

PARTICIPATORY METHODOLOGIES FOR RURAL
DEVELOPMENT: THE CASE OF AGRICULTURAL
EXTENSION AND FOOD PRODUCTION IN NYAMIRA
DISTRICT.

BY

EDWARD GIZEMBA ONTITA.

HIS THESIS HAS BEEN ACCEPTED FOR
THE DEGREE OF... M.A. 1995
AND A COPY MAY BE PLACED IN THE
UNIVERSITY LIBRARY.

A Thesis submitted in part fulfilment for the Degree of Master of
Arts in Sociology, of the University of Nairobi.

1995



FOR USE IN THE LIBRARY ONLY

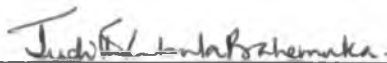
DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.



ONTITA, EDWARD GIZEMBA

This thesis has been submitted for examination with my approval as University Supervisor.



PROF. JUDITH MBULA BAHEMUKA

DEDICATION

To My late Sister, Tabitha Dorcas Monyangi, for spending a lifetime encouraging me to pursue honesty and higher education. Your death in a motor accident on Monday 17th August 1992 at 3pm at Oyugis on the Kisii-Kisumu Road remains cruel to me.

ACKNOWLEDGEMENTS

I remain grateful to Prof. M. Bahemuka (my supervisor), for all the assistance she offered me throughout the exercise of this study. Further thanks are due to Dr. Preston O. Chitere for critical comments upon reading all the work and Dr. Z.B. Jaffer for reading the research proposal.

I am greatly indebted to Monicah for encouragement when the going got tough; and to Mr. Humphrey M. Tirimba, Richard O. Mareri, Mr and Mrs Mokaya Matini, niece Gladys and all other friends for assistance at one point or another. My thanks also go to Catherine for proof-reading, prayers and encouragement.

May I not forget to thank James Nyangoka for processing the data, J. Murage and Mr. Nyang'au for typing the work, Mrs Otieno-Malo for her cooperation in the computer room and Mr. F. Ndege for reading the work at some stage. Mrs Njoroge and Jedida at sociology Dept. for all the assistance they offered.

Mention must also be made of my brother Hassan Ontita for typing the questionnaire and Mr. Omweri Angwenyi for printing the questionnaires; through Ngero Nyakundi and Irianyi secondary school. Thanks also to my nephew Walter Omboga and sister Periah Nyaboke for research assistance, brothers Elijah, Daniel, Yabesh and Gideon, and sisters Neliah and Agnes for encouragement.

I am immensely thankful to the University of Nairobi for the generous scholarship that made my dream of postgraduate studies a reality. Thanks also to my parents, the Ontitas for meeting some of my fieldwork costs and for the books they bought for the project.

ABBREVIATIONS

| | |
|-------|--|
| MOALM | Ministry of Agriculture, Livestock and Marketing |
| NGO | Non-governmental Organization |
| GO | Governmental Organisation |
| ASAL | Arid and Semi-Arid Lands |
| IADP | Integrated Agricultural Development Programme |
| HHs | Households - Farm families with access to land for their own use |
| R & D | Research and Development |
| T & V | Training and visit approach to agricultural extension |
| NSWCP | National Soil and Water Conservation Project |

ABSTRACT

This study inquires into the role of farmers' participation in agricultural extension and of extension methodology in their adoption of improved farm practices. The study further looks into the function of farmers' adoption of improved farm practices in their relative self-sufficiency in food production and levels of living of farm families. The objectives of the study were; to find out how farmers' participation in the agricultural extension process affected their adoption of improved farm practices; to examine the impact of specific agricultural extension methodologies on farmer's adoption of improved farm practices and; to find out the impact of agricultural improvement on food production and levels of living of farm families.

In this study the farm household was the unit of analysis, and the household heads were the respondents. Sampling was done through a combination of probability and non-probability techniques. The administrative district where the survey was conducted was chosen purposely, and the final clusters (administrative sub-locations) from where individual respondents were picked were randomly sampled through the multi-stage cluster sampling design.

The main research tool consisted of a standardized interview schedule made up of both closed and open-ended questions. Informal interviews with three agricultural extension agents in charge of the respective sub-locations sampled, as well as with some social group leaders in the three sublocations, were also employed.

This study benefitted from the guidance of two broad theories; the modernization theory and the communication theory. Despite the theories' daunting weaknesses which

came out in relation to this study; from the modernization perspective agricultural extension is understood as the vehicle of the "modernizing" technological and organizational packages and from the communication perspective these are information packages which must reach the audience (farming community) and elicit certain responses. From this theoretical position several hypotheses were derived which the study tested.

The main findings of this study were; that farmers' participation in agricultural extension influences their adoption of improved farm practices; that the agricultural extension methodologies influenced farmers' adoption of improved farm practices; that there is no relationship between farmers' adoption of improved farm practices and their relative self-sufficiency in food production and; that farmers' adoption of improved farm practices influences their levels of living at farm family levels.

The major conclusion of this study is that a participatory-oriented agricultural extension service employing methodologies that involve farmers in the extension process is likely to lead to a more widespread adoption of improved farm practices. The study's recommendations are two-pronged; first regarding policy and second, concerning future research. With regard to policy it is recommended that efforts to make agricultural extension more participatory in orientation be strengthened and that because T & V approach seems inhibitive to the diffusion of agricultural messages, extension methodologies such as the mass media and billboards be emphasized to reach more farmers. In respect of future research studies are recommended in the areas of extension agents' ability and suitability to facilitate farmers' participation; personal characteristics

of farmers who prefer respective extension methodologies and; the relationship between cash crop production and relative self-sufficiency in food production.

