Research-Extension-Farmer linkages.
8. Poor extension services.

Source: Kyomo and Keswani, 1987

TABLE 35(b)
FREQUENCY DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR PERCEPTIONS OF PROBLEMS CAUSING LOW CROP YIELDS (N = 300)

Problem	Respondents	
	Number	Percent
Rainfall (too little/much)	235	(78.3)
Rodents	210	(70.0)
Lack of labour	182	(60.7)
Weeds	172	(57.3)
Birds	153	(51.0)
Lack of inputs	122	(40.7)
Poor soils	114	(38.0)
Too many plants	53	(17.7)

In general, the data in Tables 35(a) and 35(b) show a similar set of problems causing low crop yields but they differed in their prioritisation of these problems. From the data in Table 35(b) it is evident that unreliable rainfall was considered a major problem by more than three quarters of the respondents. Rainfall was either too much causing floods or too little resulting in drought in some years.

After respondents identified their agricultural problems, they were asked to select their two major problems from each category of farming problems as shown in Tables 32 to 35. The major farming problems selected are presented in Table 36.

From the data in Table 36 it is shown that respondents in the study lacked tractors for cultivation. When asked about the use of farm machinery, only 3 per cent used and owned tractors while about half (47 per cent) of respondents used hired tractors. However, almost all respondents (95.3 per cent) owned and used hand hoes for most of the farm operations. The cost of hiring a tractor was Tshs. 1,500 in 1988/89 season but doubled to Tshs. 3,000 per acre in 1989/90 season. This was considered too expensive by most respondents and it could not be paid-off by the low crop yields from their farms.

TABLE 36

FREQUENCY DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR PRIORITY FARMING PROBLEMS (N = 300)

Priority Problems	Respondents	
	Number	Percent
Farm Resources Related		
Lack of tractors	238	(79.3)
Inputs too expensive	184	(61.3)
Storage Related Problems		
Rodents	210	(71.0)
Insects and pests	250	(83.3)
Causes of Low Crop Yields		
Rainfall (too little/much)	235	(78.3)
Lack of labour	182	(60.7)

Inputs such as improved seed, chemical fertilizers and pesticides were also very expensive. For example, the cost of the cotton insecticide alone was Tshs. 3,600 per acre in 1988/89 season. The cost of fertilizers (for example a 50 kilogramme bag of Nitrogenous fertilizer) had almost doubled to Tshs. 720 in 1988/89. When respondents calculated the total cost of growing 1 acre of cotton (cost of labour, tractor, seed, fertilizer and insecticide included) they found out that they were making a loss of more than Tshs 1,000 per acre. The situation for small cotton growers was bad because the price for cotton was fixed by the government and farmers were required to sell the crop to Co-operative Unions which purchased the crop on credit. Where farmers were lucky the Co-operative Unions made payments within six months after the crop had been purchased. This made farmers unable to pay for inputs or invest in farm development.

The biggest storage problem for all villages in the study area was rats and insect pests which attacked all crops from the field to the stores in the homes. Rats were reported to be eating seedlings in the fields and the harvested crop. This reduced the crop yields for farmers. It was reported by farmers that an increase in crop yields led to an increase in the number of rats. For example,

in one visit at Madudu village, the author met a farmer who had trapped more than 1000 rats overnight. The farmer used open tins dug into the ground near the stored crop (see Figure 14). It was estimated that in 1988/89 more than 30 per cent of all crops were eaten by rats. The use of traditional storage methods and rat traps was encouraged by the SEP. It was thought to be an appropriate technology for villagers especially because it was cheap, safe and appropriate when dealing with large numbers of rats in all villages.

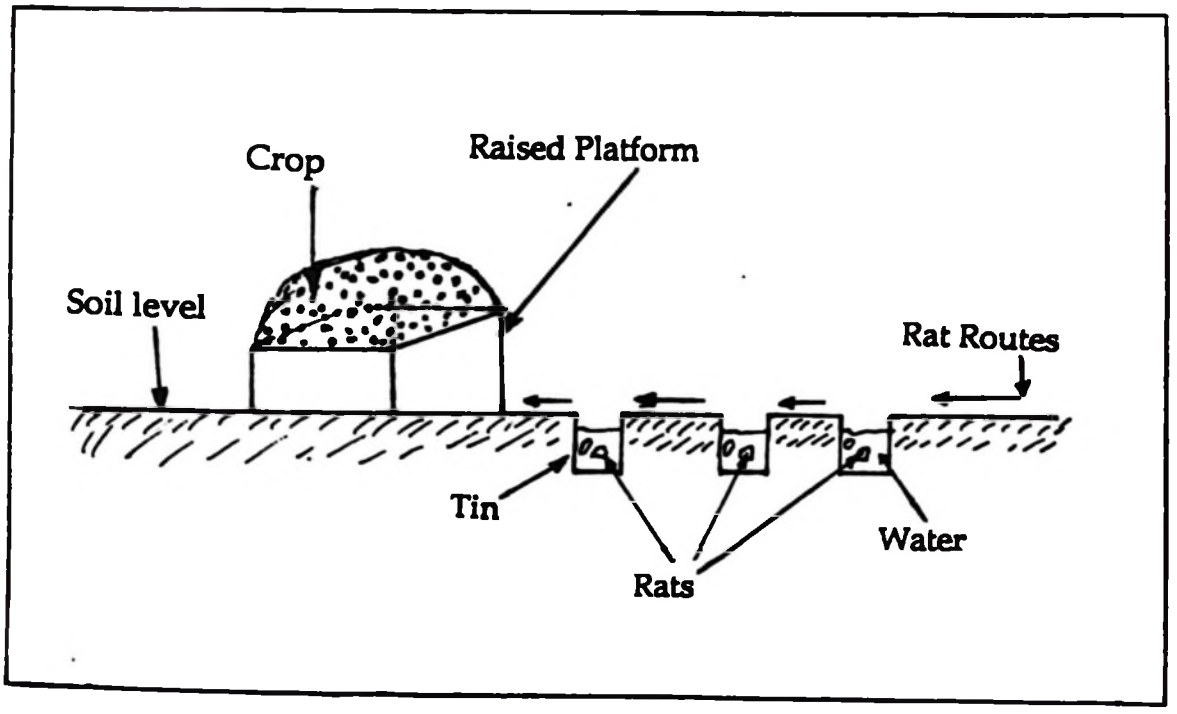

Figure 14 : Traditional Rat - Traps Using Tins.

Crop yields were also low in the study area because of unreliable rainfall, lack of irrigation, untimely planting and weeds in the farms. Most respondents planted late and could not weed all their farms. This was influenced by the availability of tractors during cultivation and labour shortage from planting to harvesting. These problems causing low crop yields led to poor food security and small farm incomes for most of the households. Hence, in the last two years the SEP initiated 7 micro-projects (see Table 12, Chapter III for a detailed discussion) aimed at improving the food and cash crop production in the study area. However, for the non-SEP villages these problems prevail and there was no specific effort by the village extension workers to address the problems.

In summary, the farmer's priority problems identified in the study included: insects and pests; lack of tractors; unreliable rainfall; rodent problems in the field and farmers' stores; farm inputs being too expensive and unavailable; and labour shortage.

The problems addressed by the SEP in the SEP villages were:

i) dependence of farmers on tractors and reduction of labour shortage by introduction of oxen cultivation;

ii) the rodent problem in the farmers' stores by initiation of storage programmes and promotion of traditional storage structures (eg. **Vihenge, Vilindo, Vyungu** and **Vibuyu**);

iii) lack of farm inputs by introduction of compost and marejea as low cost plant nutrients.

These problems were more severe in the non-SEP villages because no specific extension programmes had been initiated to solve them. The information just presented suggests that more of SEP farmers' priority problems were addressed by the SEP than was the situation in non-SEP villages. However, a considerable number of the problems identified by farmers (eg. farm inputs, fertilizers, improved seeds, pesticides, field pests-weeds, birds, insects and rodents in the field and unreliable rainfall) in the project villages had not been the subject of extension programmes and projects. Hence, the SEP had not made any significant impact on solving them at village farmer level.

Part 6: The Levels of Food and Cash Crop Production

This section sets out to test the following hypothesis:

- that the SEP farmers' level of food and cash crop production was greater than for the non-SEP farmers.

The Sokoine Extension Project has been advising farmers in Morogoro Region to improve their levels of food and cash crop production. The levels of crop production was considered in terms of the types of crops grown, yields of crops per unit area per household and incomes made from the sale of surplus food and cash crops. The changes made by farmers in the SEP in their levels of crop production and incomes are also examined.

Types of Crops Grown

In order to establish the levels of crop production, respondents in the study were asked to identify the types of crops they grow. In Table 37, the list of all the crops grown by respondents in the 1988/89 cropping season is shown.

TABLE 37

DISTRIBUTION OF RESPONDENTS BY THE TYPES OF CROPS GROWN

Crop	Respondents	
	Number	Percent
Maize	254	(84.7)
Rice	157	(48.3)
Sorghum	133	(44.3)
Cotton	136	(45.3)
Sunflower	13	(4.3)
Cassava	47	(15.7)
Cowpeas/Beans	48	(16.0)
Bananas	31	(10.3)
Sweet potatoes	30	(10.0)
Pumpkins	27	(9.0)
Sugarcane	26	(8.7)
Vegetables	29	(9.7)
Fruits	26	(8.6)

From the data in Table 37 it is evident that the major food crops grown by a large proportion of respondents were maize, rice and sorghum in that order of priority. However, from the authors experience and observations in the study villages, beans, cassava, bananas, sweet potatoes, pumpkins and vegetables were important minor crops grown by farmers. Cassava and sweet potatoes were used as food security crops and the extension workers encouraged farmers to grow at least half an acre of each of these crops. These crops safequard farmers from drought and failure of the major crops and they can also be used as cash crops to meet small households expenses. It is a common feature in many parts of Tanzania that when farmers are asked to identify their food and cash crops, they always give the first four crops shown in Table 37. This has been influenced by commodity research and extension programmes that emphasised the growing of these major crops. Hence, it is essential to include these minor crops when examining the real food situation in the rural areas.

Yields of Major Crops Grown

Farmers' success in farming is determined by their increases in the production of crops. Respondents were asked to estimate the yields of the major corps grown in the 1988/89 cropping season. The total yields of the main food and cash crops were computed. The average yields of the major crops for each respondent are shown in Table 38.

TABLE 38

COMPARISON OF THE AVERAGE YIELDS OF THE MAJOR CROPS FOR SEP RESPONDENTS FOR THREE CROPPING SEASONS

Major Crop	Season		
	1986/87* (kg/ha)	1987/88* (kg/ha)	1988/89 (kg/ha)
Maize	835.75	538.50	1509.17
Rice	900.00	320.00	1745.55
Sorghum	327.00	368.50	1053.16
Cotton	770.00	846.00	1422.67
Sunflower	NA	NA	2181.75
Legumes	453.00	83.00	NA

*Source: Ngetti (1989, p. 53).

According to Ngetti (1989) and Flatley (1989), the average crop yields of the SEP respondents were lower in 1987/88 season than during the previous season. From the data in Table 38 the average yields of the SEP respondents in 1988/89 cropping season were higher than the two previous seasons. The yield for maize, rice and sorghum had more than doubled since the inception of SEP in the study area. Average yields for cotton had increased by more than one and half times compared with the previous year when SEP was introduced in the area. In order to establish whether the SEP had an influence in the changes in the yields, the average yields of the major crops was compared for all types of respondents in the study. This means that the averages yields of the major crops for all types of respondents were computed and the results are compared in Table 39.

TABLE 39
COMPARISON OF THE AVERAGE YIELDS OF THE MAJOR CROPS ACCORDING TO THE TYPE OF RESPONDENTS

Crop	Type of Respondent		
	SEP Part (kg/ha)	SEP Non-Part (kg/ha)	Non-SEP (kg/ha)
Maize	1819.4	1227.3	907.5
Rice	2307.2	1330.6	1035.2
Sorghum	1138.7	965.8	620.0
Cotton	1442.2	1384.7	939.3
Sunflower	3041.3	806.9	NA

The data in Table 39 show that the SEP participating respondents had higher yields for all major crops than all other types of respondents. The average yields for maize, rice and sorghum for the SEP participating respondents were more than double those for the non-SEP respondents. The average yields for the crops grown by the non-SEP respondents were lower than the SEP participating and SEP non-participating respondents.

Furthermore, in order to determine whether the SEP had an influence in the increases in the crop yields in the villages, the yields of the major crops for all 15 villages in the study were computed and compared. The average yields for all major crops for each village are presented in Table 40.

TABLE 40

COMPARISON OF THE AVERAGE YIELDS OF THE MAJOR CROPS PER VILLAGE IN 1988/89 SEASON

Name of Village	Major Crops				
	Maize (kg/ha)	Rice (kg/ha)	Sorghum (kg/ha)	Cotton (kg/ha)	Sunflower (kg/ha)
Msufini	2093.4	3541.8	1358.5	NA	6463.2
Mvomero	1137.7	1152.9	874.8	1674.1	988.0
Mkundi	1015.5	NA	1122.9	1208.6	0.0
Madudu	3002.5	2264.1	1045.8	247.0	658.7
Hembeti	1101.7	2114.5	1138.9	1165.7	NA
Kitete	1626.2	1701.6	1409.0	1593.2	1180.1
Magole	1691.6	926.3	444.6	1985.6	NA
Milama	1474.0	985.4	1338.7	1899.2	1235.0
Mlali	516.9	541.2	844.6	1080.6	NA
Melela	741.0	864.5	990.9	1153.1	NA
Lusanga*	867.2	1129.1	NA	NA	NA
Chanzuru*	857.6	1100.7	NA	1533.5	NA
Ulaya Kibaoni*	1287.5	1003.0	308.8	892.8	NA
Mangae*	519.7	205.8	710.8	848.5	NA
Kauzeni*	727.3	966.0	551.0	NA	NA
Average Yield for Entire Study Population	1328.5	1432.6	938.8	1276.9	2058.3

*Denotes a non-SEP village

NA = Not Applicable

All the other villages are SEP villages.

According to the data in Table 40 more SEP than non-SEP villages had crop yields greater than the average yields reported for the entire study population (see Table 38). This information is summarised in Figure 15.

Maize: (>1328.5 kg/ha)	**Sorghum: (> 938.8 kg/ha)**
-Madudu	-Msufini
-Msufini	-Milama
-Magole	-Kitete
-Kitete	-Hembeti
-Milama	-Mkundi
Rice: (> 1482.6 kg/ha)	-Madudu
-Msufini	-Melela
-Madudu	**Cotton: (> 1276.9 kg/ha)**
-Hembeti	-Magole
-Kitete	-Milama
Sunflower (>2058.3 kg/ha)	-Mvomero
-Msufini	-Chanzuru*

* Denotes a non-SEP village
() The average crop yield for the entire study population

Figure 15: Names of the Villages which Exceeded the Average Crop Yields for the Entire Study Population in the 1988/89 Season.

It is evident from the data in Table 40 and Figure 15 that only one non-SEP village got yields for cotton greater than the average crop yields for the entire population. This was Chanzuru village. Also, the data in Table 40 show that the average yields for the non-SEP villages for all crops were lower than the average yields for all other villages in the study area. When yields were compared among villages for each crop (Figure 15), only five SEP villages exceeded the average yields for maize in the study area. These villages included: Madudu, Msufini, Magole, Kitete and Milama. The other five SEP villages and non-SEP villages recorded lower average yields. The study average yield for rice was exceeded by four SEP villages namely: Msufini,

Madudu, Hembeti and Kitete respectively while for sorghum seven SEP villages recorded higher yields than the study average and these villages were: Kitete, Msufini, Milama, Hembeti, Mkundi, Madudu and Melela respectively. Figure 15 further shows that cotton yields were exceeded by four villages: Magole, Milama, Mvomero and Chanzuru respectively while only Msufini village recorded higher yields than the average study yields for sunflower. From the above information on crop yields, it can be stated that these findings suggest that the SEP villages had greater average crop yields than the non-SEP villages.

Food Production and Sufficiency

A major aim of this study was to determine the effect of the Sokoine Extension Project on the food production and sufficiency among farmers participating in the project. According to the data in Table 37, many food crops are gown by respondents. But because it is difficult to get crop harvest estimates especially for the minor crops, only the three major food crops were used in calculating the total amount of food production for the villages. For the purpose of this study food production will be considered to include the total harvest estimates for maize, rice and sorghum. The computed food production from these three major crops will help to give the general trend of the food situation in the study area. However, these results need to be taken with caution because there are only a part of crops consumed by respondents.

The total food produced by each household ranged from 0 to 45,000 kilogrammes. The average food production per household in the SEP villages was 3,147 kilogrammes. The average production per household of the three main crops for the SEP respondents was more than twice as much as the two previous seasons. The distribution of SEP village respondents according to their total food production for three consecutive seasons (1986 to 1989) is presented in Tables 41(a) and 41(b).

TABLE 41(a)

DISTRIBUTION OF SEP VILLAGE RESPONDENTS ACCORDING TO THEIR TOTAL FOOD PRODUCTION*

Food Production	1986/87 season Respondents		1987/88 season Respondents	
(kg)	No.	(%)	No.	(%)
0	2	(2.5)	7	(8.7)
20 - 100	0	(0.0)	10	(12.5)
100 - 500	17	(21.2)	24	(30.0)
500 - 1000	26	(32.6)	18	(22.5)
1000 - 2000	18	(22.5)	12	(15.0)
2000 - 5000	13	(16.2)	5	(6.3)
5000 - 11000	4	(5.0)	4	(5.0)
Total	80	(100.0)	80	(100.0)
Mean Food Production	1500 kg		1096 kg	

* Source: Adapted from Ngetti (1989, p. 55) - data from SEP study villages

TABLE 41(b)

DISTRIBUTION OF SEP AND NON-SEP RESPONDENTS ACCORDING TO THEIR TOTAL FOOD PRODUCTION

Food Production	1988/89 Season SEP Respondents		Non-SEP Respondents	
(kg)	No.	(%)	No.	(%)
0	2	(1.0)	3	(3.2)
20 - 100	0	(0.0)	2	(2.1)
100 - 500	27	(14.2)	16	(16.8)
500 - 1000	32	(16.7)	26	(27.4)
1000 - 2000	58	(30.4)	30	(31.5)
2000 - 5000	46	(24.1)	16	(16.8)
5000 - 11000	19	(9.9)	1	(1.1)
11000 - 12400	0	(0.0	1	(1.1)
12400 - 45000	7	(3.7)	0	(0.0)
Total	191	(100.0)	95	(100.0)
Mean Food Production	3147 kg		1382 kg	

Using the data in Tables 41(a) and 41(b) the total volume of food production of the SEP and non-SEP respondents for three cropping seasons are compared. A comparison of the food production in the three seasons shows that a smaller proportion of the SEP respondents (1.0 per cent) in 1988/89 did not produce any food by comparison with that reported by Ngetti (1989) for the 1986/87 (2.5 per cent) and 1987/88 (8.7 per cent) seasons. It is interesting to note that in 1988/89 just over 3 per cent of the non-SEP respondents recorded zero food production. The data in Table 41(b) also show that a larger proportion of the SEP respondents (84.8 per cent) produced above 500 kilogrammes in 1988/89 as compared to 77.9 per cent for the non-SEP respondents. In the 1986/87 and 1987/88 seasons, 76 per cent and 48 per cent respectively of the SEP respondents produced over 500 kilogrammes. The data in Tables 41(a) and 41(b) also show that just over 3 per cent of the SEP respondents and 1 per cent of the non-SEP respondents in 1988/89 exceeded a total food production of 11,000 kilogrammes. No non-SEP respondents in 1986/87 and 1987/88 seasons exceeded this level of food production.

Furthermore, the average food production for each type of respondent in 1988/89 was compared. The results are presented in Table 42.

TABLE 42

TOTAL FOOD PRODUCTION BY TYPE OF RESPONDENT-1988/89 SEASON (N = 276)

Type of Respondent	Number	Average Food Production	t-Value	Significance
SEP PART	88	4,584 (t_1) t_1-t_2	2.98	0.04 *
SEP NON-PART	95	1,925 (t_2) t_1-t_3	3.66	0.000 ***
NON-SEP	93	1,398 (t_3) t_2-t_3	1.77	0.079 NS

* Significant at 5% level.

*** Significant at 0.1% level

NS = Not Significant.

The average food production for the entire population in the study was 2,595 kilogrammes. The data in Table 42 show that by comparison with SEP non-participating and non-SEP respondents, the SEP participating respondents produced more than twice as much food. Non-SEP respondents had the lowest average food production. Using the t-test procedure, respondents who were participating in SEP had significantly

greater food production than the SEP non-participating and non-SEP respondents (Table 42). No significant difference was found between the SEP non-participating and non-SEP respondents. These findings suggest that the SEP respondents and in particular the SEP participating respondents (the target group farmers) produce more food in the 1988/89 season than other types of respondents.

Food Sufficiency

Increasing food production and achieving food sufficiency is a major goal of the Sokoine Extension Project. In order to examine the level of food sufficiency in the study area, the total food produced and food requirement for each person in the households was computed. The manner in which total food production was calculated for each respondent was explained in the beginning of this part (page 181). The total food requirement for the households in the study was calculated on the basis of the number of people in each household as follows: according to the national recommendation, an adult requires at least 4 bags of grain (maize, sorghum or rice) or 360 kilogrammes while children under 18 years of age are estimated to require 3 bags or 270 kilogrammes of grain a year. Therefore, each household is advised by the national extension service to store food following this recommendation. The total food requirement for each member of the household was calculated by multiplying the total number of adults by 360 kilogrammes and the number of children was multiplied by 270 kilogrammes. Hence, the food requirement for each household was obtained by adding the adult and children food requirements.

In order to determine whether the food produced by respondents was enough to attain food sufficiency, the total food produced by each households was divided by the total food requirement for each household. This was also multiplied by 100 to get a percentage. The distribution of respondents according to their level of food sufficiency is presented in Table 43(a) while the farmers' perceptions of the level of food sufficiency in their households is shown in Table 43(b).

TABLE 43(a)

DISTRIBUTION OF RESPONDENTS ACCORDING TO THEIR LEVEL OF FOOD SUFFICIENCY (N = 290)

Level of Food Sufficiency (%)	Respondents	
	Number	Per cent
0	5	(1.7)
0 - 25	35	(12.1)
25 - 50	61	(21.0)
50 - 75	41	(14.1)
75 - 100	30	(10.5)
100 - 500	114	(39.2)
> 500	4	(1.4)

TABLE 43(b)

FARMERS' PERCEPTION OF THE LEVEL OF FOOD SUFFICIENCY IN THEIR HOUSEHOLDS (N = 290)

Level of Food Sufficiency (%)	Respondents	
	Number	Per cent
0	5	(1.7)
0 - 25	29	(10.0)
25 - 50	47	(16.2)
50 - 75	36	(12.4)
75 - 100	24	(8.3)
100 - 500	49	(16.9)
> 500	100	(34.5)

The farmers' perceptions of the level of food sufficiency in their households shown in Table 43(b) was obtained by dividing the total food consumed in the households as estimated by respondents by the food requirement for each member of the household and was multiplied by 100 to get the perceived level of food sufficiency.

The data in Table 43(a) show that the level of food sufficiency for 1.7 per cent of the respondents was zero (ie. they grew no food crops for their families). This was similar to farmers' perceptions of the level of food sufficiency in their households as shown in Table 43(b). The data in Table 43(a) also show that the level of food sufficiency for 59.4 per cent of the respondents was below 100 per cent. However, only 48.6 per cent of the respondents perceived their level of food sufficiency to be below 100 per cent (Table 43(b)). Furthermore, the data in Table 43(a) show that the level of food sufficiency of 1.4 per cent of the respondents was more than 500 per cent, while the data in Table 43(b) show that 34.5 per cent of respondents perceived their level of food sufficiency to be more than 500 per cent. This difference can be explained by the fact that respondents in Table 43(b) considered both the major and minor food crops in determining their level of food sufficiency. The findings from Tables 43(a) and 43(b) suggest that a majority of the respondents do not produce enough food to meet the requirements of their families.

Further analysis of the data on the level of food sufficiency revealed that 38.6 per cent of SEP participating, 62.1 per cent of SEP non-participating and 76.3 per cent of non-SEP respondents had less than the 100 per cent level of food sufficiency.

In order to determine the impact of SEP on the food sufficiency in the study villages, the three types of respondents' average level of food sufficiency was compared. The results are presented in Table 44.

TABLE 44
COMPARISON OF THE AVERAGE FOOD SUFFICIENCY BY TYPE OF RESPONDENT (N = 276)

Type of Respondent	Number	Average % Food Sufficiency	t-Value	Significance
SEP PART	88	228.3 (t_1) t_1-t_2	2.39	0.019 *
SEP NON-PART	95	110.7 (t_2) t_1-t_3	3.00	0.003 ***
NON-SEP	93	82.9 (t_3) t_2-t_3	1.88	0.061 NS

* Significant at 5% level. NS = Not Significant.
*** Significant at 0.1% level.

The data in Table 44 show that the average percentage food sufficiency for SEP participating respondents was greater than for the other two groups of respondents. The SEP participating respondents' average food sufficiency was more than double that for the SEP non-participating and non-SEP respondents. Using the t-test procedure, those who were participating in the SEP had a significantly greater level of food sufficiency than both SEP non-participating and non-SEP respondents. However, no significant difference was found between SEP non-participating and non-SEP respondents' average food sufficiency.

Further analysis was carried out to compare the levels of food sufficiency for each village. The average levels of food sufficiency and the percentages of households having less than 100 per cent food sufficiency for each village are shown in Table 45.

TABLE 45
COMPARISON OF THE VILLAGES BY THEIR LEVELS OF FOOD SUFFICIENCY

Name of Village	Average Level of Food Sufficiency (%)	Percent of Households with <100% Level of Food Sufficiency
Madudu	448.4	21.1
Magole	203.5	30.0
Msufini	207.6	47.1
Chanzuru*	144.7	47.4
Hembeti	120.3	50.0
Kitete	152.9	50.0
Mvomero	108.5	60.0
Milama	100.4	62.0
Mkundi	162.8	65.0
Melela	79.0	72.2
Mlali	71.5	81.5
Lusanga *	80.4	82.4
Ulaya Kibaoni *	75.3	86.0
Kauzeni *	51.4	89.5
Mangae *	62.3	91.0

* Denotes non-SEP villages.

It is evident from the data in Table 45 that when the village average level of food sufficiency was high the proportion of households in the village producing less than 100 per cent food sufficiency was low. The data show that there were only four villages where less than half the households were below the 100 per cent level of food sufficiency. These villages were Madudu, Magole, Msufini and Chanzuru. Only one of these was a non-SEP village. The remaining non-SEP villages had the highest percentages (over 82 per cent) of their households below the 100 per cent food sufficiency level. Hence, these findings suggest that SEP villages had a better food situation as compared to the non-SEP villages.

Farmers' Income from Crop Sales

Most subsistence farmers get their incomes from selling the surplus food crops and harvests from cash crops. In this study 17.3 per cent of the respondents sold surplus food crops and 44.7 per cent of respondents sold cash crops they grew. In order to determine the incomes made by the respondents the food sold and cash crop sales were computed. The income from food sold was calculated from total amounts of rice, maize and sorghum sales. The food sold ranged from zero to 117,000 kilogrammes of food crops. The income from cash crops was calculated from total cotton and sunflower sales. In each of these cases the government official crops sale prices were used. However, more than one-third of the food crops were sold in the parallel market where farmers made more money. For crops sold through the official market, the total income by respondents was obtained by adding the food crop and cash crop sales. The total income obtained by each respondents ranged from zero to 3,766,400 Tshs.

The distribution of respondents according to their income made from crop sales is presented in Table 46. The results need to be taken with caution. A zero Shillings from crop sales does not mean that the respondent did not make money from crop sales. However, this could mean that the respondent sold his/her crop through the parallel market, or sold processed commodities like local brew, oil, flour or milled rice. In all these cases the farmer would get more money than selling to official government organisations.

The data in Table 46 show that 44.3 per cent of respondents did not make any money from crop sales. About one-fifth of respondents had incomes of between 15,000 and 45,000 Tshs. while a similar proportion were in the 2,400 to 15,000 Tshs. range. It is also shown by the data in Table 46

that almost 4 per cent of the respondents earned more than Tshs 200,000. It is obvious from the data that the incomes for the majority of the respondents were very low. From experience living in the region, an income of less than Tsh 50,000 for a farmer would be considered very low. This means that the farmer can not purchase other services and commodities.

TABLE 46
DISTRIBUTION OF RESPONDENTS ACCORDING TO THE TOTAL INCOME FROM CROP SALES (N = 300)

Total Income (Tshs)	Respondents	
	Number	Percent
0	133	(44.3)
2,400 - 15,000	57	(19.0)
15,000 - 45,000	64	(21.4)
45,000 - 75,000	26	(8.6)
75,000 - 100,000	4	(1.4)
100,000 - 200,000	5	(1.6)
200,000 - 3,766,400	11	(3.7)

Additional analysis of incomes from crop sales was undertaken to compare the situation for the three types of respondents. The results showed that 53 per cent of the non-SEP, 54.4 per cent of the SEP non-participating and 24.7 per cent of the SEP participating respondents earned no money from crop sales. There were about twice as many non-SEP and SEP non-participating respondents as SEP participating respondents who did not make any income from crop sales. Also, a majority of the respondents (95 per cent non-SEP, 92.2 per cent SEP non-participating and 72.2 SEP participating) earned less than 50,000 Tshs. The general trend was that the SEP participating respondents earned more money than the other respondents.

Further analysis was carried out only on respondents who earned some income from crop sales. A comparison between the average income for SEP participating, SEP non-participating and non-SEP respondents revealed that

the difference between the average incomes of the three groups was not statistically significant (p = 0.3654).

The average income per respondent who sold crops was computed and compared for each of the study villages. The results are presented in Table 47.

TABLE 47
AVERAGE INCOME FROM CROP SALES PER RESPONDENT FOR THE STUDY VILLAGES

Name of Village	Average Income (Tsh.)
Mlali (n=9)	849,088
Mvomero (n=10)	460,080
Madudu (n=9)	452,833
Magole (n=10)	426,020
Hembeti (n=13)	327,023
Kitete (n=14)	296,157
Milama (n=16)	276,787
Ulaya Kibaoni * (n=16)	251,187
Msufini (n=7)	77,228
Lusanga * (n=3)	50,000
Melela (n=17)	37,464
Chanzuru * (n=8)	35,150
Mkundi (n=15)	34,173
Mangae * (n=18)	17,522
Kauzeni * (n=2)	7,500

Average Income for all respondents who sold crops = Tshs. 238,773

* Denotes a non-SEP village.

A comparison of the average income from crop sales for each of the study villages in Table 47 revealed that nine villages recorded an average income per respondent over Tsh. 50,000. Eight of these village were from the SEP area while only one was a non-SEP village. This non-SEP village was Ulaya

Kibaoni and it recorded an average farmer income of Tsh. 251,187. The data in Table 47 also show that all other non-SEP villages had average incomes per respondent of lower than Tsh. 50,000. Furthermore, the data in Table 47 show that Mlali village had the highest average farmer income of Tshs. 849,088. This could have been influenced by the fact that the village was involved in vegetable and fruit production. The prices for vegetable and fruits are not controlled by the government and farmers set the prices following the market forces. Another interesting feature in Table 47 was that Mkundi and Melela were the only SEP villages where average incomes per respondent was not over Tsh. 50,000. This could be attributed to their dependence on cotton and sunflower as cash crops which are sold through the official market. Therefore, the information in Table 47 shows that more SEP villages than non-SEP villages recorded average incomes per respondent of over Tsh. 50,000.

Summary

The following is a summary of the findings in relation to the levels of food and cash crop production that has just been reported in Part 6 of Section II of the data analysis.

The Types of Crops Grown

Three major food crops were grown by the majority of the respondents. These were: maize, rice and sorghum. The major cash crops included cotton and sunflower. Other important crops grown by respondents were beans, cassava, bananas, sweet potatoes, pumpkins and vegetables.

The Yields of the Major Crops

The average yields per hectare in 1988/89 cropping season were consistently higher than those found in studies conducted in the same area for the two previous seasons. When the average yields per hectare were compared across the three types of respondents, it was found that for the three food crops and two main cash crops the SEP participants had the highest average yields per hectare of the three types of study respondents. SEP non-participating respondents had the second highest and non-SEP respondents had the lowest yields. Likewise, the village average yields for

the five major crops were compared. It was found that more SEP villages than non-SEP villages had yields greater than the average yields for the entire population.

Food Production

The total food production was compared for three consecutive seasons. The total food produced by the SEP respondents in 1988/89 season was consistently higher than that produced in the two previous seasons. A comparison of the total food production by the type of respondents showed that the SEP participants recorded more than double the amount of food produced by the other two types of respondents. The SEP participating respondents had the highest amounts of food produced, followed by the SEP non-participating respondents and the non-SEP respondents had the lowest average food production.

Food Sufficiency

A comparison of the food sufficiency levels for all types of respondents showed that a greater percentage of the SEP than the non-SEP respondents were self sufficient in their food requirements. About 60 per cent of all respondents were not self sufficient in their food requirements for their households. More non-SEP respondents than SEP non-participating and SEP participating respondents had less than a 100 per cent level of food sufficiency. A comparison of the village food sufficiency levels showed that no village had a 100 per cent level of food sufficiency for all households. Four village had less than 50 per cent of their households which were not totally self sufficient in food requirements, and 11 villages had greater proportions of their households not totally self sufficient in food requirements. More households in SEP than in non-SEP villages had higher levels of food sufficiency.

Farmers' Income from Crop Sales

Just over 17 per cent of respondents reported that they sold surplus food and only 44.7 per cent sold cash crops to make an income. For those who sold crops in 1988/89 season, 44.3 per cent did not earn any money from crop sales, 21.4 per cent made an income between 15,000 and 45,000 shillings while 63.3 per cent did not exceed an income of 15,000 shillings. A comparison across the three types of respondents showed that the SEP participating respondents earned more money from crop sales than other

two types of respondents. When the average household income from crop sales for all villages was compared it was found that only nine villages recorded an average income over 50,000 shillings per household. Eight of these villages were from the SEP area and one was a non-SEP village.

The overall finding on the levels of food and cash crop production in the SEP approach was that:

> **Farmers identified as target farmers for SEP programmes achieved higher levels of food and cash crop production than the non-target farmers in the study. Consequently, the target farmers had higher yields per hectare, higher total food production, were more self sufficient in their food requirements and earned more money from crop sales than non-target farmers.**

Section III

Factors Affecting Change and Selected Performance Variables Used in the SEP

Many factors are likely to affect the changes which farmers in the Sokoine Extension Project make. The first part of this section sets out to examine the factors related to the SEP that affect the changes or performance of farmers in the SEP. These factors are important conditions which need to be favourable if the changes are to be positive. The factors related to SEP which were considered include:

i) Involvement of farmers in problem and solution identification;
ii) Awareness of farmers of the SEP;
iii) Involvement of farmers in selecting village projects.

The second part of this section examines the personal/social and farm characteristics that influenced the performance of farmers in the SEP. In each case an attempt was made to compare their effect on the SEP and non-SEP villagers. As outlined in Chapter V, the hypothesis to be tested is:

- **That the farmers' performance in SEP was influenced by the farmer characteristics which included the personal/social and farm characteristics.**

: The personal/social characteristics to be tested are; age, religion, gender, marital status, number of people in the households, number of adults, education and newspaper readership.

: The farm characteristics identified included: source of income, farm size, farm fragmentation, livestock ownership and the farm labour force.

Part 1: Factors Related to the SEP

This part describes the non-farmer factors related to the SEP and the extent to which they affect the changes or performance of farmers in the SEP is documented.

Involvement of Farmers in Problem and Solution Identification

Information on the involvement of farmers in problem and solution identification was based on the authors personal experience of the SEP and observations and discussions with bwana shambas, farmers and village leaders in the study villages. In the study of villagers participation in projects in villages in Tanzania Brehony (1989, p. 121) remarked that:

> ... if an organisation wants to set up a self sustaining development project geared to meeting the needs of villagers and their environment, it ought to fully involve the villagers in identifying their needs and proposed solutions.

In Tanzania in particular, in order to gain full support of villagers in implementing a project, it was critically important that the ten cell leaders were part of the decision making process since they are the people who implement the projects. If implementors are part of the decision making process they will be more committed to implementing the decision. Involvement of farmers (especially the ten cell leaders) in identifying their problems and solutions is important because:

- It gives extension workers a better appreciation of farmers problems, views and priorities.
- Involvement of farmers helps extension workers to address relevant problems for farmers.
- It can increase or maintain the level/quality of contact with farmers.
- It improves the effectiveness of home and farm visits with farmers.
- It keeps the extension worker technically up-to-date.
- Farmers become aware of the project at an early stage and have an input on what it is or should be.
- The project reflects what people want rather than what the service wants.
- It develops leadership in people and confidence between extension workers and villagers.
- The commitment of farmers is enhanced, there is no alienation of people, and extension workers get support from farmers.

Realising the importance of involving farmers the Sokoine University Extension Project developed its strategy with client or farmer needs in mind. The SEP strategy (see Figure 6, Chapter III) involved the training of extension workers through a series of workshops. After the workshops in

an in-service training course extension workers were asked to go back to their respective villages to organise meetings with village leaders and target group farmers before selecting the village problems. The extension workers were encouraged by the SEP to get an inventory of all the existing problems mentioned by the farmers. Thereafter, the extension workers asked the farmers to prioritise the identified problems. Through discussion with the target groups, the extension workers together with the farmers selected the most important problems that affected a majority of the farmers in the villages. These priority problems were those with a solution which most farmers could afford. The problems and the solutions selected formed the basis for the project activities in the village.

The authors discussion with extension workers revealed that, they organised meetings with their target group farmers and village leaders. In many instances the ten cell leaders were not directly involved unless they were part of the target groups. The village leaders who were highly involved were the village chairman and secretary and the members of the production and marketing committee. After the problems and solutions were identified at the village level, the extension workers presented these findings to the course participants during the in-service training course. During this period, consultation and discussion with the district extension officers, the ICE SEP team and other extension workers was carried out. Later, each extension worker developed a plan of action to be followed in solving these problems. However, before implementing the plan of action each extension worker was asked to present their plan of action to their village leaders and target groups. After the target group farmers and village leaders approval, then the extension worker selected the best methods for implementing a particular project or programme. A number of extension methods were used by each extension worker (see Section I, page 128).

In cases where the extension worker needed inputs which were not available locally in the villages, the SEP or district extension office was asked to assist. For example, assistance was provided in purchasing oxen teams, oxen equipment, improved seeds or providing funds to meet expenses during a village symposium or seminar organised by the extension workers. In general, the extension workers were encouraged to use locally available resources.

Also as part of the project strategy there was a continuous monitoring and evaluation procedure which helped to keep the projects/programmes relevant to the needs and wants of the farmers. The district extension

service and ICE SEP team visited the villages regularly to provide support for the extension workers activities.

Based on written reports on the SEP strategy and the author's discussions with farmers in the villages, it was found that only a core of 15 to 30 farmers were involved in each event organised by the extension worker. The ten cell leaders were not always involved and the majority of farmers in the village were not directly involved. It was not possible to involve all villagers because the SEP wanted to introduce the innovations and solve specific problems with a specific group of farmers. It was the SEP intention that, these target groups of farmers would serve as examples to other farmers in the villages and its effect would diffuse to the rest of the village. In this study it is shown how the SEP impacted on farmers in the SEP and non-SEP villages. However, it is evident that the ten cell leaders and the majority of farmers were not involved in all the activities of the project.

When village leaders were asked about the involvement of women, they expressed concern that women especially their organisation UWT (Women Organisation of Tanzania) needed to be more involved in the SEP activities. Also, the village leaders wanted the SEP to assist in solving more of women's problems especially providing milling machines. This was a major problem in some villages because women and children had to walk more than 10 kilometers to reach the nearest milling machine (eg. Makuyu and Mkundi villages). The SEP did not consider this as a priority problem but it could be a major cause for some of the weaknesses that are showing up in the project activities.

The information just presented suggests that the performance of farmers in the SEP may have been greatly influenced by the extent to which farmers were involved in the identification of their problems and solutions.

Awareness of the SEP

It is likely that farmers' performance in the SEP was influenced by the extent at which farmers were aware of its existence. In the SEP a lot of effort was made by the extension workers and other SEP staff in publicising the activities of the project. A number of methods were used to inform the farmers about the project. The methods used were village meetings, seminars, symposia and discussions with villagers. The village government leaders and ward secretaries were, on two occasions, invited to participate in the extension worker's in-service training sessions. During these seminars

the village leaders received briefing about the project goals and activities. As a follow-up to this, the village leaders also organised meetings in the villages to explain goals and objectives of the programmes of the SEP.

In this study respondents were asked if they had heard about the SEP. The data in Table 48 show the distribution of the three types of respondents according to their awareness of the project in the villages.

TABLE 48

THE DISTRIBUTION OF RESPONDENTS BY TYPE AND THEIR AWARENESS OF SEP (N = 300)

Awareness	Type of Respondent					
	SEP PART (n=97)		SEP NON-PART (n=103)		NON-SEP (n=100)	
	No.	(%)	No.	(%)	No.	(%)
Had heard of SEP	72	(74.2)	42	(40.8)	7	(7.0)
Had not heard of SEP	22	(22.7)	58	(56.3)	89	(89.0)
No response	3	(3.1)	3	(2.9)	4	(4.0)
Total	97	(100.0)	103	(100.0)	100	(100.0)

It is evident from the data in Table 48 that a majority (74.2 per cent) of the SEP participating respondents were aware of the existence of the SEP. The comparable proportions of the SEP non-participating and non-SEP respondents was 40.8 per cent and 7.0 per cent respectively. This was expected because most of the SEP village activities did not involve other nearby villages. The few respondents from the non-SEP villages who had heard about this project were probably the village leaders. Also, it is surprising that 56.3 per cent of the SEP non-participating respondents stated that they had not heard of SEP. It was expected that all the SEP participating and a majority of the SEP non-participating village farmers would be aware of SEP.

Furthermore, respondents were asked to state how they heard about SEP. Just over 42 per cent of the SEP participating and 61 per cent of the SEP non-participating respondents stated that they heard about SEP through their extension workers. These findings were not expected because a greater proportion of SEP participating respondents should have heard about the

project through their extension workers. These respondents were the target group for the extension workers' activities in the villages. An interesting feature about these findings is that 57.1 per cent of the non-SEP respondents heard about SEP from the other farmers. Almost 43 per cent of the non-SEP respondents identified the extension workers and Sokoine University staff as their source of information about the project. Village leaders were identified as a source of information about SEP by 13.4 per cent and 17.1 per cent of the SEP participating and SEP non-participating respondents . respectively.

In addition, the influence of awareness of the SEP on the respondents' average involvement in extension activities, total food production and level of food sufficiency for the three types of respondents was examined. This information is presented in Table 49.

TABLE 49

RELATIONSHIP BETWEEN AWARENESS OF SEP, TYPE OF RESPONDENT AND SELECTED PERFORMANCE VARIABLES (N=290)

Awareness of SEP	Type of Respondents								
	SEP PART (N=94)			SEP NON-PART (N=100)			NON-SEP (N=96)		
	No.	Mean EXT	Sig.	No.	Mean EXT	Sig.	No.	Mean EXT	Sig.
Heard of SEP	68	12.4	0.000**	40	8.9	0.000**	7	7.7	0.361NS
Not heard of SEP	22	8.4		56	4.8		87	6.0	
Awareness of SEP	No.	Mean T Food	Sig.	No.	Mean T Food	Sig.	No.	Mean T Food	Sig.
Heard of SEP	65	5530.8	0.002**	38	2389.5	0.137NS	6	2100.0	0.038*
Not heard of SEP	20	1775.0		54	1522.2		85	1222.4	
Awareness of SEP	No.	Mean FO SUFF	Sig.	No.	Mean FO SUFF	Sig.	No.	Mean FO SUFF	Sig.
Heard of SEP	65	278.1	0.005**	38	125.6	0.171NS	6	110.0	0.380NS
Not heard of SEP	20	87.4		54	93.4		85	79.1	

Sig. = Significance level
* Significant at 5% level
** Significant at 0.1% level

Mean EXT = Average Extension Activity Involvement
Mean T Food = Average Total Food Production
Mean FO STUFF = Average Level of Food Sufficiency (%)

The data in Table 49 show that the differences between the average extension activity involvement, total food production and levels of food sufficiency for SEP participating respondents who had heard and those who had not heard about SEP were statistically significant (p=0.000, p=0.002 and p=0.005 respectively). The SEP participating respondents who had heard of SEP (were aware of SEP) had greater levels of selected performance in the SEP than those who had not heard of SEP (were not aware of SEP).

The data also show that the difference between the average extension activity involvement for the SEP non-participating respondents who heard and those who had not heard of SEP was statistically significant (p=0.000). None of the other relationships examined were significant (Table 49). In general, those who had heard of SEP had greater levels of involvement with extension, produced more food and were more self-sufficient in food than those who had not heard of SEP.

The comparable results for the non-SEP respondents show that only the difference between the average total food production for those who heard and those who had not heard of SEP was significant (p=0.0). The other relationships examined were not significant (Table 49). Similarly, the non-SEP respondents who had heard of SEP had higher levels of selected performance in SEP than those who had not heard of SEP.

In summary the findings just reported show that:

i) more target farmers (SEP participants) were aware of the SEP than the other types of respondents;

ii) a greater number of respondents in the study heard about the SEP through their extension workers and other farmers in the villages;

iii) the target farmers had higher levels of selected performance in SEP than the non-target and non-SEP farmers;

iv) the target farmers who were aware of the SEP had greater average extension activity involvement, total food production and levels of food sufficiency than the non-target farmers and non-SEP farmers who were not aware of the SEP.

Involvement of Farmers in Selecting Village Projects

In order that the projects/programmes are sustainable it is essential that farmers are fully involved in selecting village projects. In this study each village had several projects under the extension worker and a specific target group of farmers was selected. The extension workers selected 15 to 30

target farmers who were willing to implement the projects or programmes. These projects/programmes were of low cost inputs and were intended to solve the food and cash crop production problems of farmers. The target group farmers were used by the extension workers to demonstrate to other farmers in the villages specific agricultural practices which needed to be adopted. This involvement of farmers was an important factor that could influence the performance of the farmers in the SEP.

Respondents were asked to state if they were involved in selecting the village projects. The distribution of the three types of respondents according to their involvement in selecting the village projects is presented in Table 50.

TABLE 50
DISTRIBUTION OF RESPONDENTS BY TYPE AND THEIR INVOLVEMENT IN SELECTING VILLAGE PROJECTS (N = 300)

Response	Type of Respondents					
	SEP PART (n=97)		SEP NON-PART (n=103)		NON-SEP (n=100)	
	No.	(%)	No.	(%)	No.	(%)
Involved	29	(29.9)	14	(13.6)	12	(12.0)
Not involved	53	(54.6)	53	(51.4)	20	(20.0)
No response	15	(15.5)	36	(35.0)	68	(68.0)
Total	97	(100.0)	103	(100.0)	100	(100.0)

The data in Table 50 show that more SEP participating respondents indicated that they were involved in selecting the village projects. Almost 30 per cent SEP participating respondents indicated that they were involved while the comparable percentages for the SEP non-participating and non-SEP respondents were 13.6 per cent and 12.0 per cent respectively. Surprisingly, more than half of the SEP participating and SEP non-participating respondents stated that they were not involved in selecting the village projects. This suggests that the extension worker and village leaders made the decision on the project to be carried in the villages. The target farmers were only involved in implementing the selected projects. Furthermore, the respondents were asked to identify who selected the

village projects. They identified four categories of people including: (i) the village chairman or secretary (ii) the village government and villagers (iii) the village extension worker and (iv) the village chairman together with the village extension worker. The village chairman or secretary was named by 30 per cent of the SEP respondents and 75.8 per cent of non-SEP respondents. This indicates that the village chairman and secretary were very important decision makers on the village projects/programmes.

When asked if the village projects being implemented were useful many of the respondents perceived the projects to be of some use. The distribution of the three types of respondents by their opinions on usefulness of the village projects is presented in Table 51.

TABLE 51

DISTRIBUTION OF RESPONDENTS BY TYPE AND THEIR PERCEPTIONS ON THE USEFULNESS OF THE VILLAGE PROJECTS (N = 300)

Perception	Type of Respondents					
	SEP PART		SEP NON-PART		NON-SEP	
	No.	(%)	No.	(%)	No.	(%)
Very Useful	31	(32.0)	13	(12.6)	8	(8.0)
Of some use	38	(39.2)	43	(41.7)	20	(20.0)
No use	4	(4.1)	5	(4.9)	4	(4.0)
Do not know	7	(7.2)	5	(4.9)	1	(1.0)
No reply	17	(17.5)	37	(35.9)	67	(67.0)
Total	97	(100.0)	103	(100.0)	100	(100.0)

When respondents were asked what they thought of the village projects, 67.2 per cent of the SEP participating and 54.3 per cent of the SEP non-participating respondents said that they were either very useful or of some use. Only 28 per cent of the non-SEP respondents rated the extension projects in their villages in a similar fashion. It is evident from the data in Table 51 that more SEP than non-SEP respondents perceived that the village projects/programmes were useful in improving their agricultural practices. The findings suggest that involvement of farmers and village leaders in

selecting village projects legitimised the perception of farmers on the projects.

Further analysis was carried out to determine the influence of farmers' involvement in selecting village projects on their average extension activity involvement scores, total food production and level of food sufficiency. The results are summarised in Table 52.

TABLE 52

RELATIONSHIP BETWEEN INVOLVEMENT IN SELECTING VILLAGE PROJECTS, TYPE OF RESPONDENT AND SELECTED PERFORMANCE VARIABLES (N=174)

Involvement	Type of Respondents								
	SEP PART (N=78)			SEP NON-PART (N=64)			NON-SEP (N=32)		
	No.	Mean EXT	Sig.	No.	Mean EXT	Sig.	No.	Mean EXT	Sig.
Involved	29	12.1	0.876 NS	14	8.7	0.565 NS	12	6.3	0.820 NS
Not Involved	49	12.2		54	7.8		87	6.6	
Involvement	No.	Mean T Food	Sig.	No.	Mean T Food	Sig.	No.	Mean T Food	Sig.
Involved	27	5740.7	0.321 NS	14	1371.4	0.125 NS	12	1066.7	0.220 NS
Not Involved	46	3856.5		49	2202.0		19	1878.9	
Involvement	No.	Mean FO SUFF	Sig.	No.	Mean FO SUFF	Sig.	No.	Mean FO SUFF	Sig.
Involved	27	254.8	0.806 NS	14	84.1	0.242 NS	12	57.1	0.272 NS
Not Involved	46	230.0		49	117.1		19	85.1	

Sig. = Significance level
NS = Not significant
Mean EXT = Average Extension Activity Involvement
Mean T Food = Average Total Food Production
Mean FO SUFF = Average Level of Food Sufficiency (%)

The data in Table 52 show that the differences between the average extension activity involvement, total food production and levels of food sufficiency for the three types of respondents who were involved and those who were not involved in selecting village projects were not statistically significant. The data also indicate that the SEP participants performed better on all the selected performance variables than the SEP non-participants and non-SEP village participants. Furthermore, the SEP participating respondents who were involved in selecting village projects had higher

levels of average total food production and food sufficiency than those who were not involved. The non-SEP respondents had the lowest performance on all selected variables related to SEP (Table 52). The SEP non-participating and non-SEP respondents who were not involved in selecting village projectsa had higher average levels of total food production and food sufficiency than those who were involved in selecting village projects.