TABLE OF CONTENTS

| | |
|--|------|
| DECLARATION | ii |
| DEDICATION | iii |
| ACKNOWLEDGEMENTS | iv |
| ABBREVIATIONS | v |
| ABSTRACT | vi |
| LIST OF TABLES | xiii |
| CHAPTER I | 1 |
| INTRODUCTION AND RESEARCH PROBLEM | 1 |
| 1.1 Introduction | 1 |
| 1.2 Problem statement | 5 |
| 1.3 Objectives of the study | 10 |
| 1.4 The scope of the study | 11 |
| CHAPTER II | 13 |
| LITERATURE REVIEW | 13 |
| 2.1 The Modernization Theory. | 13 |
| 2.2 The Communication Theory | 16 |
| 2.3 Substantive Literature | 19 |
| 2.3.1 Participatory Methodologies of Working with People | 19 |
| 2.3.2 Agricultural Extension Services. | 25 |
| 2.3.3. Approaches to Agricultural Extension. | 28 |

| | |
|---|----|
| 2.3.4. Soil and Water Conservation. | 31 |
| 2.3.5. Agricultural improvement. | 33 |
| 2.3.6. Rural Food Production and Sufficiency | 36 |
| 2.3.7. Agricultural improvement and Rural Levels of Living | 38 |
| 2.4 Review of Kenya's Agricultural Extension Policy. | 40 |
| 2.4.1 Agricultural Extension in the Post-Independence Period : | |
| 1965 - 1990's. | 41 |
| 2.5 Conceptual Framework | 49 |
| 2.6 Research Hypotheses: | 50 |
| CHAPTER III | 51 |
| METHODOLOGY | 51 |
| 3.1 Geographic area of study | 51 |
| 3.2. Sampling design | 53 |
| 3.3 Methods of data collection | 56 |
| 3.4 Statistics used in analysis | 57 |
| 3.5 Operationalization of variables | 58 |
| 3.6 Conclusion | 65 |
| CHAPTER IV | 66 |
| DATA PRESENTATION | 66 |
| 4.1 Farmers' Adoption of improved Farm practices. | 66 |
| 4.2 Farmers' Participation in Agricultural Extension Process. | 79 |
| 4.3 Agricultural extension methodologies employed. | 93 |

| | |
|--|-----|
| 4.4 Farmers' food self-sufficiency | 108 |
| 4.5 Levels of Living of farm families. | 127 |
| CHAPTER V | 140 |
| DATA ANALYSIS | 140 |
| 5.1 Relationship between farmers' participation in the Agricultural extension process and their adoption of improved farm practices . . | 140 |
| 5.2 Relationship between extension methods and farmers' adoption of improved farm practices. | 144 |
| 5.3 Relationship Between Farmers' adoption of improved farm practices and their self-sufficiency in food production. | 151 |
| 5.4 Relationship between Farmers' adoption of improved agricultural practices and living standards at farm family levels. | 155 |
| 5.5 Conclusion. | 159 |
| CHAPTER VI | 161 |
| CONCLUSIONS AND IMPLICATIONS FOR POLICY AND RESEARCH . . . | 161 |
| 6.1 Recapitulation and discussion. | 161 |
| 6.2 Some Implications for Policy and Research | 163 |
| BIBLIOGRAPHY | 167 |
| APPENDIXES | 177 |
| Appendix A: PHOTOGRAPHS | 177 |
| A1: Sweet-potatoes crop on the fore and middle ground. In the mid- background is a maize | 177 |

| | |
|--|-----|
| A2: A case of agroforestry: Maize intercropped with trees used as fuel-wood (middle | 177 |
| A3. Straw-berry tree on the left fore-ground, <u>sukuma wiki</u> on the right fore-ground, millet in the middle ground and maize crop in the right mid-background. | 178 |
| A4. Pasture on the foreground and maize intercropped with bananas and some trees on the background | 178 |
| APPENDIX B: Interview schedule for heads of households. | 179 |
| APPENDIX C: MAPS | 191 |

LIST OF TABLES

| | |
|---|----|
| Table 3.1 Distribution of the sample according to sub-locations. | 55 |
| Table 4.1 Distribution of Respondents According to usage of hybrid maize seeds. | 67 |
| Table 4.2 Distribution of the Respondents According to their use of Chemical Fertilizers. | 68 |
| Table 4.3 Distribution of the respondents according to receipt of Agricultural credit. | 69 |
| Table 4.4 Distribution of the respondents according to their use of pesticides. . . | 71 |
| Table 4.5 Distribution of the respondents according to whether or not they planted maize in rows. | 72 |
| Table 4.6 Distribution of the respondents according to the measures they took against soil erosion and water loss. | 74 |
| Table 4.7 Distribution of the respondents according to their adoption of agroforestry. | 75 |
| Table 4.8 Distribution of the respondents according to their take-up of farm records keeping. | 76 |
| Table 4.9 Distribution of respondents according to cash crops adopted | 78 |
| Table 4.10 Distribution of the respondents according to their levels of adoption of improved farm practices. | 79 |
| Table 4.11 Farm problems. | 81 |

| | |
|--|----|
| Table 4.12 Distribution of the respondents according to how they proceeded to solve their farm problems. | 82 |
| Table 4.13 Distribution of respondents according to how frequently they approached agricultural extensionists for advice 1992. | 83 |
| Table 4.14 Distribution of the respondents according to their priority areas for advice. | 84 |
| Table 4.15 Distribution of the respondents according to their involvement by agricultural extensionists in the advice processes. | 85 |
| Table 4.16 Distribution of the respondents according to whether or not they were members of self-help or women's groups. | 86 |
| Table 4.17 Distribution of the respondents according to their attendance of public functions of agricultural importance. | 87 |
| Table 4.18 Distribution of the Respondents according to their Readership of Agricultural Magazines and Newspapers. | 89 |
| Table 4.19 Distribution of Respondents According to whether or not they had come across a farm innovation. | 90 |
| Table 4.20 Extent to which farmers participated in the agricultural extension process. | 92 |
| Table 4.21 Distribution of the farmers according to whether they were contact farmers of the Ministry of Agriculture. | 93 |
| Table 4.22 Distribution of the respondents according to the number of follow-up farmers they hosted each month. | 94 |