As already discussed (Table 50) these results were surprising because more than half of all the three types of respondents were not involved in selecting village projects. Those who were involved in selecting village projects included: the village leaders, extension workers and the SEP project staff (SUA). However, the results need to be taken with caution because involvement in project selection and project participation were a major emphasis of the SEP strategy. These positively influenced farmers' performance in SEP in particular the SEP participating respondents (Table 52).

The findings suggest that:

i) more SEP partipating respondents and village leaders were involved in selecting village projects than SEP non-participating and non-SEP respondents;

ii) more SEP than non-SEP respsondents perceived that the village projects and programmes were useful in improving farmers' agricultural practices;

iii) the target farmers had higher levels of selected performance in the SEP than the non-target and non-SEP farmers;

iv) the target farmers who were involved in selecting village projects had greater average extension activity involvement scores, total food production and levels of food sufficiency than the SEP non-target and non-SEP farmers who were not involved in selecting village projects.

Summary of Part 1: Section III

In summary, the following were the major findings.

Involvement of Farmers in Problem and Solution Identification

The SEP Bwana Shambas were found to have initiated village projects and programmes to address farmers priority problems. They achieved this by involving a selected target group of farmers. In most cases the village

leaders were involved while the ten cell leaders and the majority of the villagers were not involved in problem and solution identification.

Awareness of Farmers of the SEP

Surprisingly only 74.2 per cent of the SEP participating and 40.8 per cent of the SEP non-participating farmers were aware of the existence of the SEP. These findings were not expected because the SEP participating farmers were the target group selected by the Bwana Shambas and all should have been aware of the SEP. This means that SEP was not very successful in reaching its selected target groups. Furthermore, a greater proportion of farmers heard about the SEP through the extension workers and other farmers in the villages. The target farmers (SEP participants) performed better on all the selected performance variables than the SEP non-participants and non-SEP village respondents. The target farmers who were aware of the SEP had greater average extension activity involvement scores, total food production and level of food sufficiency than the SEP non-target and non-SEP farmers who were not aware of the SEP.

Involvement of Farmers in Selecting Village Projects

More than half of the SEP participating and SEP non-participating farmers said that they were not involved in selecting the village projects. These findings are not in agreement with the SEP strategy which emphasises on target group farmer involvement. In this study four groups of people were found to be responsible for selecting projects, these were: the village Chairman or Secretary, the village government and villagers, the village extension worker, and the village Chairman together with the village extension worker. More SEP than non-SEP farmers perceived that the village projects and programmes were useful in improving farmers' agricultural practices. The target farmers (SEP parrticipants) performed better on all the selected performance variables than the SEP non-participants and non-SEP village respondents. The target farmers who were involved in selecting village projects had greater average extension activity involvement scores, total food production and level of food sufficiency than the non-target and non-SEP farmers who were not involved in selecting village projects.

Part 2: Personal/Social and Farm Situational Characteristics that Influence Selected Performance Variables Used in the Study

The aim of this section is to test the hypothesis that:

the farmers' performance in the SEP was influenced by their personal and farm situational characteristics.

This section examines and compares the characteristics of the farmers, farm family and the farm place for the three categories of respondents. It also determines the influence of the farmer characteristics on the selected performance variables related to the SEP. The variables that were considered to best indicate the farmers' performance in the SEP were: levels of participation in SEP, extension activity involvement, total food production and levels of food sufficiency. The formulation of these variables has been discussed in detail in Section II of the data analysis.

Personal/Social Characteristics of the Farmer

According to Brehony (1989) the farmer characteristics that were found to affect their participation in village projects in Iringa region Tanzania were: age, gender, level of education and marital status. Likewise, in this study of the SEP, these factors are considered together with religion, number of people in the households, the number of adults in the households and the access to local newspapers. This section will determine their influence on selected farmer performance variables in the SEP.

Age

Respondents in this study were between 16 and 89 years with an average age of 43.9 years. Half of the respondents in the entire study were below 42 years of age. The distribution of the three types of respondents by age is presented in Table 53.

The data in Table 53 show that more SEP non-participating than SEP participating and non-SEP respondents were under 35 years of age. Over one-third (34.7 per cent) of the non-SEP respondents were over 55 years of age. The comparable percentages for the SEP participating and SEP non-participating respondents was 29.0 per cent and 19.2 per cent respectively. The average age for the non-SEP respondents was 46.9 years. This was

somewhat older than that recorded for SEP participants and SEP non-participants who were 45.1 and 39.9 years respectively.

TABLE 53
DISTRIBUTION OF RESPONDENTS BY TYPE AND AGE (N = 290)

Age	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
Under 35	23	(24.7)	43	(43.4)	25	(25.5)
36 to 44	22	(23.7)	16	(16.3)	19	(19.4)
45 to 54	21	(22.6)	21	(21.2)	20	(20.4)
Over 55	27	(29.0)	19	(19.2)	34	(34.7)
Total	93	(100.0)	99	(100.0)	98	(100.0)
Mean (years)	45.1		39.9		46.9	

Further analysis using the t-test procedure revealed that the relationships between age and levels of participation, extension activity involvement scores, total food production and levels of food sufficiency for SEP participating, SEP non-participating and non-SEP respondents were not significant. These findings suggest that age had no influence on the selected farmer performance variables in the SEP for all types of respondents.

Religion

Over seventy three per cent (73.8 per cent) of all the respondents interviewed were Moslems and only twenty six per cent were Christians. The proportions of Moslems and Christians for each of the three types of respondents are shown in Table 54.

The data in Table 54 show that the proportion of Christians was almost the same for all the three types of respondents. When a comparison of the average levels of participation in SEP and the level of involvement in extension activities of Moslems and Christians was carried out, it revealed

TABLE 54
DISTRIBUTION OF RESPONDENTS BY TYPE AND RELIGION
(N = 290)

Religion	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
Moslem	69	(74.2)	73	(73.7)	72	(73.5)
Christian	24	(25.8)	26	(26.3)	26	(26.5)
Total	93	(100.0)	99	(100.0)	98	(100.0)

that the differences were not significant. However, the SEP participating Moslem respondents had somewhat higher average levels of participation in SEP and involvement in extension activities than both Moslem and Christian SEP non-participating and non-SEP respondents. A comparison of the average level of food production and food sufficiency for Moslems and Christians revealed that the differences between SEP non-participating respondents were significant ($p = 0.000$ and $p = 0.009$ respectively). This means that more Moslem than Christian SEP non-participating respondents had higher levels of food production and food sufficiency. The differences between level of food production and food sufficiency for Moslem and Christian SEP participating and non-SEP respondents were not significant.

Gender

In the developing countries women have been reported to do most of the agricultural work (The United Nations Report, 1985). They do not however form part of the decision making process in many societies. In this study 219 men and 71 women (i.e. 75.5 per cent and 24.5 per cent respectively) were interviewed. It should be noted that the population list from which the three study samples were drawn, were those who were identified as head of the farm households. Evidence from other studies in Tanzania suggest that about 20 per cent of farm households are headed by

females (Due *et al.*, 1987). A comparison of the distribution of respondents by gender and respondent type is presented in Table 55.

TABLE 55
COMPARISON OF THE DISTRIBUTION OF RESPONDENTS BY TYPE AND GENDER (N = 290)

Gender	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
Male	87	(93.5)	63	(63.6)	69	(70.4)
Female	6	(6.5)	36	(36.4)	29	(29.6)
Total	93	(100.0)	99	(100.0)	98	(100.0)

The data in Table 55 show that 93.5 per cent of the SEP participating respondents were male. The percentages of males for the SEP non-participating and non-SEP categories were 63.6 per cent and 70.4 per cent respectively. The data in Table 55 clearly show that SEP participants were more likely to be male and that the proportion of female target farmers (at 6.5 per cent) was only about one-third of those households headed by females on the study population list.

Using the t-test procedure, the influence of gender on the farmers' performance in SEP was examined. No significant difference was found between the male and female SEP participating respondents' average levels of participation in SEP, involvement in extension activities and food sufficiency. However, the difference between male and female SEP participating average total food production was significant ($p = 0.038$). The data showed that the average level of participation in SEP, involvement in extension activities, total food production and food sufficiency for males were greater than that for female SEP participating respondents.

Further analysis showed that the differences between male and female SEP non-participating respondents' average level of participation and involvement in extension activities were significant ($p = 0.002$ and $p = 0.001$ respectively). However, the difference between male and female SEP non-participants' average total food production and food sufficiency were not significant. The average level of participation, involvement in extension

activities, total food production and food sufficiency for male SEP non-participating respondents were greater than the corresponding levels for female SEP non-participating respondents. Similarly, the differences between the male and female non-SEP respondents' average level of involvement in extension activities, total food production and food sufficiency were not significant.

The overall finding was that the SEP participating male and female respondents (target farmers) had greater average levels of participation, involvement in extension activities, total food production and food sufficiency than the other types of respondents, while the non-SEP male and female respondents had the lowest.

Marital Status

Most married farmers have several dependants and large families and they would be expected to be more involved in projects that helped to improve their agricultural production. The majority of the respondents (84.1 per cent) in the study were married. The distribution of the three types of respondents according to their marital status is shown in Table 56.

The data in Table 56 show that there were more married respondents than either single, widowed, or divorced respondents for all categories of respondents. In order to compare the influence of marriage on the respondents, the single, widowed and divorced were grouped and considered as unmarried respondents. Using the t-test procedure the influence of marital status on the farmers' performance in SEP was examined. It revealed that the difference between the average level of food production and food sufficiency for married and unmarried SEP participating respondents was statistically significant ($p = 0.005$ and $p = 0.012$ respectively). Those who were married had greater average levels of food production and food sufficiency than unmarried SEP participating respondents. The difference between the average level of participation in SEP and extension activity involvement scores for

TABLE 56

DISTRIBUTION OF RESPONDENTS BY TYPE AND MARITAL STATUS

(N = 290)

Marital Status	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
Married	83	(89.2)	77	(77.8)	84	(85.7)
Single	6	(6.5)	8	(8.1)	5	(5.1)
Widowed	2	(2.2)	8	(8.1)	5	(5.1)
Divorced	2	(2.2)	6	(6.1)	4	(4.1)
Total	93	(100.0)	99	(100.0)	98	(100.0)

married and unmarried SEP participating respondents was not significant. However, those who were married had higher average level of project participation and extension activity involvement scores than unmarried SEP participating respondents.

Further analysis showed that the difference between the average level of participation in SEP, extension activity involvement scores, total food production and food sufficiency for married and unmarried SEP non-participating respondents was not significant. The SEP non-participating respondents who were married had greater average levels of participation in SEP, extension activity involvement scores, total food production and food sufficiency than those who were not married.

Similarly, a comparison of the average extension activity involvement scores and food sufficiency for married and unmarried non-SEP respondents showed that the difference was not significant. The difference between average level of total food production for married and unmarried non-SEP respondents was statistically significant ($p = 0.049$). The non-SEP respondents who were married had a greater average level of food production than those who were not married. The findings suggest that marital status had a more significant influence on the target farmers' average level of total food production and food sufficiency than non-target and non-SEP farmers.

The Number of People in the Household

The number of dependants or the family size can be considered to determine the available family labour force and food requirement of a family. An examination of the number of dependants in this study revealed that, there were between 1 and 18 people in each household. The average number of dependants for the study was 6.4 people. The relationship between the type of respondents and the numbers of people in the households is presented in Table 57.

TABLE 57

RELATIONSHIP BETWEEN TYPE OF RESPONDENTS AND NUMBER OF PEOPLE IN THE HOUSEHOLDS (N = 290)

Number of People	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
1 to 5 (small)	35	(37.6)	47	(47.5)	43	(43.9)
6 to 18 (large)	58	(62.4)	52	(52.5)	55	(56.1)
Total	93	(100.0)	99	(100.0)	98	(100.0)
Mean	6.9		6.2		6.2	

Chi square = 1.92955; d.f. = 2; Significance = 0.381

A comparison of the differences in the number of dependants between the three types of respondents were not significant. The data in Table 57 show that a greater percentage of all the households in the study had more than six dependants. Households with 1 to 5 people were considered "small" while those with 6 to 18 people were categorised as "large". The t-test procedure revealed that the difference between the average levels of project participation, extension activity involvement scores, total food production and food sufficiency for small and large SEP participating households was not significant. However, the large SEP participating households had somewhat greater average levels of participation in SEP, extension activity involvement scores, total food production and food sufficiency than the small SEP participating households.

The comparable results for the SEP non-participating households showed that only the difference between the average level of food sufficiency for small and large households was significant ($p = 0.006$). The SEP non-participating households with large numbers of people had a greater average level of food sufficiency than those with small numbers of people.

The difference between the average extension activity involvement scores for small and large non-SEP households was not significant. However, the large households had greater average extension activity involvement scores than small households. Furthermore, the difference between the average level of total food production and food sufficiency for small and large non-SEP households was significant ($p = 0.011$ and $p = 0.032$ respectively). The large non-SEP households had greater average levels of total food production than the small households. Also, the small non-SEP households had a greater average level of food sufficiency than the large households.

In this study the number of adults in each household ranged between 1 and 9 people and the average was 3 adults. The households with 1 to 3 adults were considered "small" while those who had more than 3 were considered large. Further analysis of the data showed that those households with large numbers of adults (more than 3) had greater levels of participation in SEP, higher extension activity involvement scores, produced more food and had a higher level of food sufficiency than those with a small number of household adults.

Education

The extent to which people are educated tends to influence their ability to gain new knowledge on agriculture. This is likely to affect their participation in projects that require a change in the existing agricultural practices. In this study the level of education of respondents was determined and it revealed that 20.4 per cent had not attended any formal schooling while the majority (79.6 per cent) had primary education. The distribution of respondents by type and their level of education is presented in Table 58.

The data in Table 58 show that a majority of all types of respondents had between standard I and VIII form of education. It also shows that 10 per cent of the SEP participating and almost 31 per cent of the SEP non-participating respondents had no formal education. Likewise, 19.5 per cent of the non-SEP respondents had not attended any formal education.

The relationship between the selected performance variables in SEP and level of education was also examined. Two-thirds of the SEP participating

respondents who had a high level of participation in SEP had no formal education. Just over 44 per cent of the SEP participating respondents who had a high level of extension activity involvement had no formal education. Almost 70 per cent of the SEP participating respondents with a high level of food sufficiency had a high level of education. The relationship between the average level of total food production and level of education for SEP participating respondents was significant (Chi-square = 13.41177, df = 4, p = 0.00943). Sixty two per cent of the SEP participating respondents with a high level of total food production had a high level of education.

TABLE 58
DISTRIBUTION OF RESPONDENTS BY TYPE AND LEVEL OF EDUCATION (N = 271)

Level of Education	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
None	9	(10.1)	29	(30.9)	17	(19.5)
Std* I-IV	31	(34.8)	24	(25.5)	24	(27.6)
Std* V-VII/VIII	36	(40.5)	35	(36.2)	28	(32.2)
Adult Literacy	13	(14.6)	7	(7.4)	16	(18.4)
Post Primary	-	-	-	-	2	(2.3)
Total	89	(100.0)	95	(100.0)	87	(100.0)

Std* = Standard or class or grade of education.

The t-test procedure showed that the differences between the average level of total food production for SEP participating respondents without any formal education and those with lower* primary education and higher** primary education were significant (p = 0.035 and p = 0.032 respectively). The SEP participating respondents with higher primary education had the greatest average level of total food production.

* Lower primary = Standard I-IV and adult literacy

** Higher primary = Standard V-VIII and postprimary

Further analysis using the cross-tabulation procedures showed that there was no significant relationship between the average level of project participation, extension activity involvement, total food production and food sufficiency of the SEP non-participating respondents and levels of education. Likewise, the relationships between the average extension activity involvement and food sufficiency for the non-SEP respondents and their levels of education was not significant.

The findings suggest that the level of education had an influence in the average total food production for the target farmers.

Newspapers

There are many sources of information for farmers. The farmers in the Morogoro region got agricultural information from three main sources that included: the extension workers, newspapers and radio. When asked if they read newspapers 65.8 per cent of the study respondents stated that they read the local newspapers. In this study the respondents identified four types of newspapers namely: **Ukulima wa Kisasa, Uhuru, Mfanyakazi** and **Mzalendo**. All these local newspapers are written in Kiswahili. However, **Ukulima wa Kisasa** was an agricultural newspaper written specifically for farmers and was usually published once a month. The availability of this newspaper was irregular and in many cases never reached the farmers. **Uhuru** was a political daily paper published 5 days a week, while **Mfanyakazi** and **Mzalendo** were published once a week on Saturdays and Sundays respectively. The distribution of the three types of respondents according to the newspapers they read is presented in Table 59.

The data in Table 59 show that 21.5 per cent of the SEP participating, 4 per cent of the SEP non-participating and no non-SEP respondents read **Ukulima wa Kisasa** newspaper. This information was very disappointing because this was the only agricultural newspaper written specifically for farmers. The reasons that can probably best explain this situation were that the newspaper was not produced regularly and lack of transport reduced its circulation. It was also reported by farmers that the newspaper usually reached the village several months late and only a few copies were available. The data also show that only the **Uhuru** newspaper was read by a majority of the three categories of respondents.

TABLE 59

NUMBER AND PERCENTAGE OF EACH TYPE OF RESPONDENT READING PARTRICULAR NEWSPAPERS

Name of Newspaper	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
Ukulima wa Kisasa	20	(21.5)	4	(4.0)	0	(0.0)
Uhuru	67	(72.0)	43	(43.4)	44	(44.9)
Mfanyakazi	57	(53.8)	31	(31.3)	20	(20.4)
Mzalendo	43	(46.2)	32	(32.3)	17	(17.3)

Further analysis using the t-test procedure was carried out to examine the influence of reading newspapers and average levels of project participation, extension activity involvement scores, total food production and levels of food sufficiency for the three categories of respondents. This information is summarised in Table 60.

The data in Table 60 show that the differences between the average total food production and levels of food sufficiency for SEP participating respondents who read newspaper and those who did not were statistically significant ($p = 0.015$ and $p = 0.018$ respectively). The SEP participating respondents who read newspapers had a greater average amount of food production and levels of food sufficiency than those who did not read newspapers. There were no differences between the average level of project participation and extension activity involvement scores for SEP participating respondents who read newspapers and those who did not.

The data also show that the differences between the average level of project participation and extension activity involvement for SEP non-participating respondents who read newspapers and those who did not were statistically significant ($p = 0.002$ and $p = 0.029$ respectively). The differences between the average total food production and level of food sufficiency for SEP non-participating who read newspapers and those who did not were not significant.

The comparable results for the non-SEP respondents show that the difference between the average extension activity involvement for those who read newspapers and those who did not was significant ($p = 0.036$). The other

selected performance variables examined were not significantly different (Table 60).

The overall findings suggest that newspaper readership was positively associated with SEP participating farmers average total food production and levels of food sufficiency. Also, newspaper readership had an influence on the average extension activity involvement for SEP non-participating and non-SEP farmers.

TABLE 60

REALTIONSHIP BETWEEN NEWSPAPER READERSHIP, TYPE OF RESPONDENT AND SELECTED PERFORMANCE VARIABLES (N = 290)

	Types of Respondents								
	SEP PART (n = 93)			SEP NON PART (n = 99)			NON SEP (n = 98)		
Newspaper Readership	No.	Mean PART	Sig.	No.	Mean PART	Sig.	No.	Mean PART	Sig.
Yes	70	16.0	0.125 NS	45	12.2	0.002 **	NA	NA	NA
No	16	13.6		41	8.5				
Newspaper Readership	No.	Mean EXT	Sig.	No.	Mean EXT	Sig.	No.	Mean EXT	Sig.
Yes	71	11.7	0.485 NS	45	8.1	0.029 *	51	7.1	0.036 *
No	16	10.5		41	5.6		32	4.7	
Newspaper Readership	No.	Mean TFOOD	Sig.	No.	Mean TFOOD	Sig.	No.	Mean TFOOD	Sig.
Yes	67	5347.8	0.015 *	44	2434.1	0.152 NS	48	1681.3	0.132 NS
No	15	2246.7		39	1646.1		31	1167.7	
Newspaper Readership	No.	Mean FOSUFF	Sig.	No.	Mean FOSUFF	Sig.	No.	Mean FOSUFF	Sig.
Yes	67	265.7	0.018 *	44	138	0.165 NS	48	98	0.176 NS
No	15	108.0		39	101		31	70	

NA = Not Applicable; * = Significant at 5% level; ** = Significant at 1% level; NS = Not Significant.
Mean PART = Average Level of Participation; Mean EXT = Average Extension Activity Involvement.
Mean TFOOD = Average Total Food Production; Mean FOSUFF = Average Level of Food Sufficiency (%).

Farm Situational Characteristics

The farm situational characteristics such as sources of income, farm size, farm fragmentation, livestock ownership and available labour force are major factors that influence the ability of the farmers to improve agricultural production. In this part we examine how these farm factors influenced farmers' selected performance variables.

Sources of Income

The source of income is an important factor that would influence the performance of farmers in the SEP. If the sources of income were agricultural then it was likely that the farmers would participate more in the projects that were geared to improving agricultural practices. Findings from the study of agricultural practices in the Morogoro region indicated that agriculture was a major source of income for a majority of the households (Ngetti, 1989). In this study respondents were asked to identify all their sources of income. The major sources of income identified were: sale of crops, sale of vegetables and fruits, casual labour in the farms, skills and crafts, brewing, petty trade and employment. The distribution of respondents by their major source of income is presented in Table 61.

TABLE 61
DISTRIBUTION OF RESPONDENTS BY TYPE AND MAJOR SOURCES OF INCOME (N = 300)

Source of Income	Type of Respondents					
	SEP PART (n=97)		SEP NON-PART (n=103)		NON-SEP (n=100)	
	No.	(%)	No.	(%)	No.	(%)
Sale of crops	96	(99.0)	96	(93.2)	93	(93.0)
Sale of vegetable and fruits	46	(47.4)	44	(42.7)	44	(44.0)
Causal labour	18	(18.6)	37	(35.9)	12	(12.0)
Skill and crafts	23	(23.7)	28	(27.2)	22	(22.0)
Brewing	11	(11.3)	18	(17.5)	19	(19.0)
Petty trade	6	(6.2)	16	(15.5)	8	(8.0)
Employment	4	(4.1)	4	(3.9)	12	(12.0)

The data in Table 61 show that a majority of the SEP and non-SEP respondents identified the sale of crops, vegetables and fruits as their main

source of income. When respondents were asked to rank their sources of income, more than two-thirds of all the respondents (68 per cent of non-SEP, 72.8 per cent of the SEP non-participating and 86 per cent of the SEP participating) said that their primary source of income was from the sale of crops. The respondents earned most of their money from selling surplus food crops and cash crops.

The second main source of income varied for each type of respondent and it included one of the following activities: sale of vegetable and fruits, casual labour, skills and crafts and brewing. While sale of crops was an important source of income, a majority of the respondents said that their secondary sources were more reliable. This is true because most of the products from these activities were not controlled by the government and their prices were not fixed. The farmers fixed the prices following the market forces and payments were made on the spot. Vegetables and fruits were sold throughout the year reaching a peak in the dry season. Income from casual labour with other farmers was highest in the rainy season because there was a high demand of labour from many farmers. However, there was little casual labour in the farms in the dry season. Skill and crafts activities were normally practiced in the dry season or off-cropping season. The activities carried out included carpentry, masonry, weaving baskets, mats and brooms. Weaving was carried out mainly by women and children. Brewing was widely practiced in the dry season. The most common brews were, coconut brew "Mnazi", sorghum brew "Mtama" and maize brew "Kangala". In general, the preparation and sale of products was carried out by women and children. The SEP has emphasised the improvment of food and cash crop production. The first phase of SEP did not actively promote the secondary sources of income. However, in the second phase the SEP has initiated efforts to improve vegetable and fruit production in the villages.

From the above discussion it can be stated that a majority of respondents depend on agriculture (especially the sale of crops) and the secondary sources of income in order to earn money.

In order to determine the relationship between the major sources of income and the performance of respondents from the SEP and non-SEP villages, the major sources of incomes were divided into farm and non-farm categories. The farm sources were sale of crops and vegetables and fruits while non-farm sources included: causal labour, skill, craft, brewing, petty trade and employment.

Using the t-test procedure, it was found that the relationships between the major source of income for SEP participants and average total food production and levels of food sufficiency were statistically significant ($p = 0.009$ and $p = 0.019$ respectively). Those who identified the farm as a major source of income had greater average total food production and levels of food sufficiency than for those who named the non-farm sources category. The relationships between the major source of income and levels of participation and extension activity involvement were not significant.

Furthermore, the relationships between the major source of income for SEP non-participants and average levels of participation, total food production and levels of food sufficiency were not significant. However, the relationship between the major source of income and average extension activity involvement was statistically significant ($p = 0.024$). The average extension activity involvement score for the SEP non-participating respondents who identified the farm as a major source of income was greater than that recorded for those who were in the non-farm category.

Likewise, the relationship between major source of income and average extension activity involvement for non-SEP respondents was not significant. The relationships between the main source of income and average total food production and levels of food sufficiency were statistically significant ($p = 0.030$ and $p = 0.016$ respectively). The non-SEP respondents who identified the farm as a major source of income had greater average food production and levels of food sufficiency than those in the non-farm income category.

These findings suggest that the farm sources of income (sale of crops, vegetables and fruits) had the greatest influence on the average amount of food production and levels of food sufficiency of the farmers from the SEP and non-SEP villages.

Farm Size

Perhaps of greater influence on agricultural production and farmers' performance was the total number of acres farmed by each household. This issue was also examined. The area farmed in the 1988/89 season for all respondents ranged from 0.3 to 100 acres with an average of 6.5 acres. The distribution of respondents by type and area farmed in the 1988/89 season is presented in Table 62.

The data in Table 62 show that a majority of the SEP non-participating and non-SEP respondents farmed less than 5 acres. The data also show that 37.6 per cent of the SEP participating, 17.1 per cent of the SEP non-

participating and 25.6 per cent of the non-SEP respondents farmed between 5 and 10 acres of land. In this study very few respondents cultivated farms over 10 acres. The average farm sizes for the respondents were: 7.4 acres for

TABLE 62
DISTRIBUTION OF RESPONDENTS BY TYPE AND AREA FARMED IN 1988/89 SEASON (N = 290)

Number of Acres Farmed	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
Under 5	44	(47.3)	77	(77.8)	66	(67.3)
5 to 10	35	(37.6)	17	(17.1)	25	(25.6)
10 to 20	10	(10.8)	4	(4.1)	3	(3.0)
20 to 50	4	(4.3)	1	(1.0)	1	(1.0)
Over 50	0	(0.0)	0	(0.0)	3	(3.1)
Total	93	(100.0)	99	(100.0)	98	(100.0)
Mean (acres)	7.4		4.5		7.8	

SEP participating, 4.5 acres for SEP non-participating and 7.8 acres for non-SEP respondents.

In order to determine the relationship between farm size and the performance of respondents from the SEP and non-SEP villages the area farmed was used to divide respondents into "small" and "large" categories. A farm size between 0.3 to 5 acres was considered to be small while an area of over 5 acres was considered a large category. An examination of the relationship between area farmed and the respondents' selected performance variables related to SEP was carried out and the results are summarised in Table 63.

TABLE 63

THE RELATIONSHIP BETWEEN FARM SIZE AND SELECTED PERFORMANCE VARIABLES (N = 290)

	Types of Respondents								
	SEP PART (n = 93)			SEP NON PART (n = 99)			NON-SEP (n = 98)		
Farm Size	No.	PART	Sig.	No.	PART	Sig.	No.	PART	Sig.
Small (< 5)	44	14.8	0.441 NS	77	10.2	0.478 NS	NA	NA	NA
Large (> 5)	48	15.7		22	11.1				
Farm Size	No.	EXT	Sig.	No.	EXT	Sig.	No.	EXT	Sig.
Small (< 5)	44	11.2	0.697 NS	77	6.3	0.351 NS	66	5.9	0.532 NS
Large (> 5)	49	11.6		22	7.5		32	6.6	
Farm Size	No.	TFOOD	Sig.	No.	TFOOD	Sig.	No.	TFOOD	Sig.
Small (< 5)	43	2660.5	0.027 *	73	1261.6	0.003 **	62	1004.8	0.007 **
Large (> 5)	45	6422.2		22	4127.3		31	2183.8	
Farm Size	No.	FOSUFF	Sig.	No.	FOSUFF	Sig.	No.	FOSUFF	Sig.
Small (< 5)	43	194.3	0.493 NS	73	86.3	0.008 **	62	69	0.022 *
Large (> 5)	45	260.8		22	191.6		31	111	

* = Significant at 5% level; ** = Significant at 1% level;
NA = Not Applicable; NS = Not Significant; Sig. = Significance.
PART = Average Level of Participation; EXT = Extension Activity Involvement Score;
TFOOD = Average Total Food Production; FOSUFF = Average Level of Food Sufficiency (%).

The results from the t-test procedure shown in Table (63) show that the difference between the average total food production for the SEP participating respondents was statistically significant ($p = 0.027$). The SEP participating respondents who cultivated large farms had more than double the average total food production of those with small farms. No significant differences were found between average levels of participation, extension activity involvement and levels of food sufficiency for SEP participating respondents with small and large farms.

The data also show that the relationships between farm size and average total food production and level of food sufficiency for the SEP non-participating respondents were significant. Those with large farms had greater average total food production and levels of food sufficiency than those with small farms. In addition, the relationships between farm size and levels of participation and extension activity involvement for SEP non- participating respondents were not significant.

Furthermore, the data in Table 63 show that the relationships between farm size and the average total food production and levels of food sufficiency for the non-SEP respondents were statistically significant. The non-SEP respondents with large farms had more than double the average total food production and levels of food sufficiency of those with small farms. No significant relationship was found between farm size and average extension activity involvement for the non-SEP respondents.

These findings suggest that the area cultivated significantly influenced the average total food production for farmers from both SEP and non-SEP villages. Also, farm size influenced the level of food sufficiency for both SEP non-participating and non-SEP farmers. However, while the level of food sufficiency of SEP target farmers with larger farms was higher than that recorded for those with smaller farms the differences was not significant. This suggests that, to a fair extent, SEP target farmers were able to improve the amount of food they produced to meet their household needs regardless of farm size. This was not the situation for non-target SEP farmers or for those from non-SEP villages.

Farm Fragmentation

Farm fragmentation can be a serious obstacle to farm development especially for small scale farmers. In this study nearly all respondents had fragmented farms and they had between 1 and 6 fragments. A comparison of

the distribution of respondents according to their number of farm fragments is shown in Table 64.

TABLE 64
DISTRIBUTION OF RESPONDENTS BY TYPE AND NUMBER OF FARM FRAGMENTS (N = 290)

Number of Farm Fragments	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
None	3	(3.2)	0	(0.0)	0	(0.0)
1 to 2	45	(48.4)	53	(53.5)	61	(62.3)
3 to 4	42	(45.2)	43	(43.5)	36	(36.7)
Over 4	3	(3.2)	3	(3.0)	1	(1.0)
Total	93	(100.0)	99	(100.0)	98	(100.0)
Mean (farm fragments)	2.4		2.4		2.2	

The data in Table 64 show that a majority of respondents had between 1 and 2 farm fragments. This accounted for 48.4 per cent of the SEP participating, 53.5 per cent of the SEP non-participating and 62.3 per cent of the non-SEP respondents. The second largest fragmentation category was those with 3 to 4 farm fragments (Table 64). In general, farm fragmentation was considered a problem by most respondents in this study because they had to walk long distances in order to reach some of their farms. Almost 42 per cent of SEP and 48 per cent of the non-SEP respondents had to walk from a half to one and a half hours to reach their furthest farms. Also, 19.2 per cent of the SEP and non-SEP respondents walked for more than one and a half hours to the furthest farms. The relationships between farm fragmentation and average levels of participation, extension activity involvement total food production and levels of food sufficiency for all respondents were not significant. These findings suggest that the number of farm fragments did not have any influence on the selected performance variables in SEP for both SEP and non-SEP village respondents.

Livestock Ownership

Livestock keeping was not a major agricultural activity for the majority of the farmers in Morogoro region. In this study all respondents grew crops while 67.9 per cent of the SEP and 64.9 per cent of the non-SEP respondents owned livestock. The distribution of the respondents by the type and livestock owned is presented in Table 65.

TABLE 65
DISTRIBUTION OF RESPONDENTS BY TYPE AND LIVESTOCK OWNED
(N = 290)

Type of Livestock Owned	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
Sheep	0	(0.0)	2	(2.0)	0	(0.0)
Goats	7	(7.5)	3	(3.0)	7	(7.1)
Cattle	1	(1.1)	1	(1.0)	0	(0.0
Poultry	68	(73.1)	61	(61.6)	60	(61.2)
Total	93	(100.0)	99	(100.0)	98	(100.0)

According to the data in Table 65, just over 73 per cent of the SEP participating, 61.6 per cent of the SEP non-participating and 61.2 per cent of the non-SEP respondents owned poultry. The data also show that there were very small numbers of other types of livestock in the study villages. Only 21 people in the study owned small number of sheep, goats and cattle.

When livestock ownership was related to the levels of participation, extension activity involvement, total food production and levels of food sufficiency for the three categories of respondents, none of the relationships were significant. These findings were influenced by the fact that other than poultry, very few respondents kept livestock. Also, none of the SEP programmes were involved with the livestock industry.

Labour Force

The total labour force in each household in this study was taken to include the number of male and female members of the family who were considered able to work. The total labour force in this study ranged from 1 to 9 with an average of 3.1 people. It is assumed that the larger the labour force the more the household would be involved in farming activities. The distribution of respondents by type and size of labour force is shown in Table 66.

TABLE 66
DISTRIBUTION OF RESPONDENTS BY TYPE AND SIZE OF FAMILY LABOUR FORCE (N = 290)

Size of Labour Force	Type of Respondents					
	SEP PART (n=93)		SEP NON-PART (n=99)		NON-SEP (n=98)	
	No.	(%)	No.	(%)	No.	(%)
1 to 2	34	(36.6)	47	(47.6)	57	(58.2)
3 to 4	34	(36.6)	33	(33.3)	34	(34.7)
5 to 9	25	(26.8)	19	(19.1)	7	(7.1)
Total	93	(100.0)	99	(100.0)	98	(100.0)
Mean (Labour Force)	3.6		3.0		2.7	

The data in Table 66 show that over two-thirds of the SEP participating, SEP non-participating and non-SEP respondents had between 1 and 4 people as their family labour force. In order to determine the relationship between size of the labour force and the selected performance variables in SEP, a labour force of 2 people or lower was considered small. Households with a labour force of more than 2 people were considered as belonging to the large category. An examination of the relationship between size of labour force for SEP participating respondents and selected performance variables related to SEP revealed that it was not significant. However, the difference between the average levels of food sufficiency for SEP non-participating respondents with small and large size of labour force was statistically significant ($p = 0.018$). The

SEP non-participating respondents with a small size labour force had greater average levels of food sufficiency than those with a large family labour force.

Also, the relationship between size of labour force for non-SEP respondents and the average level of total food production was statistically significant ($p = 0.05$). The non-SEP respondents with large labour forces had a greater average total food production than those with small labour forces.

These findings suggest that labour force did not have any influence on all the selected performance variables related to SEP for the SEP participating respondents. Labour force had a significant influence on the average total food production of the SEP non-participating respondents and on the levels of food sufficiency for the non-SEP respondents.

Summary of Part 2: Section III

The Influence of Personal/Social and Farm Situational Characteristics on Selected Performance Variables Related to the SEP

Age: The average age of all the respondents was 43.9 years. The youngest respondent was 16 while the oldest was 89 years. A higher proportion of the SEP non-target group participants were under 35 years than was the situation for the two other categories of study respondents. Over one-third of the non-SEP respondents were over 55 years of age. The comparable percentages for the SEP target group and SEP non-target group respondents were 29 per cent and 19.2 per cent respectively. No significant relationship was found between age and the selected performance variables related to the SEP for all categories of study respondents.

Religion: Almost three quarters (73.8 per cent) of all respondents were Moslems and a quarter were Christians. There were no significant relationships between religion and levels of participation in SEP and involvement in extension activities for all categories of study respondents. A significant difference was found between Moslem and Christian SEP non-participating respondents' average levels of food production and levels of food sufficiency. Moslems had higher average levels of food production and food sufficiency than Christian SEP non-participating respondents. Overall, religion did not have a significant influence on the selected performance variables related to the SEP.

Gender: Three quarters of all respondents were male and just a quarter were female. Significantly more of the SEP participating respondents were male than either of the other two respondent categories. A significant difference was found between the male and female SEP participating respondents average total food production. Also, the differences between male and female SEP non-participating respondents' average levels of participation and extension activity involvement were significant. Gender had no influence on the selected performance variables for the non-SEP respondents. Overall, the SEP participating male and female respondents (target group farmers) had greater average levels of participation, extension activity involvement, total food production and levels of food sufficiency than the other two respondents categories.

Marital Status: Most of the respondents in the study were married while 16 per cent were not married. Significant differences were found between the average level of total food production and levels of food sufficiency for married and unmarried SEP participating respondents. Likewise, the difference between the average level of food production for married and unmarried non-SEP respondents was significant. In general, marital status had a more significant influence on the SEP target farmers' average levels of total food production and levels of food sufficiency than the SEP non-target group and non-SEP farmers.

Size of Households: The number of dependants in each household ranged from 1 to 18 people. The average size of the households in the study was 6.4 persons. No significant relationships were found between the number of people in the households and the selected performance variables related to SEP for the SEP participating respondents. However, a significant relationship was found between the number of people in each household and the average levels of food sufficiency for SEP non-participating respondents. Similarly, the relationships between the number of people in the household and average total food production and levels of food sufficiency for the non-SEP respondents were significant. In addition, the number of adults in each household did not have influence in the selected performance variables related to the SEP for all types of study respondents.

Education: Two -hirds of the respondents could read and write. Almost 20 per cent of all the respondents had not attended formal schooling. The SEP participating respondents were found to be better educated than the other two respondent categories. Only the relationships between total food production and levels of education for SEP participating respondents were found to be significant. No other relationships between the selected performance variables related to the SEP and levels of education for all types of respondents were significant. Hence, the level of education had an influence only in the average total food production for the SEP-target farmers. Those with higher levels of education had greater amounts of food production than those with low education.

Newspapers: Only 21.5 per cent of the SEP participating and 4 per cent of the SEP non-participating respondents read the **Ukulima wa Kisasa** newspaper which it was the only farmers' newspaper in the study area. **Uhuru** newspaper was read by a majority of the three categories of respondents. The relationships between average total food production and levels of food sufficiency for SEP participating respondents and newspaper readership were found to be significant. Likewise, newspaper readership had a significant influence on the average levels of participation and extension activity involvement for SEP non-participating respondents. Also, a significant relationship was found between the average level of extension activity involvement and newspaper readership for the non-SEP respondents. The SEP participating respondents were found to be slightly more informed than the other two categories of respondents through reading newspapers.

Sources of Income: Seven sources of income were identified by all the respondents in the study. The major sources of income for all respondents were sale of crops, vegetables and fruits (farm sources of income). The secondary sources of income included: casual labour, skill and crafts, brewing, petty trade and employment (non-farm sources). Significant relationships were found between the average total food production and levels of food sufficiency and sources of income for SEP participating respondents. Also, the source of income had an influence on the extension activity involvement for the SEP non-participating respondents. Likewise, the relationships between the average total food production, and levels of food sufficiency for the non-SEP respondents and the source of income were

significant. The farm sources of income had greater influence than the non-farm sources of income on the selected performance variables related to the SEP for farmers from the SEP and non-SEP villages.

Farm Size: The area farmed in 1988/89 season ranged from 0.3 to 100 acres with an average of 6.5 acres per respondent. The majority of all respondents farmed less than 5 acres. The area farmed had an influence on the average total food production for farmers from both the SEP and non-SEP villages. Also, farm size had a significant influence on the levels of food sufficiency for both SEP non-target farmers and non-SEP farmers.

Farm Fragmentation: The majority of respondents had between 1 and 2 farm fragments. Most respondents had to walk long distances and for more than 1 hour to their furthest farms. The relationships between farm fragmentation and the average level of participation, extension activity involvement, total food production and levels of food sufficiency for all categories of respondents were not significant.

Livestock Ownership: Livestock were kept by very few respondents in the study villages. There was no association between livestock keeping and any of the selected performance variables used in the study for all categories of respondents.

Labour Force: Over two-thirds of all the respondents had between 1 and 4 people as their family labour force. There was no association between the size of labour force and any of the selected performance variables used in the study for the SEP target group farmers. Labour force had a significant influence on the average total food production of the SEP non-target group farmers and on the levels of food sufficiency for the non-SEP farmers.

CHAPTER VIII

SUMMARY OF FINDINGS, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Introduction

This chapter has three major purposes: (1) to present an overview of the study, its objectives, research design, methodology and the methods of data analysis used; (2) to summarise and compare the findings from the SEP and non-SEP villages using the study framework developed for understanding the impact of the Sokoine Extension Project at the village level; and (3) to draw conclusions and implications based on the study and make recommendations for the extension service and the development activities in Tanzania.

The Research Problem

The study set out to examine the impact of the Sokoine Extension Project on farmers' and extension workers' programmes and activities in solving the food and cash crop production problems in the project villages. It also determined the effectiveness of the SEP in developing the capacity of the extension system and in accelerating agricultural development at the village level in the country. The extension workers' and farmers' performance in the SEP were the key factors in the assessment of the project and were of particular interest in this study.

The research problem was guided by three major study objectives.

i) To identify, compare and contrast the major elements and activities of the extension service in the SEP and non-SEP villages in the Morogoro Region as factors which influenced the performance of the village extension workers. The activities included: types of programmes and micro-projects, extension management and support system, the in-service training provided, duties and work activities, methods, transport and other support facilities provided and links between extension workers research, farmers and other institutions.

ii) To determine the impact of extension work on food and cash crop production in the SEP and non-SEP villages by examining the performance of farmers in the project as indicated by: the farmers' contact with the extension service; levels of farmers' participation in extension projects and programmes; levels of farmers' involvement in extension activities; the farmers' change in agricultural practices; the farmers' priority problems addressed; and farmers' changes in their levels of food and cash crop production.

iii) To examine the factors which influenced the farmers' performance in the Sokoine extension project.

Design of the Study

The study was conducted in 10 SEP and 5 non-SEP villages from Morogoro and Kilosa districts. The respondents from these villages represented the primary sources of information. These respondents included 20 farmers from each selected village (i.e. a total of 300 farmers). Another source of primary data was 25 extension workers, 20 SEP and 5 non-SEP extension workers. The secondary source of information was obtained from: SEP staff at SUA, the RALDO, DALDO, village leaders, reports on the SEP, discussion and the author's observations on the project activities in the villages were also used.

Selection of Respondents

A total of 300 hundred farmers from 15 villages in Morogoro and Kilosa districts were interviewed using interview schedules prepared. For the SEP area, half of the villages were randomly selected from a list of villages which were progressing well in the project activities. The other half was selected from villages that were not progressing well in the project. This criteria was based on the judgement by the Project Manager and the District Agricultural and Livestock Development Officers for Morogoro and Kilosa districts. Thereafter, 20 farmers were randomly selected from each of the 10 SEP villages. Ninety-seven of these farmers were selected from a list of "target group farmers" that is those who according to the village extension workers were considered to be participating in the project activities. In addition, 103 farmers (non-target farmers), classified as non-participating in the project activities, were selected based on the village ten

cell list. Similarly, 100 non-SEP village farmers were randomly selected from a list of farmers in each village as obtained from the village government offices. More information on village projects, programmes and activities was collected from the secondary sources.

The extension workers selected for interview included all 20 SEP and 5 non-SEP extension workers. The non-SEP extension workers were selected from the same villages as non-SEP farmers. The non-SEP villages were selected on the basis that they would be suitable for inclusion in the SEP in the second phase when it is extended to other villages.

Data Collection

The data was collected by conducting personal interviews with the selected farmers and extension workers using interview schedules prepared. There were specific interview schedules for each category of respondent (i.e. SEP participating, SEP non-participating and non-SEP farmers, SEP and non-SEP extension workers). Each of the farmers' interview schedules included questions related to: personal characteristics, extension contact, farm characteristics, storage, village projects and programmes and involvement of women in extension programmes. The extension workers' interview schedules contained questions on; personal characteristics, village population, village farm characteristics, village non-farm activities, extension contact, the SEP approach and involvement of women in extension programmes.

Method of Data Analysis

The data collected from all 325 interview schedules were entered on the VM/CMS computer system and were analysed using programmes from the Statistical Package for the Social Sciences (SPSS). The data obtained from the SEP and non-SEP respondents were compared. The comparative method of analysis used frequency counts, cross-tabulations, t-tests and breakdown programmes to determine the differences in performance in the project activities of the SEP and non-SEP villages.

A research model outlining the indicators of farmers' and extension workers' performance in the SEP and factors affecting the farmers' performance in the SEP was drawn up. This model (Figure 12) was used as a framework for understanding the impact of the SEP at the village level in the Morogoro Region.

Summary of the Findings Using the Framework for Understanding the Impact of the SEP

The review of the study's findings is organised into three sections:

i) A comparison of the extension service major elements and activities in the SEP and non-SEP villages in the Morogoro Region,
ii) The impact of the extension work on the selected performance variables used,
iii) Factors affecting farmers' change and selected performance variables used in the SEP.

Section 1:
A Comparison of the Extension Service Major Elements and Activities in the SEP and Non-SEP Villages in the Morogoro Region

This section examined the performance of the extension workers under the SEP. The extension workers in the non-SEP villages were used for comparison purposes to determine the similarities and differences on the operation of the SEP system and the traditional extension system. According to the research model (Figure 12), seven major elements and activities were used in the comparative analysis and are summarised in this section.

The Personal and Background Characteristics of Extension Workers

A comparison of the age categories of the extension workers showed that the SEP extension workers ages ranged from 25 to 31 while the age range for non-SEP extension workers was from 22 to 30 years. There was no significant difference in the extension workers'levels of education. A majority of both SEP and non-SEP extension workers had completed form four and possessed a minimum qualification of a certificate in agriculture. Similarly, the length of service in the same village for all the extension workers was between one and three years.

The Types of Extension Projects and Programmes at the Village Level and how they were Developed

(a) Extension Micro-Projects. The SEP extension workers were involved in 7 micro-projects. Eighty-five per cent and 60 per cent of the SEP extension workers were involved in the marejea and agroforestry micro-

projects respectively. Lower percentages of SEP extension workers were involved in the five remaining micro-projects. Each of the SEP extension workers implemented at least 2 micro-projects. By comparison, 60 per cent of the non-SEP extension workers implemented only one micro-project. This was the grain storage project. There were no non-SEP extension workers carrying out other micro-projects in the villages.

The micro-projects were used by the SEP extension workers for demonstrating innovations to farmers. These micro-projects were initiated after the extension workers attended in-service training courses. They were developed in response to complementing agricultural practices being carried out at the village level to reduce input costs for farmers and to add value to agricultural produce. The micro-projects were selected involving the participation of farmers, village leaders, extension workers, the district extension service and Sokoine University Extension Project staff. The procedure involved problem identification, discussion and meeting of all relevant parties in selecting the projects. This extension approach of using low cost input micro-projects in demonstrating innovations to farmers was not used by the non-SEP extension workers.

(b) Extension Programmes. The study findings showed that each SEP extension worker implemented from 2 to 4 extension programmes between 1988 and July 1989. These programmes were designed and targetted towards solving food and cash crop production problems of village households. The extension programmes focused on 7 major village problems:

- Food shortage in February due to low maize yields.
- Low rice yields due to poor crop husbandry practices.
- Low farm incomes generated from low cotton yields.
- Lack of alternative cash crops to generate farmers' incomes.
- Loss of maize and other grains during storage.
- Lack of firewood and poor soil conditions.
- Loss of vegetables and citrus fruit crops caused by poor production and preservation methods.

The study further showed that the non-SEP extension workers did not implement any extension programmes. The work schedules of the non-SEP extension workers was mainly guided by directives issued from the region and district extension offices.

The Extension Management and Support System Used

The study findings showed that in the SEP villages an extension management and support system had been established (Figure 13). The key structures in the SEP included: The Project Management Committee, Project Expert Groups, SEP ICE Team, District Extension Service, Village Extension Worker and Village Governments. These structures were responsible for providing administrative and operational support to the extension workers. The structures provided for more visits by the district extension service to the villages. In the SEP, while there was a structure for management and support of extension workers, it did not work effectively. From the author's experience as counterpart to the Project Manager and observations, it revealed that the tasks and responsibilities in the project all centred on the Project Manager. There was little or no delegation of responsibilities to the various key structures at the ICE, district, regional or village level. In practice,the tasks and responsibilities of the extension service at the regional, district and, village and the ICE were not clearly spelt out and followed. Likewise, the reporting system was undefined, as such, the village extension workers and district extension staff did not know what activities, and to whom to report.

Similarly, there were too many changes of the counterpart. The counterpart was expected to understudy the project manager and be able to take over the project leadership after the technical assistance was withdrawn. However, there were five counterpart reshuffles in 3 years all made without due consideration of their suitability, interest and relevance to the project. Hence, in many cases when the Project Manager was away (on leave or official business) every activity of the SEP stopped. This indicated that up to the time data for this study were collected, the formulated project structures were not working effectively. As well, it implies that the project was not going to be sustainable after the Irish technical assistance and support was withdrawn unless corrective action was taken.

The situation for the non-SEP extension workers revealed that there was no comparative operational structure established. The district extension officers and DATO's did not regularly visit these villages. The situation led to a more top down approach by the RALDO and DALDOs giving directives to the village extension workers without knowing the current village problems.

The Type of In-Service Training Provided for Extension Workers

Eight in-service training courses were attended by each SEP extension worker in a period of two years. When asked about the number of courses, 90 per cent of the extension workers wanted the number of courses to be reduced from 4 to one or two courses per year. The extension workers felt that they needed more time to implement some of the ideas learned. The SEP extension workers preferred to have 2 weeks long courses twice a year or a one month long course once a year. Sixty per cent of the SEP extension workers chose September and January as the most appropriate months for conducting in-service courses. The most important subjects learned by the SEP extension workers were: programme planning, use of low cost inputs, crop husbandry practices and communications. When asked about topics they would like more training, 65 per cent identified the following as areas of interest and weakness: programme planning, evaluation and monitoring, use of chemicals (pesticides/herbicides), soil and water conservation and food preservation.

According to the curriculum of the certificate course in Agriculture and the author's experience as a tutor in the MATIs and LITIs, the subjects identified as areas of weakness for extension workers were brought about by the fact that they were not properly taught and some were allocated very few hours. The SEP extension workers considered in-service training as helpful in their work. It had helped in:

- developing and planning programmes to solve priority problems of farmers in their villages;
- providing technical knowledge and increased their confidence;
- developing skills in problem identification, most suitable solutions, identification and learning experiences for farmers to enhance their learning of new ideas, attitudes and behaviour; and
- improving their communication skills by learning appropriate extension methods to use when advising farmers.