| | |
|---|-----|
| Table 4.23 Distribution of the respondents according to whether they liked being identified as contact farmers | 96 |
| Table 4.24 Distribution of the contact farmers according to whether they thought they deserved their positions. | 97 |
| Table 4.25 Distribution of the respondents according to why they thought they deserved the positions of contact farmers. | 98 |
| Table 4.26 Distribution of the Respondents according to their Assessment of contact Farmers. | 99 |
| Table 4.27 Distribution of the Respondents According to whether they had participated in catchment conservation activities | 100 |
| Table 4.28 Distribution of the Respondents According to who invited them to take part in catchment conservation activities | 101 |
| Table 4.29 Distribution of the Respondents According to their perceptions of the catchment Approach | 102 |
| Table 4.30 Distribution of the respondents according to their assessment of the group extension approach. | 103 |
| Table 4.31 Distribution of the respondents according to what they thought was the effect of extension on their groups. | 104 |
| Table 4.32 Distribution of the farmers according to the most important source from which they received agricultural information | 106 |
| Table 4.33 Distribution of the respondents according to the extension approach from which received farm information | 107 |

| | |
|--|-----|
| Table 4.34 Distribution of the Respondents According to the food crops they grew. | 109 |
| Table 4.35 Distribution of the Respondents According to Hectarage they reported having put to various food crops. | 111 |
| Table 4.36 Distribution of the Respondents According to their opinions on why others had been unable to produce enough food. | 113 |
| Table 4.37 Distribution of the respondents according to the number of months in a year they purchase maize for consumption. | 114 |
| Table 4.38 Distribution of the respondents according to causes of maize deficits in their families. | 115 |
| Table 4.39 Distribution of the respondents according to whether or not they received food relief in 1992. | 117 |
| Table 4.40 Distribution of the Respondents According to Sources from which they had received food relief. | 117 |
| Table 4.41 Distribution of the Respondents According to the proportion of their land they planted to food crops. | 119 |
| Table 4.42 Distribution of the Respondents According to whether Agricultural Extension service had helped them to increase their food production. . . . | 120 |
| Table 4.43 Distribution of the respondents according to the food crops they had given up. | 121 |
| Table 4.44 Distribution of the respondents according to the number of meals their families ate per day. | 122 |

| | |
|---|-----|
| Table 4.45 Distribution of the respondents according to foodstuffs that regularly made up their meals. | 123 |
| Table 4.46 Distribution of the respondents according to the foodstuffs given up 2-3 years prior to interview. | 124 |
| Table 4.47 Distribution of the respondents according to the reasons they provided for giving up some foodstuffs. | 125 |
| Table 4.48 Distribution of the respondents according to their assessment of their families' nutritional status. | 126 |
| Table 4.49: Distribution of Respondents According to their levels of food self- sufficiency. | 127 |
| Table 4.50 Distribution of the Respondents According to the Types of their main houses. | 129 |
| Table 4.51 Distribution of the Respondents According to Agricultural income Trends, 1991 - 92. | 130 |
| Table 4.52 Distribution of the Respondents According to their Non-Agricultural income Trends, 1991 - 1992. | 132 |
| Table 4.53 Distribution of the Respondents According to their 1992 Income situation and 1990 Poverty line criterion. | 133 |
| Table 4.54 Distribution Of the Respondents According to Non-farm Businesses Operated. | 134 |
| Table 4.55 Distribution Of the Respondents According to their Children's Educational Status. | 135 |

| | |
|---|-----|
| Table 4.56 Distribution of the Respondents According to Ownership of Modern Life Improving Items. | 137 |
| Table 4.57 Distribution of the Respondents According to their Reasons for Adopting improved farm practices | 138 |
| Table 4.58 Distribution of the Respondents according to levels or standards of living | 139 |
| Table 5.1 Respondents' levels of adoption according to their levels of participation in agricultural extension | 141 |
| Table 5.2 Respondents' levels of adoption according to extension methodologies. | 146 |
| Table 5.3 Relationship between varying levels of adoption of improved farm practices and relative food self-sufficiency. | 151 |
| Table 5.4 Distribution of the respondents according to levels of adoption and levels of living at farm family level. | 155 |

CHAPTER I

INTRODUCTION AND RESEARCH PROBLEM

1.1 Introduction

The importance of agricultural development to Kenya's overall development cannot be overemphasized. For instance, Kenya's sixth development plan (1989 - 1993) recalled that agriculture is the mainstay of the country's economy providing the basis for the development of the other sectors of the economy. Priority ranking in the sector centred on food production, generation of raw materials for local industries and graduated processing of production for export. This covers a wide scope of national development, hence highlighting the importance of the agricultural sector.

Correspondingly, the Kisii District Development Plan (1989:47) showed that agriculture has to provide food security, generate farm family income, absorb new farm workers at the rate of 3% per year, support export crops and stimulate the growth of productive off-farm activities for increased off-farm jobs. The reason behind this kind of argument is that in the absence of established industrial development the agricultural sector will remain the basis of national development.

Therefore, Boserup's (1965) assertion cited in Amin (1990:9), that the move to intensive agriculture, as a pre-condition to any development worth the name, is the challenge that the African people must take up, is most fitting to Kenya where as Kenya (1994:59) shows 80% of the land surface is arid and semi-arid. But the challenge has not yet been taken up. Colonization did not only fail to do so ; it was not even its aim (Amin

1990:9). This is reflected in frequent food shortages and cases of extreme poverty in Kenya (Ghai et. al 1979 and Kenya 1981).

Further, Kenya is no exception to other developing countries where as Myrdal (1970:90-91) argued, agriculture was characterized by extensive land use combined with a high land-man ratio. Naturally, this correlation results in disastrously low real incomes. The two decades after Myrdal's writing have not contradicted his contention as Kenya's agricultural situation testifies. There existed a seemingly static agricultural technology (Alila 1978:56), high population pressure on the land (Kisii District Socio-cultural Profile 1984:81) and in order to increase food production without increasing the land under food crops farmers have to follow more productive practices (ibid:36).

It is realized therefore, that agricultural development is limited in Kenya. Thus, in Kenya, as in other developing countries the quest for agricultural development has faced certain serious problems which explain why overall development has been minimal in the past and why it might remain so in the future.

The first problem is that research especially on the improvement of certain local food crops has not made any headway. For instance, no major breakthrough has been achieved in the genetic improvement of rainfed sorghum and millet, which account for 80% of the cultivated land in the Sahel and other areas of low rainfall (World Bank 1984, cited in Timberlake 1985:128 , Cohen and Odhiambo 1989).