For the non-SEP extension workers who attended in-service training courses their training needs were not considered during the planning process. The number, length, period for attending the courses, and topics for the in-service courses were predetermined by the regional extension service or course sponsors. A majority of the non-SEP extension workers did not benefit from this type of in-service training because it did not relate to their work and village problems.

A Comparison of the Duties, Work Activities and Methods Used by the Extension Workers in their Work

The extension workers in most agricultural extension organisations are involved in many administrative and regulatory activities in addition to extension related activities. The findings in this study showed that SEP extension workers were involved in more agricultural related duties than the non-SEP extension workers. The agricultural duties carried out included: advisory duties, farm and home visits, data collection and report writing, in-service courses, meetings and demonstrations, village farm and extension workers farm duties, and planning communications with other institutions. In performing these duties SEP extension workers used farm visits, meetings, symposia and demonstrations as major communication methods. The non-SEP extension workers mainly used farm visits and meetings in reaching farmers.

When asked about problems they face in advising farmers, the SEP extension workers identified six major problems while only two of these problems were identified by the non-SEP extension workers. The problems identified were: social and cultural factors; farmer resistance to change; unavailability and cost of inputs; farmers' poor attendance at meetings; low level of education of farmers; farmers living far apart and village being too big for one extension worker.

The non-SEP extension workers identified farmers' poor attendance at meetings and resistance to change as their major problems. The findings suggest that SEP extension workers were involved in more extension activities and were using a variety of extension methods as compared to the non-SEP extension workers. The SEP had been successful in reducing the proportion of time extension workers spent on non-agricultural duties.

The Transport and Other Support Facilities Provided for Extension Workers to Carry out their Work

When asked about their mobility in the villages, 95 per cent of the SEP extension workers stated that the transport facility provided by the SEP was very useful. It had helped in: increasing the number of visits to farmers, increasing mobility within the village, keeping appointments to farmers, meeting more farmers and nearby extension workers. In addition, 60 per cent of the SEP extension workers reported that there were being visited by the DALDO/DATOs at least 4 times a year since SEP started. Each DATO had been provided with a motorcycle. Other support facilities

provided for extension workers were sprayers and rain garments. These facilities were found to be particularly useful in assisting in the control of pests and diseases and working in wet weather. These transport and support facilities were not provided for the non-SEP extension workers and DATOs. They had to carry out their work on foot and the district extension officers did not regularly visit their villages. The findings suggest that the support facilities made extension workers mobile, practical and accessible to more farmers. They were more motivated to carry out their work. The situation in the SEP village showed that extension workers work performance could not be improved without providing these basic facilities.

The Links between Extension Workers, Research, Farmers and other Institutions

In this study, all the SEP extension workers perceived that the project had improved the links between the villages, research stations, the university and the extension service. Improved linkages were developed between the villages and Sokoine University of Agriculture, the Co-operative Unions and Ilonga Research Station. The SEP extension workers reported that these organisations were particularly useful in: providing training and technical knowledge; providing logistical support to extension workers; using villages for student placement; and providing loans for farmers.

The findings also showed that there was virtually no linkage between non-SEP villages and these organisations. The non-SEP extension workers did not get similar assistance as SEP extension workers did, consequently they had lost motivation in carrying out extension work. These findings provided evidence that improved linkage between extension workers and other institutions, increased extension workers efficiency and work performance.

Section 2:
The Impact of the Extension Work on the Selected Performance Variables Used in the SEP

Six factors were considered in determining the farmers' selected performance in SEP. These factors included:

- The farmers' contact with the extension service and its programmes

- The level of farmers' participation in SEP
- The level of farmers' involvement in extension activities
- The types of changes in farmers' agricultural practices
- The farmers' priority problems
- The level of food and cash crop production

This section describes how these factors were determined.

The Farmers' Contact with the Extension Service and its Programmes

In this study extension contact was considered to include: farm visits by farmers to the demonstration farms, attendance at meetings and farm visits by the extension workers to individual farmers' farms. The average extension contact is summarised in Table 67.

TABLE 67
AVERAGE EXTENSION CONTACT PER YEAR BY TYPE OF RESPONDENT (N = 290)

Type of Contact	Type of Respondent		
	SEP PART (n=93) (Ave./year)	SEP NON-PART (n=99) (Ave./year)	NON-SEP (n=98) (Ave./year)
Demonstration farm visit by farmers	2.80	1.70	1.60
Meetings attended	2.30	1.10	1.00
Farm visit by extension worker	3.95	2.90	3.00

From the data in Table 67, it is obvious that SEP participating respondents visited the demonstration farm more often (1.6 times more) than all other respondents. The study also revealed that both male and female SEP participating respondents visited the demonstration farm more frequently than male and female SEP non-participating and non-SEP respondents.

The SEP participating respondents attended more than double the number of meetings attended by SEP non-participating and non-SEP respondents. The study also showed that gender had an influence on the number of meetings attended in a year in favour of the male SEP participating respondents. Furthermore, the study findings revealed that

the SEP participating respondents received slightly more farm visits by their extension workers than either the SEP non-participating or non-SEP respondents.

When asked about the changes in extension workers' performance, 59 per cent of all respondents noticed some changes in the extension workers' activities. Eighty per cent SEP participating, 60 per cent SEP non-participating and 36 per cent non-SEP respondents noticed the changes. The study also showed that 64 per cent of the non-SEP and 40 per cent of the SEP non-participating respondents did not notice any change in the extension workers' performance. The respondents who noticed the changes identified four areas in which the change occurred: (i) more farm visits by the extension workers; (ii) more home visits; (iii) greater effort in setting demonstration farms by the extension worker; and (iv) the extension worker was more informed and had better advice to offer to farmers.

Moreover, the study showed that 89 per cent of the SEP participating respondents were aware that their village was involved in special agricultural projects. The majority of the SEP non-participating and non-SEP respondents stated that their village was not involved in special agricultural projects. For the respondents who were aware of their village involvement in special agricultural projects, they identified four micro-projects: (i) the village farm, (ii) green manure plants, (iii) agro-forestry and (iv) oxenisation. In addition, the SEP respondents identified the most important features of the SEP to be the extension workers advice, more frequent visits by the extension worker and use of marejea as green manure.

The Level of Farmers' Participation in the SEP

A SEP participation index (Appendix F) for measuring the farmers' participation in the project activities was constructed. It was computed from the following variables: their awareness of the village involvement in the SEP projects and programmes; their awareness of the SEP; their involvement in selecting village projects, the involvement of women in the SEP meetings and demonstrations; and their attendance at meetings and demonstration farm. The SEP participation score for SEP farmers in the study ranged from 1 to 25 out of a maximum score of 26. Seventy (35.2 per cent) of the SEP respondents had a score below 10 which was considered a low level of participation and 129 (64.8 per cent) respondents

had a score higher than 11 (a high level of participation). Likewise, the average SEP participation score for all the SEP villages ranged from 8.70 to 16.30. Three village (Mlali, Mkundi and Mvomero) were in the low level of participation and seven villages were in the high level of participation in the SEP.

Furthermore, the findings showed that half of the SEP non-participating respondents had a low level of participation in the SEP while 19.8 per cent of the SEP participating were in this category. Similarly, 80.2 per cent of the SEP participating and 50.5 per cent of the SEP non-participating respondents were in the high level of participation in the project. The average SEP participation score for female SEP participating respondents was greater than for the male SEP participating respondents. However, the SEP participation score for male SEP non-participating respondents was higher than for the female SEP non-participating respondents.

The Level of Farmers' Involvement in Extension Activities

An extension activities involvement index for measuring the farmers' level of involvement in extension activities was constructed (see Appendix G). The extension involvement score for farmers in the study ranged from 1 to 21 out of a maximum score of 21. There were 159 (53.0 per cent) SEP respondents with a score below 8 which was considered a low level of extension involvement and 141 (47 per cent) SEP respondents with a score higher than 8 had a high level of involvement in extension activities.

The study findings also showed that 78.4 per cent SEP participating, 34 per cent SEP non-participating and 30 per cent non-SEP village respondents had a high level of involvement in extension activities. The majority of the non-SEP and SEP non-participating respondents were in the low level of extension involvement category. The differences between the average extension involvement scores for the SEP participating, and SEP participating and non-SEP respondents were significant. The average extension involvement scores for all the villages in the study ranged from 3.75 to 11.55. Nine of the 15 study villages (4 SEP and 5 non-SEP villages) were in the low level of extension involvement category and 6 villages (all SEP) were in the high level of involvement in extension activities category.

Farmers Agricultural Practices

The data on agricultural practices showed that 68 per cent, 54.6 per cent and 42.7 per cent of the SEP participating, SEP non-participating and non-SEP respondents respectively followed a monocropping pattern for growing maize, rice, cotton and sunflower. Similarly, 43.3 per cent of the SEP participating 54.4 per cent of the SEP non-participating and 29 per cent of the non-SEP respondents used an intercropping pattern. However, it was a common practice for most respondents to grow the major crops mixed with 3 or 5 minor crops in the same plot. The crop yields in Tanzania are influenced by the farm practices adopted by the farmers (TNAP, 1982). The study findings showed that three quarters of all the respondents carried out the major recommended farm operations. The farm practices included: early planting, correct spacing, planting in lines and weeding. In addition, the data showed that more SEP participating than SEP non-participating and non-SEP respondents carried out the recommended farm operations. The SEP extension workers in the SEP villages initiated village programmes to complement the farm operations, while there were no such village programmes in non-SEP villages.

The use of inputs in the Morogoro region was generally low (Phelan and Wims, 1989; Ngetti, 1989). In this study, the inputs used by most respondents were improved seeds and insecticides/pesticides. The study findings indicated that 89.7 per cent and 64.1 per cent of the SEP participating and SEP non-participating respondents respectively used improved seeds while 54.6 per cent and 31.1 per cent of these respondents respectively used insecticides/pesticides. The comparable percentages for the non-SEP respondents in relation to the use of improved seeds and insecticides/ pesticides were 60 per cent and 29 per cent respectively. These results showed an increase in the use of these inputs as compared to the 1987/88 season. The use of inputs such as fertilizers, marejea, fungicides and herbicides had not improved in the 1988/89 season and were very low. The use of these inputs were very low because they were expensive and were supplied late to the villages.

The most common farm implement used was the handhoe. Ninety five per cent of all types of respondents in the study depended on the handhoe for land preparation and cultivation. However, almost half of all the respondents said that they had access to a tractor. The oxplough was not used by any respondent in this study. When asked about the

ownership of farm implements very few respondents and village governments owned tractors. Each respondent in the study owned several handhoes and handtools. Most respondents were unable to timely cultivate their farms following the short and long rain period in the region.

The study revealed that extension workers adviced farmers to select appropriate crop storage methods depending on how the crop was going to be stored. However, the study findings showed that less than 10 per cent of all the respondents were using the recommended traditional storage structures (i.e. **Vihenge or Vilindo**). The most common method used by all the types of respondents was sacks stacked on logs or platform. Similarly, 72.2 per cent, 46.6 per cent and 33 per cent of the SEP participating, SEP non-participating and non-SEP respondents respectively used storage pesticides. They used very small amounts. The major difficulty for farmers was to change from their traditional practices of storing crops without shelling to shelling and mixing the produce with a pesticide. The traditional practice did not require extra labour of shelling and mixing the grain with a pesticide.

The Farmers' Priority Problems

In this study, three major types of problems were experienced by the respondents: (i) problems on the farm, (ii) crop storage related problems and (iii) problems that caused low crop yields. The most important farm problems identified by all respondents were:

- availability of tractors (tractors were few and expensive to hire);
- inadequate labour; and
- lack and cost of agricultural inputs. Inputs like fertilizers, improved

seeds and pesticides were scarce, expensive and delivered too late.

The major crop storage problems in the study were rodents, insects pests and lack of storage pesticides. Respondents were adviced to use traditional storage methods in order to minimise crop loses due to these problems. The SEP encouraged farmers to use traditional structure like, **"Vihenge, Vibuyu, Vyungu and Vilindo"**. The problems causing low crop yields identified by the respondents included rainfall, rodents, lack of labour, weeds and birds. These problems were similar to those identified by the national research stations and the extension service. In addition,

respondents were asked to prioritise their problems and they identified the following as the major problems:

1) farm related - lack of tractors and inputs being too expensive;
2) storage related - rodents and insect pests; and
3) causes of low yields - unreliable rainfall and lack of labour.

There was substantial progress in the SEP villages because an attempt has been made to address some of these problems by the initiation of micro-projects. Nothing specific was being done in the non-SEP villages.

The Level of Food and Cash Crop Production

The study findings showed that the major food crops grown by a large proportion of respondents were maize, rice and sorghum. The minor food crops were: beans, cassava, bananas, sweet potatoes, pumpkins and vegetables. The respondents also stated that their cash crops included, cotton, sunflower and all the food crop surpluses. Cassava and sweet potatoes were considered as the main food security crops. The average yields of major crops for SEP respondents were higher than the previous two seasons. The yields had increased by more than double since the inception of SEP in the area. Similarly, cotton yields had increased by more than 1.5 times that recorded for the previous year. In addition, a comparison of the crop yields for the SEP and SEP non-participating respondents showed that they recorded higher yields than for the non-SEP respondents. Also, most SEP villages recorded greater average crop yields than the non-SEP villages.

An examination of the food situation in the villages revealed that the total food production for each household ranged from 0 to 45,000 kilogrammes per year. The average food production for SEP respondents was 3,147 kilogrammes while only 1,382 kilogrammes of food were produced by the non-SEP respondents. A majority (64.4 per cent) of the SEP respondents recorded food production between 1,000 to 11,000 kilogrammes while only 49.4 per cent of the non-SEP respondents were in this category. The data also showed that the average total food production for SEP respondents in 1988/89 had increased by more than double the average total food production for the two previous seasons. In addition, SEP participating respondents recorded more than double the food produced by the SEP non-participating and non-SEP respondents. Their

average amount of food produced by the SEP participating, SEP non-participating and non-SEP respondents were 4,584, 1,925 and 1,398 kilogrammes for each household per year respectively.

A majority of respondents had not achieved a 100 per cent level of food sufficiency. Sixty per cent of respondents were below the 100 per cent level of food sufficiency. Only 48.6 per cent of the respondents perceived that they had not achieved this level. In addition, the data showed that 39.2 per cent of respondents had achieved between 100 and 500 per cent level of food sufficiency, but only 16.9 per cent stated that they were in this category. Also, 1.4 per cent of the respondents had achieved over 5 times their levels of food sufficiency, while 34.5 per cent stated that they had achieved this level of food sufficiency.

A comparison of the levels of food sufficiency for all types of respondents revealed that 38.6 per cent of the SEP participating, 62.1 per cent of the SEP non-participating and 76.3 per cent of the non-SEP respondents had less than 100 per cent food sufficiency. Similarly, more non-SEP than SEP villages recorded greater percentage of households that were below 100 per cent level of food sufficiency. It was also evident that when the average level of food sufficiency was high the proportion of households recording less than 100 per cent food sufficiency decreased.

Furthermore, the study findings showed that 17.3 per cent of the respondents sold surplus food crops and 44.7 per cent sold cash crops grown. The total food sold ranged from 0 to 117,000 kilogrammes. Interestingly, more than one-third of the food crops were sold in the parallel market where farmers were paid promptly and earned more money than from official markets or institutions. The total income made from all crop sales for each respondent ranged from 0 to 3,766,400 Tshs. The data also showed that 44.3 per cent of the respondents did not earn any money from crop sales. In addition, 21.4 per cent of the respondents earned between 15,000 to 45,000 Tshs while 19 per cent earned between 2,400 and 15,000 Tshs. In this study, only 4 per cent of the respondents earned more than 200,000 Tsh. Personal experience in the area shows that an income less than 50,000 Tsh would be considered very low and inadequate. The data showed that about twice as many non-SEP and SEP non-participating as SEP participating respondents did not make an income from crop sales. A majority (95 per cent non-SEP, 92.2 per cent SEP non-participating and 72.2 per cent SEP participating) of respondents earned less than 50,000 Tshs. A comparison of the average incomes per

household for each of the study villages revealed that only 8 SEP and one non-SEP village recorded an average income over 50,000 Tshs. while all the other villages recorded lower average incomes. Using these figure alone, it shows that most farmers did not make enough money from crop sales.

Section 3:
Factors Affecting Change and Selected Performance Variables used in the SEP

Two major factors were considered to have an effect on the performance of farmers in the project. The factors examined were:

(a) Factors Related to the SEP:
- involvement of farmers in problem and solution identification,
- awareness of farmers of SEP,
- involvement of farmers in selecting village projects.

(b) Factors that Influence the Selected Performance Variables used in the SEP:
- the farmers' characteristics (personal and farm characteristics).

Factors Related to the SEP

i) Involvement in Problem and Solution Identification

The SEP strategy involved selection of a target group of farmers. There were about 15 to 30 target farmers selected in each SEP village. The target farmers, village leaders and extension workers selected the priority problems. The priority problems selected were those for which there was a solution and which most farmers could afford using locally available resources. However, the study findings showed that only the target farmers were involved in the problem and solution selection of village priority problems. The ten cell leaders and the majority of farmers in the villages were not involved in this process and in project activities. The study also showed that only a relatively small proportion of women farmers were involved in the SEP and that women's problems were not addressed. The SEP strategy adopted did not involve the majority of the people and in particular the most vulnerable groups in the community or rural areas.

ii) Awareness of Farmers of the SEP

All the extension workers in the SEP villages used a variety of methods to inform farmers about the project. The methods used were: village meetings, seminars, symposia and discussions with villagers. However, the data showed that only 74.2 per cent of the SEP participating, 40.8 per cent of SEP non-participating and 7.0 per cent of the non-SEP respondents were aware of the existence of SEP. The results were surprising because all the SEP participating and a majority of the SEP non-participating respondents were expected to be aware of SEP. In addition, 42.3 per cent of the SEP participating and 61 per cent of the SEP non-participating respondents stated that they had heard about the SEP through their extension worker while 57.1 per cent of the non-SEP respondents heard about the SEP from other farmers. The target farmers who were aware of the SEP had greater average extension activity involvement, total food production and levels of food sufficiency than the SEP non-target and non-SEP farmers who were not aware of the SEP.

iii) Involvement of Farmers in Selecting Village Projects

The data showed that only 29.9 per cent of the SEP participating, 13.6 per cent of the SEP non-participating and 12.0 per cent of the non-SEP respondents were involved in selecting the village projects. Surprisingly, more than half the SEP participating and SEP non-participating respondents said were not involved in selecting the village projects. The respondents identified four groups of people who selected village projects. These were: the village chairman/secretary, village governments, village extension workers and the village chairman together with village extension workers.

The majority of the respondents thought that the village projects were useful in improving farmers' agricultural practices. The SEP target farmers who were involved in selecting village projects had greater average extension activity involvement, total food production and levels of food sufficiency than the SEP non target and non-SEP farmers who were not involved in selecting village projects.

Factors that Influence the Selected Performance Variables Related to the SEP

i) Personal Characteristics

The personal characteristics of the farmers that were examined to determine their influence on the selected performance variables in the SEP were: age, gender, level of education, marital status, religion, number of people in the households, number of adults in the households and access to local newspapers.

In this study, respondents were aged between 16 and 89 years with an average of 43.9 years. A higher proportion of the SEP non-target farmers were under 35 years old than the two other respondent categories. Over one-third of the non-SEP respondents were over 55 years of age. The comparable percentages for the SEP target and SEP non-target group respondents were 29 per cent and 19.2 per cent respectively. There was no association between age and the selected performance variables related to the SEP for all categories of study respondents.

When religion was examined, it revealed that nearly three quarters (73.8 per cent) of all the respondents were Moslems and a quarter were Christians. The study findings also showed that there were no significant relationship between religion and extension activity involvement for all categories of respondents. Likewise, there was no association between religion and levels of participation in SEP for SEP participating and SEP non-participating respondents. A significant relationship was found between religion and average levels of food production and levels of food sufficiency for SEP non-participating respondents. The Moslems had higher average levels of food production and food sufficiency than Christian SEP non-participating respondents.

In this study, three-quarters of the respondents were male and a quarter were female. The data showed that significantly more of the SEP participating respondents were male than either of the other two categories of the respondents. The difference between male and female SEP participating respondents' average total food production was found to be significant. The study findings also showed that gender had a significant relationship with average levels of SEP participation and extension activity involvement for SEP non-participating respondents. There was no association between gender and any selected performance variables used for the non-SEP village respondents. Overall, the SEP participating male and female respondents had greater average levels of participation in SEP, extension activity involvement, total food production and levels of food sufficiency than the other two respondent categories.

The study findings showed that most of the respondents were married. By comparison with unmarried respondents, SEP participating respondents had significantly higher levels of total food production and levels of food sufficiency. Likewise, the difference between the average level of total food production for married and unmarried non-SEP respondents was found to be significant. Marital status had a more significant influence on the average levels of total food production and levels of food sufficiency for SEP target farmers than the SEP non-target and non-SEP farmers.

The number of dependants in each household ranged from 1 to 18 people. The average size of a household in the study was 6.4 persons. There was no association between the number of people in the households and the selected performance variables related to the SEP for the SEP participating respondents. A significant relationship was found between the number of people in each household and the average levels of food sufficiency for SEP non-participating respondents. Similarly, significant relationships were found between the number of people in the households and the average total food production and levels of food sufficiency for non-SEP respondents. The study findings showed that there was no association between the number of adults in each household and any of the selected performance variables related to the SEP for all categories of respondents in the study.

Two-thirds of all respondents could read and write. The study findings showed that almost 20 per cent of all the respondents had not attended formal schooling. The majority of the respondents had completed primary education (standard I to VIII). The SEP participating respondents were found to be better educated than the other two respondent categories. The relationship between the average total food production and levels of education for the SEP participating respondents was found to be significant. The SEP participating respondents who had higher levels of education had greater amounts of food production than those with lower education. No other relationships between the selected performance variables related to the SEP and levels of education were significant.

The study findings also showed that only 21.5 per cent of the SEP participating and 4 per cent of the SEP non-participating respondents read the farmers' newspaper (**Ukulima wa Kisasa**). No non-SEP respondent read this newspaper. A majority of the respondents read the **Uhuru** newspaper. The relationships between average total food production and

levels of food sufficiency for SEP participating respondents and newspaper readership were significant. In addition, newspaper readership had a significant influence on the average levels of participation in SEP and extension activity involvement for SEP non-participating respondents. Also, there was a significant relationship between the average extension activity involvement and newspaper readership for the non-SEP respondents. The SEP participating respondents were found to be slightly more informed through reading newspapers than the other two categories of respondents.

ii) Farm Situational Characteristics

Seven sources of income were identified by respondents in the study. The major sources of income were sale of crops, vegetables and fruits. The secondary sources of incomes included non-farm factors like, casual labour, skills and crafts, brewing, petty trade and employment. The relationships between the average total food production and levels of food sufficiency and the source of income for the SEP participating respondents were found to be significant. Those whose primary source of income was from the sale of crops performed better on these variables. There was a positive association between extension activity involvement and the source of income for the SEP non-participating respondents. The relationships between the average total food production and levels of food sufficiency for the non-SEP respondents and the source of income were found to be significant. The farm sources of income had greater influence than non-farm sources of income on the selected performance variables related to the SEP for farmers from the SEP and non-SEP villages.

The area farmed in the 1988/89 season for all respondents ranged from 0.3 to 100 acres with an average of 6.5 acres. The majority of all respondents farmed less than 5 acres. A significant positive relationship between area farmed and average total food production was found for farmers from both SEP and non-SEP villages. Also, farm size had a significant influence on the level of food sufficiency for both SEP non-target and non-SEP farmers.

The majority of the respondents in the study had 1 to 2 farm fragments. Most respondents had to walk long distances and for more than 1 hour to their furthest farms. There was no association between the number of farm fragments and any of the selected performance variables used in the study for all categories of respondents.

Livestock were kept by very few respondents in the study villages. Almost two-thirds of the respondents in the study owned poultry. However, there was no association between livestock keeping and any of the selected performance variables used in the study for all categories of respondents.

The total labour force for all respondents ranged from 1 to 9 with an average of 3 people per household. Over two-thirds of all the respondents had between 1 and 4 people as their family labour force. There was no association between labour force size and any of the selected performance variables used in the study for the SEP participating respondents. Labour force had a significant influence on the average total food production of the SEP non-participating respondents. Similarly the relationship between labour force and levels of food sufficiency for the non-SEP respondents was found to be significant.

Conclusions, Implications and Recommendations

In this section of the study, some selected findings are examined and the conclusions are formulated in relation to the more important aspects of the study. These findings are further interpreted and implications are drawn. These implications lead to the suggestion of some recommendations regarding the planning and implementation of the SEP approach in the Morogoro Region and possibly in other parts of Tanzania. The conclusions and implications are discussed under the following headings:

1. Micro-projects and programmes in the SEP
2. Extension Management and Support System
3. The Type of In-Service Training Provided
4. The Transport and Other Support Facilities Provided
5. Research-Extension and Farmer Linkages
6. Farmers' Contact with the Extension Service
7. Farmers' Priority Problems
8. Food Production and Sufficiency
9. Effect of Personal and Farm Characteristics on Farmers' Selected Performance Variables used in SEP
10. The Management and Marketing Approach (MMA)
11. The Research Model Used

1. Micro-projects and Programmes in the SEP

The study provided evidence that a majority of the SEP extension workers initiated and implemented at least 2 micro-projects and from 2 to

4 programmes for the short and long rain periods. Both the extension workers and farmers stated that farmers had very little involvement in the identification and selection of the projects and programmes. According to the farmers in the study, the majority of the micro-projects and programmes were selected by the extension workers and village government leaders. The extension workers in turn stated that SUA played a major role in selection of micro-projects especially the sunflower oil extraction, oxenisation and marejea projects. The non-SEP extension workers did not implement micro-projects and programmes as part of their extension approach. Hence, there were more projects and programmes implemented in the SEP than non-SEP villages. It is evident that farmers' involvement in the identification, selection and implementation of projects and programmes' must be improved in order to increase their effectiveness in the SEP.