The second problem is the unavailability of advice for farmers (Timberlake 1985:125). Often, farmers have no accessibility to agricultural information because

extension staff have low morale to work or their physical mobility to reach farmers is limited due to inadequate means of transport.

The third problem has to do with the integration of the smallholder farmers into the agricultural extension process. Extension agencies in Africa have largely not evolved extension methodologies which facilitate the involvement of smallholder farmers in the services they offer. For example, it has been argued that peasants have much to learn from agricultural researchers, but so do researchers have much to learn from peasants. Lines of communication have never been effectively opened in either direction; until they are, neither will benefit, with African agriculture and the environment on which it depends being the main losers (Timberlake 1985:123). There is need for agricultural extension agencies to facilitate and accept agricultural knowledge inputs from smallholder farmers.

The final problem is the unsuitable soils and climate in certain areas such as the semi-arid and arid lands (Kenya 1986:84 and 1994:59). The environment in these areas is fragile and subject to degradation as more people move in to cultivate.

Attempts at agricultural development in Kenya, among African farmers originated with the Swynnerton Plan of 1955. Swynnerton (1955:12) argued that the single biggest factor which would bring about intensified farming was a scale of extension staffing, European and African, which would ensure the closest contact possible with African farmers.

Swynnerton (1955:8-9) listed a number of problems and lines of development as requiring the attention of the five year plan. Among them were; one, to provide the

farmer with technical assistance to develop his/her land on sound lines, having regard to the ecological conditions under which he/she lived. Two, to provide the farmer with high priced cash crops for which a longterm demand was probable and which would help provide the money required for the expanding domestic needs of the family, for the financing of farming operations and development, and as a backing to such agricultural credit as would have been required. Three, to provide an agricultural bias to the education of the farmers' children so as to give them a progressive outlook on farming. Four, to provide the farmer with security of tenure over land to safeguard the labour and monies invested in its development.

The central theme in the Swynnerton Plan, and which has continued to influence Kenya's agricultural policy ever since, is agricultural extension services. The centrality of agricultural extension services in the process of agricultural improvement is almost universally accepted as shown in Savile (1965), Ogada (1971:36), Lele (1975), Chitere (1976), Leonard (1977), Benor and Harrison (1977), Alila (1978), Chitere (1980), Benor and Baxter (1984), Benor, Harrison and Baxter (1984) and, Ban and Hawkins (1988). Agricultural extension is almost indispensable.

The question that inevitably arises and which bugged this study is: how far has the extension service which has been effectively in place for about 40 years, gone in bringing about agricultural improvement in Kenya? In order to look at part of the answer to this question, farm families were surveyed in Nyamira, an agricultural district. The district is agro-ecologically high potential and is typical of Kenya's rainfed agriculture with almost equal emphasis on both cash and food crops. The study contended that

agricultural extension induced improvement in farm practices, in the district would have tremendous impact on the general agricultural outlook due to the district's suitability for agriculture.

The study traces farmers' responses (in terms of take-up of improved farm practices) to agricultural extension, depending on their participation in the extension process and on the agricultural extension methodology employed. The study goes further to look at the implications of farmers' take-up of improved farm practices to their relative food self-sufficiency and to their levels of living at farm family levels.

In terms of organisation of this paper, the rest of this chapter deals with the problem statement, the study objectives and the scope of the study. Chapter two provides the literature review, while chapter three explains the research methodology. Chapters four and five deal with data analysis and presentation, and chapter six provides the summary and conclusion.

1.2 Problem statement

The aim of this study was to inquire into the role of agricultural extension in food production and levels of living of farm families. The impact of farmers' participation in the agricultural extension service and of agricultural extension methodology on adoption of improved farm practices was also studied.

Leonard (1977:xvi) had anticipated that reaching the smallholder farmer and helping him/her to develop was, and would remain the responsibility of government extension services. However, presently Non-governmental Organisations (NGOs) share

in the task of agricultural extension. Such NGOs include Foster Parents Plan International (FPPI), Action-Aid, Kenya (AAK) and Finnish International Development Agency (FINIDA) (Wandera and Omoto 1991:97). These NGOs often focus on small areas and on 4-k clubs, therefore attaining limited impact. State corporations such as Kenya Tea Development Authority (KTDA) and private companies including British American Tobacco (BAT), Kenya Breweries Limited (KBL) and East Africa Industries (EAI) also carry out their own extension for specific crops which form their raw materials (Kenya Development Plan 1989-1993). The KTDA which operates in the study areas provides fertilizers for tea on credit. This credit facility has definite positive implications to family incomes and food production, especially by releasing funds to food production ventures in the short-run.

The total agricultural land in Nyamira District is around 724,400 hectares, made up of small farms. Agricultural extension therefore, stands out critically, as the basis and vehicle of agricultural development and rural development in general, and improved food production and living standards in particular.

The task most critical to overall development process, and which agricultural development bureaucracy was charged with, is bringing about change in agriculture so that all sections of the farming population can contribute to agricultural development (Alila 1978:350). These objectives are more crucial given the rapid expansion of the population and a shortage of unexploited arable land in the main high potential areas (Kenya 1981:2), inevitably requiring improved farm practices on available farm holdings if for instance local demand for food is to be met.

The secret of success in all extension work lies in the method of approach to the problems of the farm family, giving priority to their wishes, teaching them how to overcome their difficulties and developing in them a sense of pride in their achievements (Savile 1965:2).

In line with the foregoing principle, research is needed to examine the performance of such agricultural extension methodologies as are in place in Kenya. This research will broaden our understanding of various methodologies in terms of their execution and difficulties entailed, possible implications to social systems, farmers' responses, the tenability of the assumptions upon which they operate and the theoretical relevance of these assumptions to Kenya.

A variety of methods have been applied in Kenya in a bid to transform agriculture. During the colonial period, Alila (1978:101-103) has held that agricultural transformation was carried out initially under the threat of coercion. Later through demands for tax and legislation (nominally passed by African Councils or chiefs) which carried with it the threat of fines or imprisonment for failure to comply. Orders also required people to plant cash crops for tax or an extra field of cassava as a reserve against famine.