The findings imply that the approach of using micro-projects and programmes can greatly improve the work efficiency of the extension workers in introducing, demonstrating new ideas and complementing existing farmers' agricultural practices. The efficiency of the extension workers can not be improved if it is guided only by directives issued from national, regional or district extension offices.

2. Extension Management and Support System

The study showed that an extension management and support system had been established in the SEP villages while it did not exist in the non-SEP villages. The key structures in the SEP management and support system consisted of; the project management committee, expert groups, project manager/counterpart, SEP-ICE team, the district extension service, village extension workers and the village governments. These structures were expected to provide for administrative, operational and material support to the village extension workers but this did not work effectively. The tasks, responsibilities, reporting system, financial and other resources and plans for each structure were not clearly spelt out as a result the SEP operated to a large extent as directed by the Project Manager. It is the function of management that resources available to extension are used in the most efficient manner possible. When resources are scarce the efficient utilisation of available resources is particularly important. Frequently the real and perceived lack of resources, resulting in a low level of extension programme implementation and support from

management, results from the absence of good planning and the co-ordination of activities to maximise the limited amount of money and facilities available.

The study findings also showed that the SEP extension workers were involved in more agricultural related duties than the non-SEP extension workers. More than 25 per cent of the SEP extension workers' time was spent on advisory duties, farm and home visits, demonstrations and in-service training courses. The major communication methods used in reaching farmers by the SEP and non-SEP extension workers were farm visits and meetings. In addition, the SEP extension workers used symposia and demonstrations. The main problems extension workers faced in their work were farmers' poor attendance at meetings and resistance to change. The implications of these findings are:

i) There is need to establish the work priorities for extension workers at all levels particularly for village extension workers. Likewise, there is need to base the provision of resources for transport and other support of extension workers on what is the minimum needed to implement what are agreed projects and programmes or work priorities.

ii) An extension management and support system is vital in reducing the isolation and gap between the village extension workers and the district extension service and in enhancing their effectiveness in carrying out extension duties.

3. The Type of In-Service Training Provided

The SEP had improved the in-service training for extension workers in the SEP villages by providing 8 two-weekly courses in two years. The study showed that the pre-service training provided for the extension workers emphasised technical skills and was weak in extension related areas. The content of the in-service training courses needs to be developed taking into account the training needs of the village extension workers. It should be related to: (i) priority problems in the villages and defects in village extension workers technical competencies; (ii) development of new appropriate technology;and (iii) extension methods and improvement of the quality of work practices. A majority of the SEP extension workers wanted the number of in-service training courses to be reduced by half. Most of the non-SEP extension attended in-service training courses which were not related to their needs and the socio-

economic circumstances of their target farmers. The location of training needs to be selected considering the cost of providing all the in-service training courses at SUA and the necessity to keep village extension workers motivated, up-to-date on technical information and that the VEWs are able to learn and share experiences. In order that the project is replicable, the in-service training needs to be decentralised from SUA to the villages and to other agricultural and training institutions in the country.

These findings imply that regular in-service training is necessary in keeping village extension workers updated on technical information, and in increasing the contact with, farmers, the extension service, research, training and other agricultural related institutions. This is essential in view of the constant changes in farm technology and developments in the system of operation and the approaches and techniques used in extension (Chang, 1986, p. 221).

4. The Transport and Other Support Facilities Provided

In Tanzania, lack of transport and support facilities are major problems with all government departments in carrying out work at the village level. In the SEP villages, each extension worker was provided with a bicycle, sprayer, rain garments and training allowances. The district extension service (especially the DATOs) and the Sokoine University staff (at ICE) were provided with motorcycles and vehicles respectively. These facilities were found useful in increasing mobility of the SEP extension workers and meeting more numbers of farmers. The district extension service increased visits to the SEP villages at least 4 times more since the SEP was initiated. No transport and similar support facilities were provided for the non-SEP extension workers and the district extension staff.

The study findings indicated that transport and support facilities provided by the project made the SEP extension workers mobile, practical and accessible to more farmers. The extension workers were motivated to carry out their work in the villages. In the study conducted by Swanson and Claar mobility was ranked as the first most important problem in order of seriousness according to responses from 50 extension directors world wide (Swanson and Claar, 1984). Similarly, Claar and Bentz (1984) stated that adequate transportation is a prerequisite for effective extension work and presents special problems for extension organisations. All

categories of extension staff must be able to travel throughout their respective service area if the organisation is to fulfil its mission. Due to the acute shortage of transport in the country the bicycles, motorcycles and vehicles provided need a special servicing fund without which this project would not be sustainable once the funding is withdrawn. Despite this in the SEP no spare parts were included in the transport package (even the basic requirements like, pumps, tubes, tyres and repair kits).

Similarly, the project through its in-service training courses needs to provide training manuals for village extension workers to deal with both technical and extension methods (e.g. oxen training, record keeping, farm planning and group skills manuals). These manuals could be prepared by the ICE in co-operation with research institutions and the extension service in the region. The manuals would need to focus on how the village extension workers can carry out the activities in specific village situations. Such manuals would serve as guides and reference information for the village extension workers.

The implication of these findings and observations is that transport and other extension support facilities are essential basic requirements needed in reaching farmers effectively and in improving the performance of the extension workers.

5. Research-Extension and Farmer Linkages

Organisational gaps are not uncommon within government establishments which are assigned to various components of the technology development and transfer process. One of the most common gaps is found between research and extension (Acker and Sungusia, 1985). The interaction between research and extension is necessary so that research information can flow freely between these institutions and farmers. Linkage was ranked as the 8th most important problem by directors of extension and it was lacking in most developing countries (Swanson and Claar, 1984).

In this study, all the SEP extension workers perceived that the linkage between the SUA, the villages, the district and the regional extension staff had been significantly improved. There was an increase in the flow of information from researchers to extension workers. In the SEP, linkage was found to be useful in providing technical knowledge, training and logistical support for the extension workers. However, no similar links had been developed between the non-SEP extension workers, villages and

agricultural institutions. This lack of linkage had developed alienation and the non-SEP extension workers were not motivated to do their work well. Therefore, it is important that the flow of information should be in both directions from research-extension and farmers and vice versa. This ensures farmers' priority problems are known and addressed by researchers and research information reaches the farmers. This can be achieved for example by farmers giving their ideas and experiences on specific problems or technology, by inviting researchers and extension personnel at Village Development Committee and Village Planning Committee meetings which discuss all village problems and plans. Also, researchers and extension personnel should try to exchange ideas with farmers by organising symposia, demonstrations, open days and farmers days. Research stations should make deliberate efforts by setting demonstration trials and work with interested groups of farmers in developing technologies in the country.

These findings have the implication that extension needs to have continuing interaction with other agencies including farmers, research, training, sources of credit, input, marketing agencies and policy makers (Claar and Bentz, 1984).

6. Farmers' Contact with the Extension Service

The study findings indicated that almost 50 per cent of all the farmers had a high level of involvement in extension activities. The farmers in the SEP villages had more extension contact through a variety of methods than farmers in the non-SEP villages. Farmers in the study area were found to be fairly well involved in SEP activities as nearly two-thirds of the SEP farmers had a high SEP participation score. Also, the farmers in the SEP villages had made more changes in their agricultural practices than non-SEP farmers. Most of the SEP farmers used improved practices such as shelling of maize, used pesticides/insecticides, improved seeds and followed recommended cropping patterns like early planting, correct spacing, planting in lines and weeding. This resulted from their frequent contact with the extension workers, attendance at meetings, demonstrations and in the farmers involvement in SEP micro-projects and programmes.

This implied that those farmers who were highly involved in the project activities and who had high participation in the SEP had a greater chance of increasing their food and cash crops production.

7. Farmers' Priority Problems

The study findings showed that farmers in Morogoro region experienced three major problems. These were: problems on the farm (lack of machinery, cost of hiring tractors and expensive inputs), storage related problems (especially rats and insect pests) and problems that caused low yields (unreliable rainfall and lack of labour). While micro-projects and programmes were initiated in the SEP villages to solve farmers' priority problems, very few farmers were involved in the identification, selection of problems and their solutions. For example, the ten cell leaders and a majority of the small farmers especially women and the youth who were important implementors of the agricultural projects were not involved. Despite this, some of the priority problems for farmers in the SEP villages were addressed. These problems included:

i) Rat control-farmers were advised to use traditional storage structure (e.g. **vihenge, vilindo, vibuyu** and **vyungu**). However, less than 10 per cent of the farmers used the traditional storage structures recommended by the extension workers. Most farmers stored their shelled grain in sacks.

ii) The use of oxen for cultivation instead of the costly tractors. The study indicated that there was no success in the promotion of the ox-plough because no farmer used this technology. A small proportion of farmers used hired tractors while the majority (95 per cent) were still using the hand hoe.

iii) Timely planting to make use of the short and long unreliable rainfall, and the use of green manuring plants (eg. marejea) and compost as a low cost input instead of fertilizers. A majority of farmers followed timely planting while a few farmers used marejea and compost.

This implies that all the major problems identified by farmers need to be addressed. By finding suitable solutions for most of the farmers' priority problems it will ensure that an increase in the level food and cash crop production will be realised. The findings from this study also imply that more effort by the extension workers is required to convince farmers of the need to use oxen for cultivation and follow other recommended crop practices.

8. Food Production and Sufficiency

The study findings indicated that farmers in the SEP villages had higher crop yields per hectare for maize, rice, sorghum, sunflower and cotton than farmers in the non-SEP villages. The average food production per household in the SEP villages was 3,147 kilogrammes. This was higher than the average food production for the non-SEP farmers which was 1,382 kilogrammes. The food production in the SEP villages was more than double the average food production for the same villages for the two previous seasons when the corresponding figures were 1,500 and 1,096 kilogrammes. On average, 60 per cent of the farmers in the study had not achieved self sufficiency in food production. Also, more non-SEP farmers than SEP farmers were not self sufficient in food. Farmers, however, perceived that their food situation was satisfactory. This can be explained by the fact that minor crops grown by farmers such as bananas, cassava, cowpeas, sweet potatoes, beans and pumpkins not used in the determination of the food produced contributed in fulfilling their food requirements.

In this study, only 17 per cent of the farmers sold surplus food and 45 per cent sold cash crops. The study also showed that more than one-third of the food was sold in the parallel market. The majority of the farmers earned less than 50,000 Tshs. from crop sales. Despite the importance of agriculture in generating incomes for farmers in the Morogoro region almost twice as many non-SEP farmers as those who participated in the SEP did not make any income from crop sales.

This implies that the food situation in the study villages was still poor and food sufficiency had not been attained. Farmers were living in poor conditions and had inadequate food production and low incomes. This means that they had no capital to invest in farm development.

9. Effect of Personal and Farm Characteristics on Farmers' Selected Performance Variables used in SEP

Farmers' performance in the SEP activities was highly influenced by their personal and farm characteristics. These factors included: gender; marital status; level of education; and farm size. The male farmers in these SEP villages had higher levels of participation in the SEP activities than the female farmers. Also, married SEP farmers in the project area

produced more food and were more self sufficient in their food requirements than married non-SEP farmers. The farmers participating in the SEP were found to be better educated than the non-target and non-SEP farmers and those with high level of education had greater levels of food production than those with lower education. The majority of the farmers in the non-SEP villages had a low level of education. Newspapers were found to be a very important source of information for both extension workers and farmers. However, very few farmers read the farmers' magazine (**Ukulima wa Kisasa**) because of its poor and irregular distribution to the villages. Farm size was the only farm factor that significantly influenced the performance of farmers in the project activities. Farmers with large farms had significantly high yields, produced more food and were more self sufficient in their food requirements. The SEP farmers had the largest farms and higher levels of food production and sufficiency than the non-SEP farmers who had the smallest farms.

From the study findings it is evident that the SEP like the traditional extension approach focussed mainly on men, the educated and progressive farmers and largely ignored the small farmers, women and young farmers. However, leaving out women, small and young farmers guarantees failure as these are the main food and cash crop producers in the villages in Tanzania.

This implies that the involvement of more small farmers, women and the youth could significantly improve the impact of the project on increasing the food and cash crop production in the villages.

10. The Management and Marketing Approach (MMA)

The Management and Marketing Approach is an extension approach that has been developed and is being promoted by Dr. Joe Mannion of University College Dublin - Ireland. The MMA has been used as a basis for guiding the development and implementation of the SEP in the Morogoro region of Tanzania. It is basically a problem solving approach which is based on three principles:

i) a thorough analysis of the situation including on-farm as well as off-farm opportunities and constraints;
ii) identification of what the problem are, what the causes of these problems are and what solutions are possible; and

iii) precise statements of what actions can be taken to solve the priority problems identified.

Mannion (1987) went on to say that if optimum use is to be made of available resources, farm families and those who advice them must use a Management and Marketing Approach (MMA).

Ability of Village Extension Workers to use the MMA

The village extension workers in Morogoro and Kilosa districts were involved in advising farmers using the MMA for a period of almost 2 years. This approach has been successful and useful in:

i) Improving the mobility of extension workers. Each Bwana Shamba was provided with a bicycle and was able to travel and reach more farmers in the villages than previous years before inception of SEP.

ii) Reducing the proportion of time extension workers spent on non-agricultural duties. In this approach emphasis was placed on Bwana Shambas giving attention to the priority agricultural problems of farmers.

iii) Emphasising the use of low cost inputs especially the use of traditional agricultural practices (e.g. traditional storage structures - **Vihenge, Vyungu, Vilindo** etc.) that help farmers in solving some of their problems. The extension approach also encouraged farmers to use intermediate or appropriate technology (eg. oxen for cultivation, green manures and compost making). All these practices made use of locally available resources.

iv) Promoting the use of micro-projects and programmes by village extension workers. This has been a significant strength for the MMA as the micro-projects and programmes selected were implemented by village governments without external assistance. They also addressed the priority food and cash crop problems of farmers.

v) In-service training courses - through a series of in-service training courses each year the village extension workers were kept

up-to- date on technical information. The courses also increased Bwana Shambas' confidence and motivated them to carry out their work. Bwana shambas found extension programming to be the most valuable extension aspect of the SEP in-service training courses.

vi) Developing a management and support system - the necessity for a strong management and support system for the extension service has been emphasised in the MMA. The regional and district extension service and the University provided personnel to deal with administrative and logistical support issues for the village extension workers. Through such an arrangement the University and the extension service in the districts increased their meetings and visits to the villages and support to the Bwana Shambas.

The Weakness in the Operation of the MMA in Morogoro Region

i) Selection of Target Farmers - The target farmers selected were not representative of the majority of farmers in the villages. The approach followed typical extension trends in that participating farmers selected had greater resources, greater education and were mainly men. The ten cell leaders, women, small and young farmers were not involved in the project.

ii) The Training Provided - The number of training courses, the content of training courses and the cost of training were major weaknesses in the in-service training courses provided. The frequency of training courses at SUA needs to be reduced to allow extension workers to practise what is learned during the training courses. The content of training also needs to emphasise communication skills especially those related to extension methods like group skills and techniques of dealing with the problems of the farm groups (i.e. women, illiterate, small, young and poor farmers). The cost of training extension workers at the ICE was very expensive. It would be better to decentralise the training programme to selected villages where groups of extension workers with similar problems can assemble and exchange ideas. Such an arrangement will give research staff, extension personnel and SUA an opportunity to see village problems at first hand.

iii) Management and Support System - The project structures established for the SEP were not working effectively. Organisational problems (i.e. centralisation of SEP activities at ICE, frequent changes on the project manager counterpart and lack of delegation of authority to the regional/district extension service or village governments) affected the efficiency of the project activities for the Project Manager and counterpart, the ICE, the regional and district extension personnel, village extension workers and village governments. The extension service was answerable only to the ministry of agriculture thus can not receive directives from SUA. In addition, the project facilities and resources were centralised at the ICE and all decisions were made by the Project Manager or the Director of the ICE without any delegation of authority to the regional/district extension service or village governments. The tasks and responsibilities and reporting system in the project were not clear to everyone involved in implementing the project. Unless these key project procedures are satisfactorily resolved it will not be replicable nor sustainable after the technical assistance is withdrawn.

iv) The Village Governments - In this project only the Village Chairman and Village Secretary for each selected village were involved in the project activities. There was limited effort by extension workers and other project staff to meet with village government leaders to discuss the farmers problems, micro-projects and programmes. While the flow of information from research to extension workers and farmers had improved, there was no feedback from farmers to researchers. In general, the village governments were made more dependant on assistance from the SEP. In order for the village projects and programme to be relevant to farmers, the village governments must be made more responsible for all the development activities for their villages. This can be done through village government leaders and farmers' active participation in the selection of projects and programmes and contributing towards their funding. This will reduce dependence, increase the two way flow of information and increase the project's sustainability.

Relationship of the MMA and T & V System

The MMA is being operated in some of the villages in the Morogoro region where the T & V system is going to be fully implemented from July 1991 (see Chapter IV for a detailed discussion of extension approaches). The main features and strength of the MMA included:

i) involvement of farmers on dealing with farmers' priority problems;
ii) involvement of farmers in selecting village projects and programmes;
iii) emphasis on the use of available local resources;
iv) emphasis on a clear management and support system for extension workers; and
v) working with farmers, research and extension personnel together.

The T & V system and MMA are designed to give each extension worker a well defied job with timely training, technical backstopping and adequate supervision. These extension approaches provide transport facilities for all the extension workers. Both the MMA and T & V system are being promoted as low cost approaches, however, the T & V system requires a substantial financial and manpower input. T & V system unlike the MMA can not contribute towards overcoming agricultural production problems in Tanzania because it does not consider the development problems as a package. The T & V system deals with extension workers and researchers separately. It does not deal with farmers directly and highly relies on contact farmers. In this approach the farmers local and social problems are not addressed. Also in the T & V system, women and small farmers are not selected as contact farmers (Due *et al.*, 1987; Sutherland, 1988). In order to achieve favourable results, the T & V system needs to be modified to include the points of strength of the MMA and in this way it can be a more effective and sustainable extension system in Tanzania.

11. The Research Model Used

The analysis of the SEP study data was carried out in Chapter VII using the framework developed in the research model in Figure 12. The research model was used to assess the impact of the Sokoine Extension

Project on the extension work in the villages in the Morogoro region. According to this model, agricultural and rural development were seen as an outcome of the extension service intervention and farmers' participation in the extension project activities. The selected performance variables used in the SEP were significantly influenced by the factors related to the SEP and the farmer characteristics such as gender, level of education, marital status and farm size. The research model also showed that the farmers' performance in the SEP activities was influenced by the extension workers' performance in the project. The extension workers' performance was in turn influenced by: type of activities carried out in the villages; the extension method used; the type of training provided; the extension management and support system used; and the linkages of extension with research and other agricultural related institutions. Overall, the study showed that the extension workers' activities in the villages in Morogoro and Kilosa districts significantly contributed to the farmers' changes in the food and cash crop production and as such can lead to agricultural and rural development in Tanzania.

Specific Recommendations

1. i) The extension policy in the country has been encouraging the use of demonstrations by each village extension worker in advising farmers. It is recommended that the extension service should adopt a policy of encouraging extension workers to initiate and use micro-projects and programmes as part of their extension approach. The micro-projects and programmes should be developed by involving extension workers, village leaders, specific groups of farmers and women in the villages. The research and extension services should provide the needed expertise and logistical support.

   (ii) In addition, in order that a majority of farmers benefit from the extension efforts, it is recommended that the extension workers must try to involve the majority of farmers in each village in the identification of problems, solutions, selection of village projects/programmes and their implementation. Because it is unrealistic for extension workers to deal with the entire village in any one programme or project over a particular time period, it is suggested that the extension workers follow stages summarised in Figure 16. The extension worker should concentrate his efforts on the core group and target group farmers in identification of

problems and solutions. The core group farmers should consult with the target group and later on these spread the ideas to all farmers in the village. It is important that the core group and target farmers are selected to include, groups of women, ten cell leaders, small and young farmers. Extension has a vital role to play in ensuring that the three way exchange strategy outlined in Figure 16 does in fact operate for the benefit of the majority of village farmers.

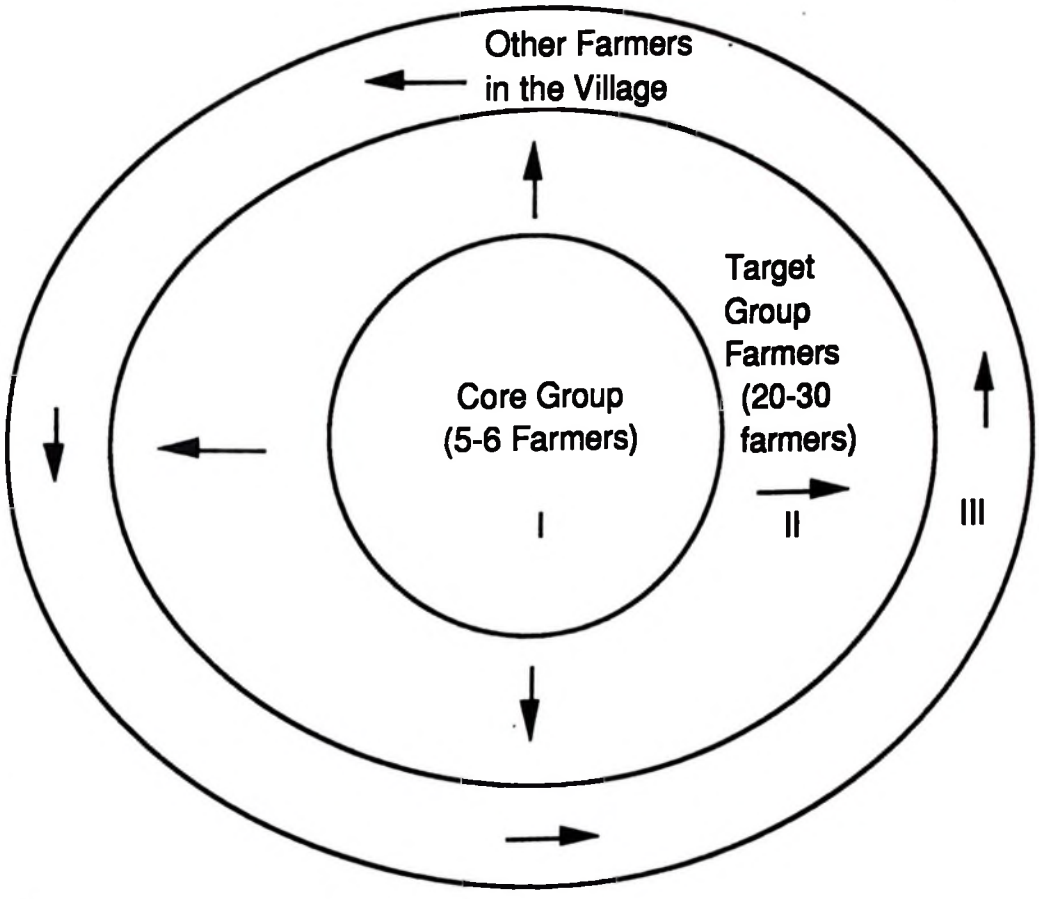

Figure 16: Model for Village Problem and Solution Identification

2. The study showed that there was an increase in the number of farmers who were involved in the SEP activities and some of the identified farmers' priority problems were addressed by the SEP. However, the following priority problems were not a major focus of the micro-projects and programmes of the SEP:

- Vegetables and fruit production, processing and preservation,
- Lack of farm inputs,

- Irrigation/drainage,
- Rodent control in the fields,
- Labour shortage during the rainy season.

It is recommended that these problems should be the basis of the second phase of the SEP. The SEP should consider addressing these problems by co-operating with other government institutions in the country for example, the Co-operatives, Horti Tengeru, Tan Seed, and Research Centres.

3. Due to the importance of the in-service training for extension workers it is recommended that:

i) Regular in-service training should be provided for all extension workers.

ii) A survey of the villages and extension workers situation should be carried out to identify VEW training needs. It is recommended that the in-service training should be decentralised from SUA (ICE) to the villages, zonal agricultural research and training institutes in the country. The resources from SUA and other agricultural institutions should be involved in the training courses. The in-service training courses should be provided considering the identified training needs of the extension workers and the circumstances of the farmers in the villages where the extension workers are working. It is suggested that the following topics should be emphasised in the in-service training courses:

- group skills,
- farm planning and management,
- record keeping and data collection,
- oxenisation,
- crop storage.

4. In order that a larger number of farmers are reached and interaction between farmers, research and extension is improved it is recommended that:

i) Farmer training at MATIs, LITIs, FTCs and villages should be increased through symposia, seminars, demonstrations and study tours for farmers to see agricultural practices in other villages.

ii) The literacy programmes in the villages should be encouraged and extension workers should be involved in teaching some of the agricultural topics.

iii) The Ministry of Agriculture and Livestock Development and the Institute of Continuing Education should work together in improving the contents and distribution of the farmers' magazine (**Ukulima wa Kisasa**).

5. i) The extension workers can not be successful in their work without access to the necessary supplies, equipment and support facilities. The extension organisation should provide the required logistical support to the village extension workers from the ward, district, regional and national level. Other support facilities which must be provided include, regular visits, in-service training, promotion, housing, attractive salaries, allowances, transport, and other working tools.

ii) Each extension worker should be assigned to work in one village, hence, implementing the policy of "One Village, One Bwana Shamba". This will enable the village extension workers to travel and reach a majority of farmers in the village.