Presently, one of the methodologies employed in Kenya's agricultural extension service is the Training and Visit (T & V) system. In this approach, field staff work with contact farmers (Bahemuka 1984:34, Benor and Harrison 1977:13-14) to whom they give ideas and from whom they receive problems, passing them on to divisional agricultural staff. Solutions to the problems reach contact farmers by the same channel

and are expected to diffuse to the rest of the farming community. The Training and Visit (T&V) system also utilizes existing groups such as young farmers clubs, 4-k clubs and youth groups to deliver their advice. In Nyamira district both contact farmers and contact groups are used.

Concerning this approach the study inquired into: the problems faced by contact farmers in those capacities, whether contact farmers liked being so identified, whether contact farmers thought they deserved those positions and the reasons why they thought they deserved those positions. The study also looked into other farmers' perceptions of contact farmers with regard to accessibility for advice and whether other farmers turn up to meet extension workers at contact farm units.

The group extension approach, where field staff work with social groups within their areas of jurisdiction, normally sub-locations, is also studied. The extension workers receive problems from members of the groups and give them ideas. These ideas are expected to diffuse to non-members. The groups which extension staff worked with included self-help groups, women's groups, youth groups and public barazas (public meetings). The study sought to find out whether or not initial group objectives were in tune with agricultural extension aims and if group objectives were being met. The study also sought an understanding of the farmers' assessment of the group approach to extension, and the reasoning behind such assessments.

The catchment approach is also in place in Kenya. In this, field staff identify an area (catchment) with acute soil erosion problems and mobilize people who live in it and in its vicinity to implement soil conservation measures. In connection with this we

endeavoured to find out the nature of mobilization of people, the perceptions of farmers about the soil erosion problem and the responses to this approach.

The potential importance of agricultural extension services to development does not guarantee that they always work well. Despite the failures, however, almost no one is willing to conclude that agricultural extension should be abolished (Leonard 1977). Mosher's (1966) contention that an agriculture that is developing is always changing, and that today's methods need to be different from yesterday's cannot be more fitting.

In the literature agricultural extension has been overwhelmingly depicted as largely aimed at teaching people living in rural areas to raise their standards of living, and particularly increase food production (Savile,1965, Ban and Hawkins,1988 and Kenya 1981). Rural sociologists, agricultural economists and development administration experts have almost invariably agreed that involvement of local people in programmes that are aimed at benefiting them, would lead to their favourable responses to the programme activities. That once involved in programmes, local people easily adopt new or improved technologies introduced by the programmes (Chitere and Kiros,1994, Mbithi,1974, Oyugi,1981 and Chitere 1994). It has also been argued widely in the literature that the methods used in teaching rural people may determine the extent to which extension programmes record successes or failures (Savile,1965, Ban and Hawkins, 1988, Seidman, 1977 and Chitere and Kiros, 1994).

The overall picture that emerges from the literature therefore, is that agricultural extension in participatory-oriented methods transforms agriculture and inter alia leads

to higher levels of living and relative self-sufficiency in food production among rural farm families.

It is against this theoretical background that the present study is anchored. This study in a sense undertook an empirical examination of the foregoing theoretical position. The study looked at the performance of agricultural extension at farm level in general depending on the participation of farmers in the extension process and on the extension methodology employed in the first instance. In the second instance the study examined the performance of agricultural extension at farm level, particularly with regard to areas of relative self-sufficiency in food production and of standards of living.

Essentially, the research sought to find out whether farmers had access to the agricultural extension service and the likelihood that such accessibility led to improved agriculture. The study also sought to find out whether farmers' participation in the agricultural extension process and the extension methodology employed influenced the farmers' improvement of farm practices, and more importantly whether farmers' improvement of farm practices led them to higher levels of living and relative food self-sufficiency.

1.3 Objectives of the study

1. To find out how agricultural extension fitted into the general framework of participatory approaches to rural development, and whether farmers' contact with the agricultural extension service led them to adopt improved farm practices.

2. To examine the impact of specific agricultural extension methodologies on the overall performance of the MOALM's extension service in terms of specific adoptions on the part of farmers. Which methodology reached more farmers (poor and progressive)? What were the possible weaknesses and strengths of the various methodologies in place?
3. To find out the impact of agricultural improvement on food production and levels of living of farm families. More specifically this study sought to examine the relationship between agricultural improvement and food production in the first instance and between agricultural improvement and living standards at farm family levels, in the second instance.

1.4 The scope of the study

The study concentrated its data collection in Nyamira district, which is inhabited by the Abagusii people. The district was carved out of the larger Kisii district in 1990. The inquiry was confined to the heads of households. Selected key informants including the agricultural extension staff in the three administrative sub-locations sampled were also studied.

The major assumption of this study was that farmers' adoption of improved farm practices was a direct result of agricultural extension efforts. That farmers had no capacity to learn of new or improved practices, other than through contact with agricultural extension efforts. The study further assumed that farmers were rational and hence aimed at improving their standards of living and their food security.

In view of the foregoing assumptions, this study sought an understanding of the role of farmers' participation in agricultural extension and of extension methodology in their adoption of improved farm practices. The study further pursued the function of farmers' adoption of improved farm practices in their relative self-sufficiency in food production and levels of living of farm families.

Within the perspective of the aforesaid research agenda, this study rested at the bay of several limitations. Key among them is that the study did not exclusively address the factors that affect farmers' adoption of improved farm practices, their participation in the extension process, their preference of certain extension approaches, their self-sufficiency in food production or even their levels of living. The study just situated the farmers (respondents) with regard to the variables, in view of how these situations resulted in or from adoption of improved farm practices. The study relied on farmers as respondents and did not emphasize the extensionists' side of the story. Finally, the study did not attempt a historiographical analysis of the life improving variables in order to accurately capture the respondents' regression or progression of levels of living.

The study constituted an effort in linking key variables in the rural development equation, with a view to understanding the role of participatory methodologies such as agricultural extension (and therefore the agricultural sector) in rural development. The study held that broad based agricultural improvement is prerequisite to rural development.