6. Training manuals for Bwana Shambas and farmer groups relevant to both technical and extension methods need to be developed by the ICE in co-operation with research institutions and the extension service. The manuals need to focus on how the Bwana Shambas can carry out the activities in specific village situations (e.g. crop storage, vegetable and fruit production, oxen training, record keeping, farm planning, group skills, etc.). These training manuals would serve as guides and reference information for Bwana Shambas and farmers.

7. The study of the Sokoine Extension Project has been carried out when the project had been in operation for only 18 months. In most extension projects results take a long time to be realised. Commenting on impact of extension Feder and Slade stated that:

> "The impact of extension is an imprecise term... To have a reasonable chance of success any extension system must become well-known to farmers".
>
> (Feder and Slade, 1986, pp. 255-256)

In this study, there were significant indications that the SEP had a positive impact on the extension workers efficiency at the village level. This could be measured in terms of:

- changes in farmers' agricultural practices,
- the levels of food and cash crop production,
- number and types of initiated micro-projects and programmes,
- number and types of in-service training courses provided,
- work and duties of extension workers in the villages.

It is, therefore, recommended that a full assessment of the Sokoine Extension Project be carried out after it has completed the second phase (i.e.after a 4 year period of operation in Morogoro) before the SEP approach can be extended to other regions in Tanzania.

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APPENDICES

Appendix A : The Map of Tanzania

Appendix A : The Map of Tanzania

(i) Neighbouring countries to Tanzania

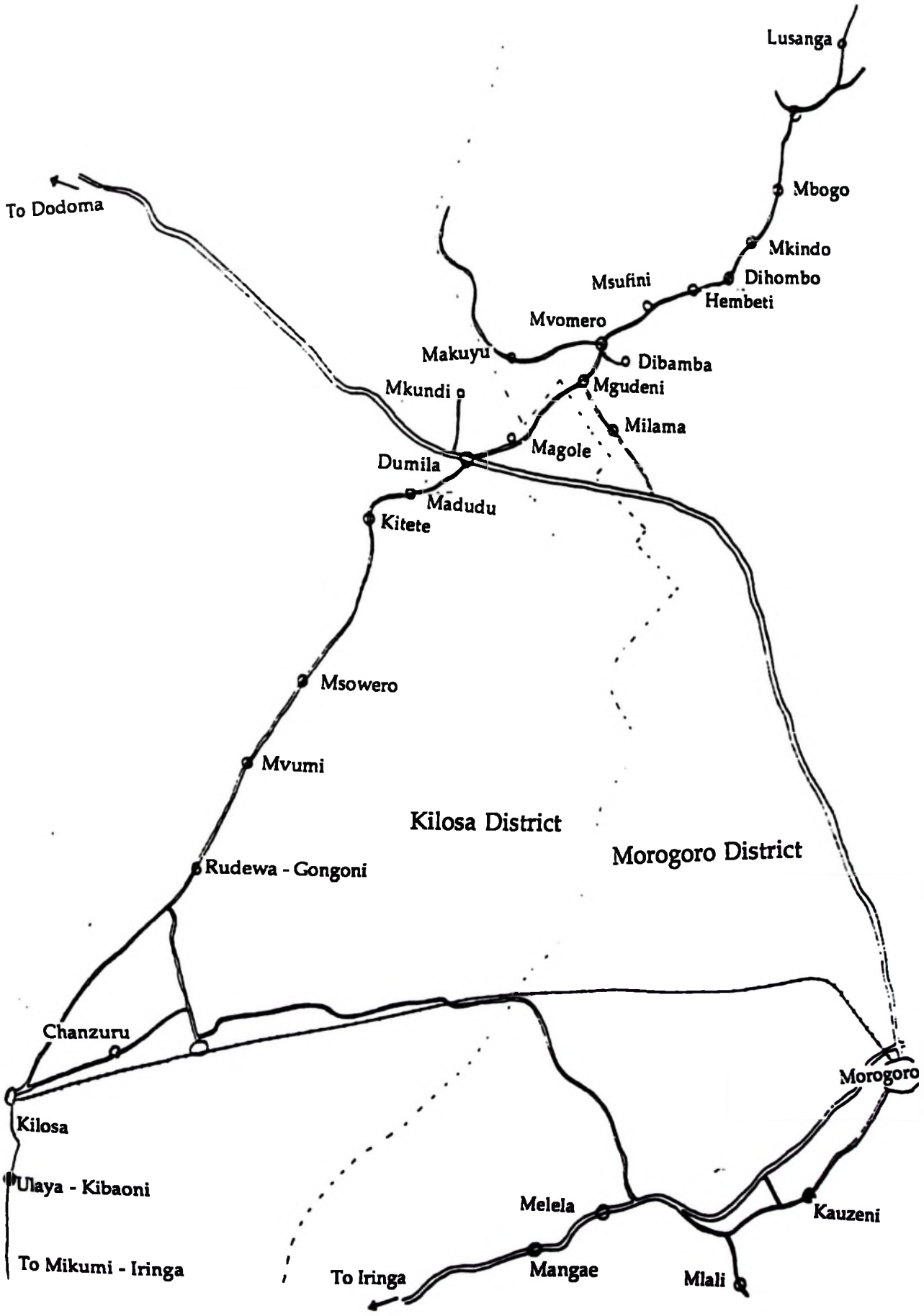
(ii) Regions of Tanzania

(iii) The Study Area in the Morogoro Region

The Study Area in the Morogoro Region

Appendix B: The Study Villages in the Morogoro and Kilosa Districts

Appendix B: The Study Villages in the Morogoro and Kilosa Districts



Appendix C : Modes of Crop Production in Tanzania

Appendix C

Modes of Crop Production in Tanzania

In Tanzania, three major forms of crop production can be found and both research and extension need to develop and provide the required technology and advice. These include the following.

The Small Scale Farming Sector

This includes the homestead and private small farms. the homestead farms are small family farms maintained to meet individual family needs. they vary in size from 0.5 hectares or more depending on the availability of land and family resources. these farms normally surround the homes where farmers live. The private small farms are family farms away from the home used to grow food and cash crops.

The small scale farming sector consists of farmers who are the major food producers in Tanzania. In general, they have farms under ten hectares and depend on co-operative societies for inputs and the extension service for their new technology but some do not use these services at all.

State and Parastatal Farms

These are large scale commercial farms which are owned and operated by government institutions each with its responsibilities. They have a minimum size of 500 hectares, are mechanised and make full use of inputs. These farms grow wheat, rice, sugar, sisal, maize, etc.

Private Commercial Farms

i) Medium Scale Farms: these are mostly owned by nationals who engage in the production of food and cash crops and occasionally practice mixed farming. these farms have an area ranging from 10 to 100 hectares. The farmers mainly rely on employed labour and purchased inputs.

ii) Large Scale Farms: can be regarded as those with the size of over 100 hectares. they are owned by international companies on their own or in partnership with local groups or persons. Others are owned by foreigners and a small percentage are owned by Tanzanian nationals. These farms are predominantly engaged in the production of export crops such as sisal, tea, coffee, wattle, tobacco, etc. On these farms, farmers rely on mechanization, purchased inputs and use hired labour for most of their farm operations.

Appendix D: Letter of Introduction to the Village Leaders

Appendix D: Letter of Introduction to the Village Leaders

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA WAZIRI MKUU NA MAKAMU WA KWANZA WA RAIS

Ofisi ya Mkuu wa Wilaya,
S.L.P. 681,
MOROGORO.

Kumb. Na. MD/P.10/11/241

22 Juni, 1989

Katibu Tarafa,
Mvomero, Turiani na Mlali,
WILAYA YA MOROGORO.

UTAFITI WA WAALIMU NA WANAFUNZI WA CHUO KIKUU

Tafadhali husika na kichwa cha habari kilichopo hapa juu.

Niliowataja hapa chini ya barua hii watafika katika Tarafa yako kufanya utafiti katika eneo la ushirikishwaji wa wanawake na uskulima kwa ujumla katika vijiji vilivyomo katika Tarafa yako vya mradi wa uchaguzi wa Chuo Kikuu cha Sokoine.

Vijiji vyenyewe ni Msufuni, Makuyu, Mgudeni, Dihombo, Dibamba, Mlali, Mvomero, Hembeti, Milama, Melela na Mboge, katika kipindi cha miezi 2 (siku 60).

Wahusika ni Ndugu A. Markey, Ndugu J. Kilalee, Ndugu R. Rwambali na Mrs. Shayo;S. Lugoye.

(R. J. E. Mabanda)
AFISA WA WILAYA
MOROGORO
DISTRICT ADMINISTRATIVE OFFICER
MOROGORO

Appendix E: Interview Schedules

Appendix E1: Interview Schedule for SEP Bwana Shambas

1. Name of the village: _____

2. Respondent's sex _____ 3. Respondent's age _____

4. Educational level: (PLEASE TICK FINAL LEVEL OBTAINED)

	Tick	Year obtained
Standard VII		
Form IV		
Form VI		

5. Professional training:

	Final Qualification	Specialisation	Year of Graduation
Certificate			
Diploma			
Degree			

6. How long have you been working as a Bwana Shamba? _____ years

7. How long have you been working in this village? _____ years

8. Do you read newspapers? Yes ____ No ____

9. Please indicate which newspapers you read:

Paper	Tick	How many times/month?
Ukulima wa Kisasa		
Uhuru		
Mfanyakazi		
Mzalendo		
Daily News		
Sunday News		
Kiongozi (Leader)		

10. Do you possess a radio? Yes ____ No ____

11. Do you listen to the agricultural broadcast periods?

Yes ____ No ____

12. How many times a week? 1 ___ 2 ___ 3 ___ 4 ___ 5 ___

13. How many farm households do you have in the village? _____(no.)

14. Give village population:

Children less than 18 yrs. _____

Adults who cannot work _____

Adult - females who can work _____

Adult - males who can work _____

15. How many households are headed by men? _____

16. How many households are headed by women? _____

17. How many farm families have you contact with? _____

18. Do farmers come to see you for advice Yes _____ No _____

19. How many farmers come to see you for advice in a year? _____

20. Do you have a plan or map for the village farms?

Yes _____ No _____

21. What size is the village farm? _____ acre

22. What crops were grown this season on the village farm?

Crop	Yield	Acres

23. Have there been any changes in the agricultural practices on the village farm?

Yes _____ No _____

24. (IF YES) Which of the following practices are now being implemented on the village farm? (TICK)

Recommended spacing

Planting in lines

Correct intercropping pattern

Use of improved seed

Use of fertiliser

Timely operations

Use of storage structure (kihenge)

Others (specify) _____

25. List the three major food crops in the villages:

(1) _____ (2)_____

(3) _____

26. What are the three major cash crops in the village.

(1) _____ (2)_____

(3) _____

27. List five cash generating activities of the farmers in the village.

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

28. Has there been any changes in the agricultural practices carried out by farmers in the village since SEP started?

Yes ____ No ____

29. (IF YES) Which of the following practices have been adopted by farmers? (TICK)

(1) Recommended spacing

(2) Planting in lines

(3) Correct intercropping pattern

(4) Used improved seed

(5) Timely operations

(6) Used fertilisers

(7) Used storage structures (kihenge)

(8) Others (specify): _____

30. Do you have a calendar of work? Yes ____ No ____

31. Do you have a demonstration plot (farm)? Yes ____ No ____

32. What size is the demonstration plot/farm? _____ acre

33. What crops did you grow on the demonstration plot for the last two seasons

1987/88 Season

Crop	Acres	Yield (kgs.)

1988/89 Season

Crop	Acres	Yield (kgs.)

34. Do you organise visits for farmers to the demonstration plot?

Yes ____ No ____

35. (IF YES) How many times a year? _____

36. (IF YES) How many farmers came to all the visits this year? _____

37. How do you contact farmers to invite them?

_____

SEP Approach

38. How do you contact the DALDO?

a) visit _____

b) letter _____

c) other _____

39. How many times has the DALDO visited you since SEP started?

1-3 _____ 4-5 _____ more than 5 _____

40. In what ways has transport supplied by SEP been helpful to your work? _____

41. What support facilities provided by SEP did you find useful?

_____

_____

42. In what ways have you found these support facilities useful?

_____

_____

43. List your main duties as a Bwana Shamba and the percentage time spent on each category.

	Agricultural Duties	% Time	Non-agricultural Duties	% Time
a)				
b)				
c)				

44. What major problems do you encounter in advising farmers in your village?

a) _____

b) _____

c) _____

45. What three major communications methods are you using in advising farmers since SEP started?

a) _____

b) _____

c) _____

46. What are your three major sources of information?

a) _____

b) _____

c) _____

47. What 3 main features of the SEP approach do you like?

a) _____

b) _____

c) _____

48. What 3 main features of the SEP approach do you not like?

a) _____

b) _____

c) _____

49. What would you like to see changed in the SEP approach?

a) _____

b) _____

c) _____

50. Will you be able to follow the SEP approach after the project ends?

Yes ____ No ____

51. (IF NO) Why not? _____

_____

_____

Village Project/Programme

52. What special projects/programmes are you implementing in your village and how many farmers were involved in each project/programme?

	No. of Farmers
1.	
2.	
3.	
4.	

53. List the people/organisations involved in selecting the projects/programmes?

1. _____

2. _____

3. _____

4. _____

54. What procedures were followed in selecting the project?

_____

_____

_____

55. How do you rate the projects/programmes in helping farmers in your village? (TICK ONE)

Very useful _____ Of some use _____ No use ____

56. Would you like to make any changes in the method of selecting a implementing village projects/programmes?

Yes _____ No _____

57. (IF YES) What changes?

_____

_____

_____

In-Service Training

58. What length do you think in-service training courses should be?

_____ day

59. How many courses a year would be suitable for you?

_____

60. Which months (period) of the year do you consider suitable?

_____

61. List the important things you have learned from recent in-servi training programmes?

1. _____
2. _____
3. _____
4. _____

62. List the topics in which you would like to get more training?

1. _____
2. _____
3. _____
4. _____
5. _____

63. Explain how in-service training has helped you in your work with farmers in the village

_____

_____

_____

_____

64. Which of the following are weaknesses of the existing extension service?

Effective policy	Lack of farmer's education
Training and re-training	Research-extension linkage
Technical packages	Multiple role
Extension aids	Support services
Staff motivation	Other (specify) _____

65. Which two of the above do you consider are the biggest weaknesses of the existing extension service?

_____

_____

66. Has the SEP project helped you to overcome any of the weaknesses listed above?

Yes ____ No ____

67. (IF YES) Which ones? _____

_____

_____

68. Has the project (SEP) helped you in improving the linkage between villages and research and other service organisations?

Yes ____ No ____

69. (IF YES) Which of the following organisations do you now have closer association with in your village? (TICK)

Research - Ilonga	____	Tanzania Seed Company	___
Sokoine University	____	The Party	___
Co-operation Union	____	MATI - LITI	___
CRDB	____	Forestry Division	___
		Others	___

70. What help did you get from the organisations mentioned above?

_____

_____

_____

Involvement of Women

71. How often do you make farm visits to women?

frequently ____ rarely ___

occasionally ____ never ___

72. Are women involved in the extension projects, meetings and demonstrations?

Yes ____ No ____

73. (IF YES) Does the presence of women cause any problems?

Yes ____ No ____

74. (IF YES) What problems?

_____

_____

_____

75. Do you think that women should be more involved in projects, meetings and demonstrations?

Yes _____ No _____

76. (IF NO) Why not? _____

_____

_____

77. (IF YES) How can it be ensured that women get more involved?

_____

_____

Appendix E2: Interview Schedule for non-SEP Bwana Shambas

Appendix E2: Interview Schedule for non-SEP Bwana Shambas

1. Name of the village: _____

2. Respondent's sex _____ 3. Respondent's age _____

4. Educational level: (PLEASE TICK FINAL LEVEL OBTAINED)

	Tick	Year obtained
Standard VII		
Form IV		
Form VI		

5. Professional training:

	Final Qualification	Specialisation	Year of Graduation
Certificate			
Diploma			
Degree			

6. How long have you been working as a Bwana Shamba? _____ years

7. How long have you been working in this village? _____ years

8. Do you read newspapers? Yes ____ No ____

9. Please indicate which newspapers you read:

Paper	Tick	How many times/month?
Ukulima wa Kisasa		
Mwuru		
Mfanyakazi		
Mzalendo		
Daily News		
Sundays News		
Kiongozi (Leader)		

10. Do you possess a radio? Yes ____ No ____

11. Do you listen to the agricultural broadcast periods?

Yes ____ No ____

12. How many times a week? 1 ____ 2 ____ 3 ____ 4 ____ 5 ____

13. How many farm households do you have in the village? ____(no

14. Give village population:

Children less than 18 yrs. _____

Adult who cannot work _____

Adult - female who can work _____

Adult - male who can work _____

15. How many households are headed by men? _____

16. How many households are headed by women? _____

17. How many farm families do you reach? _____

18. Do farmers come to see you for advice Yes ____ No ____

19. How many farmers come to see you for advice in a year? _____

20. Do you have a plan or map for the village farms?

Yes ____ No ____

21. What size is the village farm? _____ acre

22. What crops did you grow this season on the village farm?

Crop	Yield	Acres

23. Have there been any changes in the agricultural practices on the village farm?

Yes ____ No ____

24. (IF YES) Which of the following practices are now being implemented on the village farm? (TICK)

Recommended spacing

Planting in lines

Correct intercropping pattern

Use of improved seed

Use of fertiliser

Timely operations

Use of storage structure (kihenge)

Others (specify) _____

25. List the three major food crops in the village

(1) _____ (2)_____

(3) _____

26. What are the three major cash crops in the village.

(1) _____ (2)_____

(3) _____

27. List the five cash generating activities of the farmers in the village.

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

28. Has there been any changes in the agricultural practices carried out by farmers in the village over the last two years?

Yes ____ No ____

29. (IF YES) Which of the following practices have been adopted by farmers? (TICK)

(1) Recommended spacing

(2) Planing in lines

(3) Correct intercropping pattern

(4) Used improved seed

(5) Timely operations

(6) Used fertilisers

(7) Used storage structures (kihenge)

(8) Others (specify): _____

30. Do you have a calendar of work? Yes ____ No ____

31. Do you have a demonstration plot (farm)?
Yes ____ No ____

32. What size is the demonstration plot/farm? _____ acre

33. What crops did you grow on the demonstration plot for the last two seasons

1987/88 Season

Crop	Acres	Yield (kgs.)

1988/89 Season

Crop	Acres	Yield (kgs.)

34. Do you organise visits for farmers to the demonstration plot?

Yes ____ No ____

35. (IF YES) How many times a year? _____

36. (IF YES) How many farmers came to all the visits this year? _____

37. How do you contact farmers to invite them?

_____

38. What type of transport do you use in your job? (TICK)

Bicycle _____ Walk _____ Bus/lorry _____

39. How do you contact the DALDO?

a) visit _____

b) letter _____

c) other _____

40. How many times does the DALDO visit your village in a year?

0 _____ 1-3 _____ 4-5 _____ more and 6 _____

41. What support facilities provided by th DALDO did you find useful?

_____

_____

_____

42. In what ways have you found these support facilities useful?

_____

_____

_____

43. List your main duties as a Bwana Shamba and the percentage time spent on each category.

Agricultural Duties	% Time	Non-agricultural Duties	% Time
1.		1.	
2.		2.	
3.		3.	

44. What major problems do you encounter in advising farmers in your village?

_____

_____

_____

45. What three major communications methods are you using in advising farmers?

a) _____

b) _____

c) _____

46. What are your three major sources of information?

a) _____

b) _____

c) _____

Village Project/Programme

47. What special projects/programmes are you implementing in your village and how many farmers were involved in each project/programme?

	No. of Farmers
1.	
2.	
3.	
4.	

48. List the people/organisations involved in selecting the projects/programmes?

1. _____
2. _____
3. _____
4. _____

49. What procedures were followed in selecting the project?

_____

_____

_____

50. How do you rate the projects/programmes in helping farmers in your village? (TICK ONE)

Very useful ____ Of some use ____ No useful ____

51. Would you like to make any changes in the method of selecting and implementing village projects/programmes?

Yes ____ No ____

52. (IF YES) What changes?

_____

_____

_____

In-Service Training

We would like to ask you about the in-service courses you have attended.

53. have you attended any in-service training courses organised by the DALDO since you were posted to this village?

Yes ____ No ____

54. (IF YES) How many courses have you attended? ____ number

55. How do you rate the courses?

very useful ____

useful ____

little use ____

56. Would you like in-service training to continue?

Yes ____ No ____

57. How many days do you consider to be enough? ____ days

58. How many courses a year? ____ numb

59. Which months (period) of the year do you consider suitable?

_____

60. List the topics in which you would like more training.

1. _____

2. _____

3. _____

4. _____

61. Which of the following are weaknesses of the existing extension service? (TICK)

Effective policy

Training and re-training

Transport

Technical packages

Extension aids

Staff motivation

Lack of farmers education

Research-extension linkage

Multiple role

Support services

Others (specify): _____

_____

62. Which 2 of the above do you consider are the biggest weaknesses of the existing extension service?

1. _____

2. _____ _____

63. Which of the following organisations or people do you now have a close association with in your village? (TICK)

The DALDO	____	Tanzania Seed Company	____
Research Ilonga	____	The Party	____
Sokoine University	____	MATI - LITI	____
Co-operation Union	____	Forestry Division	____
CRDB	____	Others	____

64. What help do you get from the above organisations/people?

_____

_____

_____

Involvement of Women

65. How often do you make farm visits to women?

frequently _____

occasionally _____

rarely _____

never _____

66. Are women involved in the extension projects, meetings and demonstrations?

Yes _____ No _____

67. (IF YES) Does the presence of women cause any problems?

Yes _____ No _____

68. (IF YES) What problems?

_____

_____

_____

69. Do you think that women should be more involved in projects, meetings and demonstrations?

Yes _____ No _____

70. (IF NO) Why not? _____

_____

_____

71. (IF YES) How can it be ensured that women get more involved?

_____

_____

72. How often did you consult women when developing the village programme?

frequently ___ occasionally ___ never ___ rarely ___

Appendix E3: Interview Schedule for SEP and non-SEP Farmers

Appendix E3: Interview Schedule for SEP and non-SEP Farmers

SOKOINE UNIVERSITY EXTENSION DEMONSTRATION AND TRAINING PROJECT

STUDY TOPICS : FARMERS' PARTICIPATION AND PERFORMANCE

DISTRICT _____

VILLAGE _____

. FAMRER'S NAME: _____

FARMERS

Personal Characteristics

1. Sex: Male _____

Female _____

2. Age: _____ Years

3. Religion: Muslim _____

Christian _____

Other _____

4. Marital status: Single _____

Married _____

Widowed _____

Divorced _____

5. How many people live in your household? _____

Adults (over 18 years) _____

Left school (under 18 years) _____

Schooling _____

Pre-school children _____

6. How many people in the household depend on the farm:

for cash _____

for food _____

7. What is the labour force in your family?

Male _____

Female _____

8. Can you read or write? Yes _____ No _____

9. Please indicate your level of formal education

		Tick
a)	None	
b)	Std 1-IV	
c)	Std V-VII/VIII	
d)	Post Primary	
e)	Adult Literacy	

10. Do you read newspapers? Yes _____ No _____

11. Please indicate which newspapers you read:

Paper	Tick	How many times/month?
Ukulima wa Kisasa		
Whuru		
Mfanyakaji		
Mzalendo		
Others		

12. Do you possess a radio? Yes _____ No _____

13. Do you listen to the agricultural broadcast periods?

Yes _____ No _____

14. How many times a week?

Once _____

Twice _____

Three or more times _____

Extension Contact

We would like to ask you about the extension service.

15. Do you have contact with the Bwana Shambas?

Yes _____ No _____

16. (IF YES) How often? 1-3 times a year _____

4-5 times a year _____

6 + times a year _____

17. (IF NO) Have you ever tried to contact him/her?

Yes _____ No _____

18. (IF YES) How many times? _____

19. On what business? _____

_____

20. Does the Bwana Shamba have a village demonstration farm?

Yes _____ No _____

(IF YES)

21. How many times did you visit the village demonstration farm in the last season? _____ times

22. State reasons for your visit:

a) organised invitation _____

b) to get specific information _____

c) passing by _____

d) others (specify) _____

_____

23. (IF NO) Why?

a) never invited _____

b) no demonstration farm _____

c) no use _____

d) others (specify) _____

_____

24. How did you hear about the demonstration?

_____

25. Have you attended any meetings organised by the Bwana Shamba?

Yes _____ No _____

26. (IF YES) How many meetings did you attend in the last year?

_____

27. Particulars of meetings:

Meeting Name	Where held	Purpose	Useful	Not Useful

28. How did you hear about the meetings? _____

_____

29. Has the Bwana Shamba visited your farm?

Yes _____ No _____

30. (IF YES) How many times in the last year? _____

31. Do you find the Bwana Shamba:

Useful _____

Of some use _____

Of no use _____

32. Would you like more contact/visits? Yes _____ No _____

33. (IF YES) How many times/year?

5 or less times _____ 6-7 times _____ 8-10 times _____

34. If you had contact with the Bwana Shamba, did you make any changes as a result of his/her advice?

Yes _____ No _____

35. (IF YES) What changes did you make as a result of his/her advice?