CHAPTER II

LITERATURE REVIEW

This study benefitted from the guidance of two theories: the modernization theory and the communication theory.

2.1 The Modernization Theory.

Chattopadhyay (1972:189-196) argued that modernization is the dissolution of the old mode of production and the introduction of a new one. In a situation of dual economy it involves the modernization of the agrarian structure. Kenya is largely a dual economy with a fairly distinctive rural agricultural sector dominated by traditional modes of production along side the modern urban sector. The two sectors are not mutually exclusive and on this account then, Kenya is not an ideal type dual economy. A dual economy does not exist in practice.

Vajas (1972) considers modernization as a process of manifold interrelated changes in the economic, social, political, and cultural field, through which less developed societies acquire the characteristics of more developed societies. The developed societies are therefore depicted as prototypes toward whose achievements the less developed societies should work.

Inkeles and Smith (1974) and Lerner (1958) have associated modernity with physical mobility from the countryside to the urban industrial sector. They argue that such physical mobility leads to social mobility also. They depict the mobile person as innovative, independent from traditional sources of influence, and informed participant

citizen. Perkins-Witt (1961), Hill-Mosher (1963), Johnson-Mellor (1961) and Wharton (1965) cited in Hunter 1969:24-25, saw agricultural development in three stages: 1. Traditional 2. Transitional and 3. Commercial stages.

Hunter (1969:31) thinks of three main stages of modernization. The first is the traditional society in its fullest sense - groups within which traditional religion, social relations and methods of agriculture seem to stretch back virtually unchanged into history. Stage two represents societies which have already been drawn into a modern economy but are yet strongly held in traditional ways and values: they may grow a cash crop and use fertilizer, but magical practices (reverence to magico-religious attributes such as witchcraft and rain-making), tribal customs, traditional land tenure, values and instincts of the past have a strong grip. Stage three will stand for the modern, commercializing farmers who increasingly have accepted modern outlook and are finding ways of evading traditional restraints which no longer have a binding force upon them.

Rostow (1960) thinks of modernization as proceeding in stages; from the traditional society through pre-conditions for take-off, take-off, the drive to maturity to the stage of high mass consumption. Agriculture is seen as developing from a stage of rudimentary technology to a stage where the agricultural community has willingness to accept new techniques and to respond to possibilities of the widened commercial markets. Thinking about the role of agricultural science in development was dominated until the mid-1970s by the concept of modernization. This implied the introduction of new, often "Western" technology and management practices, sometimes accompanied by changes in the size and structure of land holdings, with the intention of emulating patterns of

agricultural development that had evolved in the North [Biggs and Farrington 1991:12]. Modernization subsumes under it a dichotomy of society into the modern and the traditional, anticipates the transformation of the traditional into the modern and sees agricultural development as a transformation that is measurable in agricultural product growth. It perceives development from a linear perspective and views the transfer of technology, know-how and institutional models as playing a key role in modernization. This is through accelerating transformation and the diffusion of improved ways of doing things, through the adoption of new practices, including improved or new techniques in directly productive and research processes.

The notion of transfer of technology has been central to the process of transformation as it relates to agriculture (and other sectors) in two contexts: new and improved technology, and institution building. In both of these contexts, however, the emphasis has been on "transferring in" technologies or institutions from situations in which they function well, rather than on strengthening and improving what already exists [Biggs and Farrington 1991:13].

The modernization theory assumes that the "traditional" societies and/or sectors are culturally and hence technologically hollow. It proposes the transfer of technology and institutions from the "modern" societies and/or sectors to help "develop" the "traditional". The very assumption of culturally hollow "traditional" societies underlies the problems facing technological transfer attempts and explains why the same has not been a panacea to the development problems of the Third World, because the assumption is simply not true.

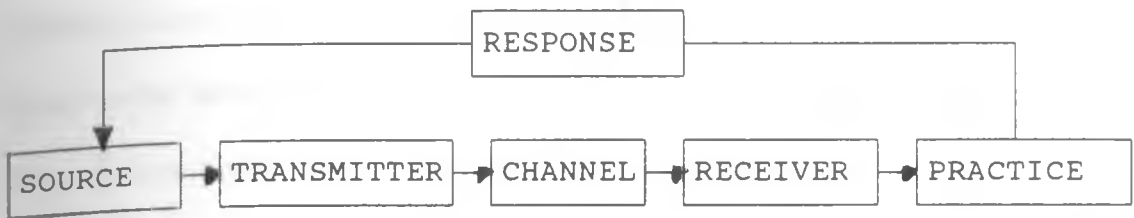
Moreover, the theory does not offer the specific strategies by which development may be achieved. The theory provides the end (technological transfer) but does not provide the means to the end. How can technology be transferred effectively? How can resistance to these attempts be managed? In a nutshell, the theory raises more questions than it answers. The modernization theory then, is a mere conceptual ideal when looked at from the point of view of present-day developing countries. Nowhere in the World do we find a purely dichotomous society characteristic of traditional and modern. In the second instance, the stages of development which Rostow (1960) for example cherishes are basically Eurocentric and cannot be transplanted to Third World socio-cultural conditions. To be sure, the modernization theory together with the Western technology it engenders are not socio-culturally universal.

From the modernization perspective nonetheless, agricultural extension is understood as the vehicle of technological transfer in order to achieve agricultural development which is the end-result of the transformation of "traditional" systems into "modern" ones. The challenge to the extension service in that position is to adapt technology to the cultural conditions of recipient societies and/or sectors rather than simply transferring it in.

2.2 The Communication Theory

Communication theory gives a model of information flow where a source produces signals, symbols, or messages which are transmitted by a channel connecting the transmitter and the receiver (Mbithi: 1974:53).

Information Flow Model



Source: Lerner and Schramm, eds.,(1967).

The source is the originator or sender of the message. A message is the information a source wishes to pass to the receiver. The problem of communication is really how to devise messages that will arouse or make salient " a felt need", a sense of "strong practical benefit", and stimulate "willing cooperation" (Lerner and Schramm 1967:20). A Channel is the avenue between the source and the receiver. Communication must make itself heard or seen against competition. This may require repetition or use of multiple channels. In many Indian villages for example, a new idea is distrusted if it comes from only one channel ; unless parallel channels are available by which to check the facts, the new idea is received with suspicion and usually rejected (ibid: 25- 26). The receiver is the audience.