_____

_____

_____

_____

36. Did you carry out any of the following

	Tick
Timely operations	_____
Recommended spacing	_____
Used improved seed	_____
Planted in lines	_____
Used oxen for cultivation	_____
Used marejea	_____
Used Kihenge for storage	_____
Used storage pesticides	_____
Used herbicides	_____
Weeding	_____
Using insecticides/pesticides	_____
Recommended intercropping	

37. Have you seen any difference in the performance of the Bwana Shamba in the last year?

Yes _____ No _____

38. (IF YES) What changes? _____

_____

39. When did you notice the difference? _____

_____

Farm Characteristics

40. Is your farm divided into separate fragments?

Yes _____ No _____

(IF YES - Q.41-Q.46)

41. How many fragments? _____

42. How long does it take to get to your nearest plot?

less than ½ hr. _____

½-1½ hrs. _____

more than 1½ hrs. _____

43. How long does it take to get to your furthest plot?

less than ½ hr. _____

½-1½ hrs. _____

more than 1½ hrs. _____

44. Which plot gives the better yield?

nearest _____

furthest _____

45. Which plot gives the worst yield?

nearest _____

furthest _____

46. Do the plots farthest away from home get the same attention?

Yes _____ No _____

47. (IF NO) Why? _____

_____

_____

48. What is the total area of your farm? _____ acres

49. What area did you farm this season? _____ acres

50. Do you own livestock? Yes _____ No _____

51. (IF YES) What types of livestock and how many?

	Tick	Number
Sheep		
Goats		
Cattle		
Poultry		

52. For this season (88/89), please give a summary of the crops cultivated and the amounts harvested.

Crop	Food	Cash	Area	Harvest Kgs.	Home Use Kgs.	Sale Kgs.

53. How many bags of food crops do you use to feed your family in a year?

_____ bags

54. How many acres of food crops do you grow to produce enough food for your family?

_____ acres

55. How many bags of food crops do you buy in a year to feed your family?

_____ bags of _____

_____ bags of _____

_____ bags of _____

_____ bags of _____

56. Which of the following items do you use?

Item	Use	Owned	Hired
Tractor			
Oxen			
Hand hoe			
Others			

57. Which of the following do you consider as the causes for low yields in your farm? (TICK)

Rainfall: little	_____	Weeding	_____
too much	_____	Too many plants	_____
Lack of labour	_____	Poor soils	_____
Lack of inputs: seeds	_____	Birds	_____
fertiliser	_____	Rodents	_____
tractor	_____	Others	_____

58. Of those ticked above, what are the 2 main causes of low yields?

(i) _____

(ii) _____

We would like to ask you how you carried out the following farm operations in relation to your three main crops in the 88/89 season.

List the 3 main crops: (1) _____

(2) _____

(3) _____

60.

Farming Operation	Crop 1 Method of Farming				Crop 2 Method of Farming				Crop 3 Method of Farming			
	1	2	3	4	1	2	3	4	1	2	3	4
Land preparation												
Cultivating												
Sowing												
Weeding												
Spraying/dusting												
Harvesting												
Threshing												
Treatment/storage												

1 = tractor; 2 = animal power; 3 = manual; 4 = tractor & manual

61. Tick the following inputs which you used in the 88/89 season.

Input	Tick	Amount Used	*Where Obtained
Improved seed			
Fertilisers			
Marejea			
Insecticides			
Fungicides			
Herbicides			

* 1 = Within village; 2 = Nearest town; 3 = Other

62. How did you plant your three main crops?

Main Crop	Mono	Mixed	Other Crops	Planting Date	Harvest Date
1.			a)		
			b)		
			c)		
			d)		
2.			a)		
			b)		
			c)		
			d)		
2.			a)		
			b)		
			c)		
			d)		

63. Which of the following are sources of income for you and your family?

Sale of Crops ____

Sale of vegetables and fruit ____

Casual labour in others' fields ____

Skill and crafts ____

Brewing ____

Other ____

64. List the two main sources of income for you and your family:

(1) _____

(2) _____

Storage

We would like to ask you how you store your crops.

65. Do you shell your grain crops for storage?
Yes _____ No _____

66. After harvest, how do you store your crops? (TICK)

a) In special storage structures (kihenge) ____

b) In the house in gunny bags on the floor ____

c) In the house in gunny bags in the ceiling ____

d) In the house in drums ____

e) Other ____

67. Do you regard the following as problems in storage?

a) Rodents _____

b) Insects/pests _____

c) Moulds & fungi _____

d) Availability of kihenge _____

e) Availability of pesticides _____

f) Others (specify): _____

_____

68. Which two are the most major problems?

(1) _____

(2) _____

69. Do you use storage pesticides? Yes ____ No ____

60. (IF YES) Which one did you use last year? (TICK)

Super dust

DDT

Rodenticide

Malathion

Zinc phosphide

Others

71. Which of the following are problems on your farm?

Farm fragmentation

Not enough food for family

Not enough crops to sell

Not enough family labour

Availability of machinery

Machinery too expensive to hire

Inputs too expensive

Lack of labour for hire

Unavailability of inputs

72. Which of the above are the 2 greatest problems?

(a) _____

(b) _____

Village Projects/Programmes

73. Is your village involved in any special agricultural projects/programmes?

Yes ____ No ____ Don't know ____

74. (IF YES) Please specify the projects:

(a) _____

(b) _____

(c) _____

75. Who informed you of the projects? (TICK)

Village Chairman/secretary

10-cell leader

Bwana Shamba

Sokoine University

DALDO

CCM

Other

76. Were you involved in selecting the village projects?

Yes _____ No _____

77 Who selected the project being implemented? (TICK)

DALDO

Bwana Shamba

Village Chairman/Secretary

SUA Staff

Other

Don't know

78. Is the village project/programme being implemented:

Very useful? _____

Some use _____

No use _____

79. How has it helped in increasing food or cash crop yields for farmers in the village?
Explain: _____

_____

80. Could you suggest changes which would improve the project?

_____

_____

_____

81. Have you heard of the Sokoine Extension Project?

Yes _____ No _____

82. (IF YES) Who told you about SEP? (TICK)

Village Chairman/Secretary

Bwana Shamba

Sokoine University

DALDO

CCM

Other

Involvement of Women

83. Are women involved in the extension projects, meetings and demonstrations?

Yes _____ No _____

84. (IF YES) Does the presence of women cause any problems?

Yes _____ No _____

85. (IF YES) What problems?

(1) _____

(2) _____

(3) _____

86. Do you think that women should be more involved in projects, meetings and demonstrations?

Yes _____ No _____

87. (IF NO) Why not? _____

_____

_____

88. (IF YES) How can it be ensured that women get more involved?

_____

_____

80. Could you suggest changes which would improve the project?

_____

_____

_____

81. Have your crop yields increased since the project started?

Yes _____ No _____

82. How do you rate your household security situation since the project started?

Food security is better _____

Food security is the same _____

Food security is worse _____

83. What 3 features of the project do you like?

(1) _____

(2) _____

(3) _____

84. What 3 features of the project do you not like?

(1) _____

(2) _____

(3) _____

85. Have you heard of the Sokoine Extension Project?

Yes _____ No _____

86. (IF YES) Who told you about SEP? (TICK)

Village Chairman/Secretary

Bwana Shamba

Sokoine University

DALDO

CCM

Other

Involvement of Women

87. Are women involved in the extension projects, meetings and demonstrations?

Yes _____ No _____

88. (IF YES) Does the presence of women cause any problems?

Yes _____ No _____

89. (IF YES) What problems?

(1) _____

(2) _____

(3) _____

90. Do you think that women should be more involved in projects, meetings and demonstrations?

Yes _____ No _____

91. (IF NO) Why not? _____

_____

_____

92. (IF YES) How can it be ensured that women get more involved?

_____

_____

Appendix E4: Interview Schedule for SEP and non-SEP Farmers (Kiswahili Version)

Appendix E4: Interview Schedule for SEP and non-SEP Farmers (Kiswahili Version)

CHUO KIKUU CHA SOKOINE CHA KILIMO

MRADI WA USHAURI WA KILIMO KWA WAKULIMA

WAHOJIWA: WAKULIMA

MASOMO: KUSHIRIKISHWA KWA WAKULIMA NA MATOKEO YA MRADI VIJIJINI

Wilaya _____

Kijiji _____

Jina la Mkulima _____

A: TAKWIMU ZA BINAFSI

1. Mume _____

   Mke _____

2. Umri: _____ (Miaka)

3. Dini:

   Muislamu _____

   Mkristo _____

   Nyingine (Eleza) _____

4. Ndoa. Umeoa/Umeolewa _____

   Hujaoa/olewa _____

   Mtalaka _____

5. Watu wangapi wanaishi katika kaya yako? _____

   Watu wazima (> Miaka 18) _____

   Waliomaliza shule (< miaka 18) _____

   Wanaosoma _____

   Ambao hawajaanza shule _____

6. Watu wangapi katika kaya yako wanaotegemea mapato ya nyumbani:

Kwa fedha _____

Kwa chakula _____

7. Kaya yako ina watu wangapi wenye uwezo wa kufanya kazi?

Wanaume _____

Wanawake _____

8. Je? unajua kusoma na kuandika? _____ Ndiyo _____ Hapana

9. Tafadhali onyesha kiwango chako cha elimu

Kiwango	Weka ( )
i. Sikusoma	
ii. Darasa la I - IV	
iii. Darasa la V- VII/VIII	
iv. Zaidi ya Elimu ya Msingi	
v. Elimu ya Watu Wazima	

10. Je, huwa unasoma magazeti? _____ Ndiyo _____ Hapana

11. Tafadhali onyesha magazeti unayosoma

Gazeti	Weka (V)	Mara ngapi kwa mwezi
Ukulima wa Kisasa		
Uhuru		
Mfanyakazi		
Mzalendo		
Mengineyo		

12. Je, unayo redio? _____ Ndiyo _____ Hapana

13. Je, huwa unasikiliza vipindi vya kilimo redioni?

_____ Ndiyo _____ Hapana

14. Mara ngapi kwa wiki ?

Mara moja _____

Mara mbili _____

Mara tatu au zaidi _____

B: MAWASILIANO NA BWANA SHAMBA

Tungependa kukuuliza kuhusu ushauri wa kilimo.

15. Je, unawasiliana na Bwanashamba?

_____ Ndiyo _____ Hapana

16. (Kama ndiyo) Mara ngapi ?

Mara 1 - 3 kwa mwaka _____

Mara 4 - 5 kwa mwaka _____

Mara 6 + kwa mwaka _____

17. (Kama hapana) Umejaribu kuwasiliana naye?

_____ Ndiyo _____ Hapana

18. (Kama ndiyo) Mara ngapi? _____

19. Kwa shughuli gani? _____

_____

_____

20. Je, Bwana Shamba analo shamba la maonyesho?

_____ Ndiyo _____ Hapana

21. Umetembelea shamba la maonyesho kijijini mara ngapi msimu huu?
---------- (namba)

22. Taja sababu za kutembelea shamba la maonyesho:

i. Kwa mwaliko rasmi

ii. Kupata taarifa maalum

iii. Nilipita tu

iv. Nyinginezo (Eleza) _____

_____

23. Kama hapana, kwa nini?

i. Sijawahi kualikwa

ii. Hakuna shamba la maonyesho

iii. Hamna manufaa

iv. Mengine(taja) _____

_____

24. Ulipataje taarifa kuhusu shamba la maonyesho?

_____

25. Je, umewahi kuhudhuria mikutano yoyote iliyoandaliwa na Bwana Shamba?

_____ Ndiyo _____Hapana

26. (Kama ndiyo) umehudhuria mikutano mingapi mwaka huu?

_____

27. Maelezo kuhusu mikutano

Jina la Mkutano	Mahali	Nia ya Mkutano	Ulikuwa na manufaa	Haukuwa na manufaa

28. Ulipataje taarifa ya mkutano huo? _____

_____

29. Bwana shamba amewahi kutembelea shamba lako?

_____ Ndiyo _____ Hapana

30. (Kama ndiyo) Mara ngapi msimu huu? _____

31. Je,unamwonaje Bwanashamba ?

Anahitajika _____

Anahitajika kidogo _____

Haitajiki _____

32. Je, ungependa kuwa na mawasiliano zaidi na Bwanashamba?

_____ Ndiyo _____ Hapana

33. (Kama ndiyo) Mara ngapi kwa mwaka?

5 _____

6 - 7 _____

8 - 10 _____

34. Kama Bwanashamba alikutembelea, umefanya mabadiliko yoyote kutokana na ushauri wake?

_____ Ndiyo _____ Hapana

35. (Kama ndiyo) Umefanya mabadiliko gani kutokana na ushauri wake?

_____

_____

36. Je, ulifanya shughuli zipi zifuatazo kufuatana na ushauri wa Bwanashamba?

	Weka (V)
Kilimo kwa wakati unaotakiwa	_____
Kupanda kwa nafasi zinazoshauriwa	_____
Mbegu bora	_____
Kupanda kwa mistari	_____
Kulima kwa maksai	_____
Kutumia marejea	_____
Kihenge kwa hifadhi ya nafaka	_____
Kutumia madawa ghalani	_____
Dawa ya mgugu	_____
Palizi	_____
Kunyunyizia dawa shambani	_____
Kuchanganya mazao inavyoshauriwa	_____

37. Je, umena mabadiliko yeyote katika utekelezaji wa Bwana Shamba msimu huu? _____ Ndiyo _____ Hapana.

38. (Kama ndiyo) Mabadiliko gani ? _____

_____

_____

39. Uliyaona lini mabadiliko haya? _____

_____

_____

C: TAKWIMU ZA KILIMO

40. Je, shamba lako limegawanyika katika sehemu mbalimbali?

_____ Ndiyo _____ Hapana

(KAMA NDIYO, Q. 41 - Q. 46)

41. Una mashamba mangapi? _____

42. Inakuchukua muda gani: _____ 1/2 saa
Hadi shamba la karibu? _____ 1/2 - saa 1 1/2
_____ Saa 1 1/2

43. Inakuchukua muda gani _____ 1/2 - saa
Hadi shamba lililo mbali _____ 1/2 _ SAA 1 1/2
Kupita yote? _____ 1 1/2

44. Shamba lipi linalokupa mavuno zaidi _____ Jirani
_____ Mbali

45. Shamba lipi linalokupa mavuno kidogo _____ Jirani
kuliko yote ? _____ Mbali

46. Je, unashughulikia mashamba yaliyoko mbali kama yale ya jirani?
_____ Ndiyo _____ Hapana

47. (Kama hapana) Kwa nini? _____

_____

48. Ulilima eneo gani msimu huu? _____ eka.

49. Mashamba yako yana jumla ya eka ngapi? _____ eka

50. Je, unayo mifugo? --------- Ndiyo ----- Hapana

51. (Kama ndiyo) Una aina gani ya mifugo na kiasi gani?

_____

Weka (V) Namba

Kondoo

_____

Mbuzi

_____

Ng'ombe

_____

Kuku

_____

52. Kwa msimu huu, (1988/89), tafadhali toa muhtasari wa mazao uliyolima na mazao uliyopata.

Zao	Chakula	Biashara	Eneo eka	Mavuno (kg)	Tumika Nyumbani (kg)	Mauzo (kg)

53. Familia yako inatumia gunia ngapi za nafaka kwa chakula kila mwala?
_____ (gunia)

54. Je, unalima eka ngapi za mazao ya chakula ili kujitosheleza kwa chakula? _____ (eka)

55. Je, unanunua chakula kiasi gani kwa ajili ya familia yako kwa mwaka?

Gunia _____ za _____

gunia _____ za _____

GUnia _____ za _____

Gunia _____ za _____

56. Unatumia zana gani kati ya zifuatazo?

Zana	Tumia	Mali yangu	K odisha
Trekta			
Maksai			
Jembe			
Nyingine			

57. Je nini sababu za mavuno kidogo kwenye shamba lako?

	Weka (V)
Mvua (pungufu,nyingi)	_____
Kazi nyingi mno	_____
Ukosefu wa pembejeo	_____
Palizi	_____
Kutokupunguza miche	_____
Ukosefu wa rutuba	_____
Ndege	_____
Panya	_____
Nyingine(taja)	_____

58. Kati ya sababu ulizozitaja, toa sababu kuu mbili zinazosababisha upungufu wa mavuno

i. _____

ii. _____

Tungependa kukuuliza jinsi ulivyotekeleza shughuli mbalimbali za kilimo kuhusu mazao makuu matatu uliyolima msimu huu wa 1988/89.

59. Orodhesha mazao makuu matatu uliyolima

i. _____

ii. _____

iii. _____

60.

Shughuli za kilimo	Zao la 1 Zana zilizotumika				Zao la 2 Zana zilizotumika				Zao la 3 Zana zilizotumika			
	1	2	3	4	1	2	3	4	1	2	3	4
Kuandaa shamba												
Kulima												
Kupanda												
Kupalilia												
Kunyunyizia dawa												
Kuvuna												
Kupukucha/ Kupukucha												
Kuweka dawa/ Hifadhi												

1 = Trekta
2 = Maksai
3 = Mikono
4 = Trekta mikono

61. Je, ulitumia pembejeo gani msimu wa 1988/89

Pembejeo	Weka ( )	Kiasi kilichotumika +	Mahali zilipopatikana
Mbegu bora			
Marejea			
Dawa ya wadudu			
Dawa ya ukungu			
Dawa ya magugu			

\+ 1 = Kijijini
2 = Mji wa jirani
3 = Pengine

62. Ulipanda vipi mazao yako makuu?

Zao kuu	Pekee	Mchanganyiko	Mazao yali-changanywa	Tarehe ya kupanda	Tarehe ya kuvuna
1.			a.		
			b.		
			c.		
			d.		
2.			a.		
			b.		
			c.		
			d.		
3.			a.		
			b.		
			c.		
			d.		

63. Je, ni shughuli zipi zinazokupatia wewe na familia yako fedha

	Weka v
Mauzo ya mazao	
Mauzo ya mboga na matunda	
Kufanya kibarua mashambani	
Ujuzi/ufundi	
Kupika pombe	
Nyingine	

64. Onyesha shughuli mbili muhimu zinazokupatia wewe na familia yako fedha

i. _____

II. _____

D: HIFADHI YA MAZAO

Tungependa kukuuliza namna unavyohifadhi mazao yako.

65. Je, unapukuchuka/kupiga nafakakabla ya kuhifadhi?

_____ Ndiyo _____ Hapana

66. Baada ya kuvuna, huwa unahifadhi vipi mazao yako?

i. kwenye kihenge
ii. kwenye magunia sakafuni
iii. kwenye magunia juu ya mawe/mbao
iv. kwenye mapipa
v. njia nyingine

67. Je, yafuatayo ni matatizo katika uhifadi wa mazao?

i. Panya
ii. Wadudu
iii. Ukungu
iv. Upatikanaji wa madawa
v. Upatikanaji wa vihenge
vi. Mengine taja _____
_____

68. Taja matatizo makuu mawili kati ya hayo

i. _____
II. _____

69. Je, unatumia dawa za kuhifadhi nafaka

_____ Ndiyo _____ Hapana

70. (Kama ndiyo) ulitumia dawa gani msimu uliopita?

	WEKA (V)
Super dust	
DDT	
Rodenticide	
Malathion	
Zinc phosphide	
Nyingine	

71. Je, ni yapi yafuatayo ni matatizo katika shamba lako?

	Weka (V)
Mashamba kukaa mbali mbali	
Upungufu wa chakula	
Ukosefu wa mazao ya biashara	
Shughuli nyingi kuliko uwezo wafamilia	
Ukosefu wa zana	
Kukodisha zana ni ghali	
Pembejeo ni ghali	
Ukosefu wa vibarua	
Ukosefu wa pembejeo	

72. Je, yapi ni matatizo mawili makuu kati ya hayo?

i. _____

II. _____

E: MIRADI/MIPANGO YA KIJIJI

73. Je, kijiji hiki kinajihusisha katika mpango/mradi wowote wa kilimo?

_____ Ndiyo _____ Hapana _____ Sifahamu

(KAMA NDIYO, Q. 74 - q.84)

74. (Kama ndiyo) Taja miradi hiyo

i. _____

ii. _____

iii. _____

75. Nani alikufahamisha kuhusu mradi huo?

	Weka (V)
Mwenyekiti wa Kijiji/Katibu	----------
BALOZI	_____
Bwanashamba	_____
Chuo kikuu cha Sokoine	_____
Afisa kilimo wilaya	_____
Wengine	_____

76. Je, ulihusishwa katika kuchagua miradi ya kijiji?

_____ Ndiyo _____ Hapana

77. Je, nani aliyechagua mradi unaotekelezwa hivi sasa?

	Weka (V)
Afisa kilimo wilaya	_____
Bwanashamba	_____
Mwenyekiti/Katibu	_____
SUA	_____
SIFAHAMU	_____

78. Je, nini mawazo yako kuhusu mradi/mpango unaotekelezwa?

Unasaidia sana	_____
Unasaidia kiasi	_____
Hausaidii	_____

79. Mradi/Mpango umesaidia vipi katika kuongeza mavuno ya mazao ya chakula na biashara kijijini?

80. Je, unayo mapendekezo kuhusu ufanisi wa mradi huu?

_____

_____

81. Je, umeshawahi kusikia juu ya mradi wa Sokoine wa ushauri wa kilimo kwa wakulima?

_____ Ndiyo _____ Hapana

82. (Kama ndiyo) nani aliyekueleza kuhusu mradi huo?

	Weka (V)
Mwenyekiti/Katibu	_____
Bwanashamba	_____
SUA	_____
Afisa Kilimo wilaya	_____
CCM	_____
Wengine	_____

F: KUWASHIRIKISHA WANAWAKE

83. Je, wanawake kijijini wanaruhusiwa katika mikutano na maonyesho ya kilimo katika mradi?

_____ Ndiyo _____ Hapana

84. (Kama ndiyo) Je, kuweko kwa wanawake katika shuhuli hizo kunasababisha matatizo yoyote?

_____ Ndiyo _____ Hapana

85. (Kama ndiyo) matatizo gani?

i. _____

II. _____

iii. _____

86. Je, unadhani ni muhimu kuwahusisha zaidi wanawake katika shughuli za miradi, mikutano na maonyesho ya kilimo?

_____ Ndiyo _____ Hapana

87. (Kama hapana) Kwa sababu gani?

_____

_____

_____

88. (Kama ndiyo) je,ni mbinu gani zinatakiwa zitumike ili kuweza kuwahusisha zaidi wanawake?

_____

_____

_____

79. Mradi/mpango umesaidia vipi katika kuongeza mavuno ya mazao ya chakula na biashara kijijini?

Eleza: _____

_____

80. Je, unayo mapendekezo kuhusu ufanisi wa mradi huu?

_____

_____

81. Je, mavuno yako yameongezeka tangu mradi uanze?

_____ ndiyo _____ Hapana

82. Je, unaionaje hali ya chakula nyumbani mwako tangu mradi uanze?

Hali ya chakula ni nzuri zaidi _____

Hali ya chakula haikubadilika _____

Hali ya chakula imezidi kuwa mbaya _____

83. Taja vipengere vitatu vya mradi ulivyopenda?

1. _____

2. _____

3. _____

84. Taja vipengere vitatu katika mradi ambavyo umeona havifai

1. _____

2. _____

3. _____

85. Je,umeshawahi kusikia juu ya mradi wa Sokoine wa ushauri wa kilimo kwa wakulima?

_____ Ndiyo _____ Hapana

86. (Kama ndiyo) Nani aliyekueleza kuhusu mradi huo?

	Weka (V)
Mwenyekiti/Katibu	_____
Bwanashamba	_____
SUA	_____
Afisa kilimo wilaya	_____
CCM	_____
Wengine	_____

F: KUWASHIRIKISHA WANAWAKE

87. Je, wanawake kijijini wanaruhusiwa katika mikutano na maonyesho ya kilimo katika mradi?

_____ Ndiyo _____ Hapana

88. Kama ndiyo Je, kuweko kwa wanawake katika shuhuli hizo kunasababisha matatizo yoyote?

_____Ndiyo _____ Hapana

89. (Kama ndiyo) matatizo gani?

_____

_____

_____

90. Je, unadhani ni muhimu kuwahusiha zaidi wanawake katika shughuli za miradi, mikutano na maonyesho ya kilimo?

_____ Ndiyo _____ Hapana

91. (Kama hapana) Kwa sababu gani?

_____

_____

_____

92. (Kama ndiyo) Je, ni mbinu gani zinatakiwa zitumike ili kuweza kuwahusisha zaidi wanawake?

_____

_____

_____

Appendix F :The SEP Participation Index

Appendix F

The SEP Participation Index

The SEP participation index was calculated by allocating a weight to the six variables used in the construction of the index. Each variable score was weighted and the weighting was allocated according to the importance of the variable in affecting the participation index. the scoring procedure is shown below.

Variable	Actual Score	Weighted Score	Maximum Score
Awareness of farmers of the village involvement in SEP project/ programmes	1 2 3	3 0 0	3
Awareness of the SEP	1 2	5 0	5
Involvement in selecting village projects	0 1 2	0 5 0	5
Number of meetings organised and attended	0 1-3 4-5 6-9	0 2 4 5	3
Number of visits to the demonstration farm	0 1-3 4-5 6-9	0 3 4 5	5
Total			**26**

The minimum score obtained = 0

The maximum score obtainable = 26

The maximum score obtained = 25

Appendix G: Extension Involvement Index

Appendix G

Extension Involvement Index

The respondents' involvement in extension activities index (or involvement) was constructed using 5 variables related to extension contact. The scoring procedure followed is shown below.

Variable	Actual Score	Weighted Score	Maximum Score
Number of times the farmer tried to contact the extension worker	0 1 2 3 4 5-9	0 1 2 3 4 5	5
Number of visits to the demonstration farm	0 1-3 4-5 6-9	0 3 4 5	5
Number of meetings attended	0 1-3 4-5 6-9	0 3 4 5	5
Number of farm visits by the extension worker	0 1-3 4-5 6-9	0 2 4 5	5
Changes as a result of the extension workers' contact	0 1 2	0 3 0	3
Total			**23**

The minimum involvement score = 0

The maximum involvement score obtainable = 23

The maximum score obtained = 21