It sounds like truism to say that, communication, to be effective, must reach the audience in the first place. Finally, if new behaviour is to be learned, it must be practiced, people (receivers or audience), must practice to retain and perfect their new skill, and they must have, practice material (ibid: 22-26). Practice is the receivers' translation of the message received into one's own knowledge and taking action in response to it.

Mbithi (1974:53-54) asserts that such a communication model suggests that the following factors will constrain upon the efficient flow of information from the research station to the farmer, and reduce the adoption rate of farming technology for example: First, the nature of message "innovation" in terms of relevance to the farmers' situation and perception. Second, whether the language used to transmit the research is understood by the grass roots extensionist and the farmer. Third, the media or channel to convey the message may be directed at a receiver whose attributes are such that there is no effective contact established with the small farmer. Fourth, the interaction effect of a faulty channel reaching an expectant receiver or vice versa may lead to the alienation of both parties or distrust between them. Fifth, receivers must be tuned to the wave length of the message which is influenced by the choice of transmitter and channel. Farmers do not have the same receptive capacity, mainly because of their differing socio-economic statuses as well as their predispositions for change.

Therefore, approaches found to be important to the adoption of innovations are those which relate source of technology, nature of technology, channels and media of communication to the recipient system (Mbithi: 1974:55).

The assumption inherent in the communication theory that information relevant to audience needs is continuously available is erroneous. For instance, Cohen and Odhiambo (1989:65) and Timberlake (1985) have shown that research into sorghum and finger millet have had no major breakthroughs. Secondly, the coincidence of farmers' needs and research interests in Research Institutes and Learned Academies remains elusive. Third, extensionists may face daunting problems such as lack of means of

transport and low morale (Chitere 1991:156) hence interfering with the communication process. Fourth, the communication channels to the farmer may not be appropriate depending on the farmer's socio-economic conditions. Finally, useful information may take scores of years to move from research stations to the farms.

The communication theory therefore, while sketching the information dissemination process, does not show how the same may be made more effective. It remains the work of extension agencies to identify the problems facing their programmes and devise appropriate methods of overcoming them.

The modernization and communication theories, have certain implications to agricultural extension which are basic to this study. From the modernization perspective agricultural extension was understood as the vehicle of the "modernizing" technological and organizational packages, and from the communication perspective these are information packages which must reach the audience (farming community) and elicit certain responses, either positive implying agricultural change or improvement, or negative implying stagnation.

2.3 Substantive Literature

2.3.1 Participatory Methodologies of Working with People

Popular participation in development has been a much sought after phenomenon by development planners and administrators to the extent that while it is ideally a means to development, it has become a goal to be attained (Muia 1991). Even so, only limited and isolated successes have been scored in terms of achieving actual popular participation

in development. What the concept of participation means is often in doubt in the minds of many development workers.

The United Nations Task Force on Rural Development (1977) defined popular participation as: "An active process in which the participants take initiative and action that is stimulated by their own thinking and deliberation and over which they can exert effective control. The idea of passive participation which only involves the people in actions which have been thought out and designed by others is unacceptable" (cited in Muia, 1991).

This type of conception is problematic especially when understood against the background of poverty, illiteracy and ignorance that dominate some rural communities in the Third World to which Kenya is no exception. The conception however, in a sense challenges rural development workers in this region to assume facilitating roles, so that communities in their jurisdiction may evolve their own ideas about development and shape their own programmes which can be implemented on their terms.

Concerning rural development approaches, those pertinent in this discussion are extension and community development. Both are educational approaches to facilitating participation of people in rural development activities (Chitere, 1987 cited in Chitere 1991:68). The approaches are a means to involving people in planning and in taking actions aimed at improving their living conditions. It should be added that the underlying philosophy of both extension and community development is education of people through actual actions; that is "learning by doing". (Chitere 1991:68-69).

The issue of peoples' involvement in development activities has fully taken centre stage in development agenda, and Timberlake (1985:188-189) has argued that NGOs' workers in Africa often without farming experience themselves but involving farmers in their programmes have succeeded to bring about change among smallholder farmers, while governments with highly trained workers and consultants have often failed. The question that inevitably emerges is; What is in peoples' participation that facilitates success in rural development programmes?

Chitere (1994:3-5) has argued that the need for participation of local people in development is underlined by a number of reasons. First, people often tend to resist innovations or measures that are imposed on them. Their involvement therefore, makes them internalize the innovations. Second, local participation is also needed because it permits mobilization of local resources and their use in development. Third, participation permits growth of local capacity, which develops out of the establishment of a partnership between development agencies and the community. Fourth, participation helps reduce the growing sense of lack of community which comes with the weakening of social relationships in society. Finally, participation tends to reduce alienation which prevents members from identifying with their communities. Community Development and extension therefore, are attempts at peoples' involvement in development.

The 1982 World Consultation Forum on "The churches and peoples participation," noted in part that people's participation is the people's initiative, to assert themselves as subjects of history. It is marked by the development of new knowledge

by the people, including the appropriation and control of technology so that it serves the people (Mulwa 1987:vii).

The issue of liberating education or the problem-posing concept of education (Freire,1972) that is, education that consults the learner is central to peoples' participation in development. It is in this vein, that Action Research, especially participatory research's emphasis on conscientization and learning of a liberating nature, is also emphasized by the rural development approaches, especially community development (Chitere, 1991:74) which give priority to peoples' participation in development. Action and Participatory research methods seek to understand reality from the perspective and for the benefit of the researched. In a sense, these research methods enable Researchers to guide communities to research themselves and attempt to remedy their development problems in their own terms.

Thus, the concept of 'community' is central to rural development work. Rural development work proceeds, among other things, from an effective understanding of the communities in which change agents are located (Ontita and Chitere, 1991:159). In order for participation of people in rural development activities to be facilitated in Kenya, there is need for the understanding of rural villages which are made up of dispersed homesteads, are much smaller comprising in some cases of members of one ethnic group and share such facilities as schools with neighbouring villages. For purposes of planning and implementing of rural development projects, national and development agency policies need to concentrate on rural villages where there is usually intensive interaction

between members and where a sense of belonging of people in the area is well developed (ibid:168).

Village communities are the ideal focus for participatory-oriented development activities because of their cohesiveness. This is important because as Omoka (1991:83) argued "the extent to which residents of a community have a sense of community identity affects their involvement in community development affairs (projects)". In terms of institutional base of power which may speed up community development praxis (ibid:86), Ontita (1991:181) has noted that the Kabras village headmen did not possess any unique personal characteristics uncommon among their fellow villagers. They were in most cases elected and were popular grassroots leaders close to the villagers and with potential for influencing them to undertake development work. Ontita (1991) concludes that participatory action research activities would be more effective if they treated villages as their basic units.

Therefore, community leadership is central to the process of peoples' participation in development. Wandera and Omoto (1991:98) have argued that community leaders have been considered as an important link between the NGOs and the populace. Thus, NGOs interested in participation have set aside funds to train community leaders, and the training aims at equipping them with knowledge and skills to enable them to effectively mobilize and manage locally available resources for accelerated development in the framework of the District Focus for Rural Development Strategy. This argument leads this discussion to the specific role of government in facilitating participatory development, and Mbithi (1974) drives the point home.

Mbithi (1974: 124), saw participation to include involvement of local residents (non-officials and low level indigenous government staff) in project planning and implementation stages. He further reasons that local participation implies that it is incorporated into government machinery and operations. This is echoed in Kenya (1987:8,22) thus; "A major objective of the District Focus Strategy is to increase communication between the local community and government officers working in the districts. Full participation of the local community in the planning and implementation of development activities is the key element to this strategy".

The foregoing argument seems to be based on the principle that the stronger the participation of beneficiaries in all aspects of a programme - from planning to evaluation, not just in implementation - the more successful the programme is likely to be (Russel 1983:26). The question that remains is whether the government has fully accepted this in practice.

Chambers (1983) on the other hand sees participation as tapping the local people's knowledge and starting from what they know and what they have such as organic rather than chemical fertilizers. Chambers' conception seems to recognize the fact that smallholder farmers' expertise represents "the single largest knowledge resource not yet mobilized in the development enterprise and which we simply cannot afford to ignore any longer" (Hatch 1976, cited in Timberlake 1985:121). Thus, development agencies need to open up through their frontline staff and other methods, for knowledge inputs from those people whom they set out to change. This is what peoples' participation in development is all about. The overall picture which emerges with regard to people's

participation, is their empowerment to determine their destiny. Agricultural extension needed to be analyzed against this background, as its success or failure has tremendous impact on the direction of development among enormous numbers of men and women in the rural sector whose livelihoods are directly pegged to agriculture.

2.3.2 Agricultural Extension Services.

The term 'extension education' was first introduced in 1873 by Cambridge University to describe a particular education innovation. This was to take the educational advantages of the universities to the ordinary people, where they lived and worked (FAO, 1972:12). Agricultural extension has since come to refer to agricultural knowledge passed to farmers to help them improve it. For instance, (ibid:23) showed that agricultural extension services are established for the purpose of changing the knowledge, skills, practices and attitudes of masses of rural people. Hence rural development is mostly about agricultural change.

The extension worker begins by analyzing the main problems of the district he or she works in, and sets objectives based on the results that the best 10% of the local farmers are already realizing (Harrison 1987). This is perhaps how to get to understand the farmers' situation and think through the relevance of the extension message, as provided for in the communication theory.

Leonard (1977) argued that rural development had become the focus of attention and at the very center of the ensuing concern and activity was the smallholder farmer and his productivity. He further argued that the smallholder farmer must be helped to develop

by the agricultural extension service. In agreement with Leonard, FAO (1983:ii-iii) showed that smallholder farmers account for the bulk of the agricultural output in most African countries and represent a massive potential for increased production yet to be fully realized. Hence focusing on the smallholder farmers is an appropriate strategy as it is often a more cost effective way to increase production than any other alternative allow.

From the modernization perspective the extension service aims at transforming the farming community, to "develop" it, to help it discontinue traditional attributes which may, arguably include insufficient food, poor shelter, poor clothing, inadequate income and inefficient agricultural methods, at least among those in present-day Kenya, who have been considerably drawn into the cash economy. From the cost-effectiveness point of view, transforming the smallholder farmers means a whole farming community is transformed leading to broad based agricultural improvement that is contributory to rural development.

Indeed, Pickering (1983:3) pointed out that experience has shown that the most effective way of both alleviating poverty and promoting overall economic growth is to raise the productivity of small scale farmers. But in practice extension services which are supposed to stimulate increasing productivity have often ignored smallholder farmers, preferring to work with the ready to change progressive farmers.

Mosher (1966) argued that since the abilities of farmers and the decisions they make about their farming operations are so crucial to the rate of agricultural development, special programs designed to facilitate farmer education are an important

phase of education for development. He saw the extension worker as an 'animateur', one who makes the farmer lively and active. This is supposed to facilitate farmers' learning and their actions in response. Even so, some farmers may not have accessibility to extension workers or the workers may not have sufficient time for them hence learning is hampered.

Despite the good intentions of agricultural extension, Nyerere (1968 cited in Leonard 1977) argued that an inefficient bureaucracy can be as exploitative of the masses as is capitalism. And Leonard (1977: 173) showed that current extension practice in Kenya was accelerating the gap between the wealthier minority and the poor majority of smallholder farmers. Concentration by the extension service on the progressive and well to do farmers empowers them economically and enables them to exploit the smallholder farmers by as Leys (1977:355) explained, purchasing small plots from them on a continuous basis. This negatively affects the agricultural improvement process among smallholder farmers as it reduces the resources at their disposal.

On the same score, Chitere (1976;116), has shown that a farmer is faced by many factors which affect his performance. These include age, family size and the surrounding community. Agricultural extension does not therefore always achieve its objectives fully, because some of these factors are beyond its control.

The foregoing reasons partly explain why as Pickering (1983:4) argued, the condition of agriculture the world over testifies to the gap that exists between the accumulated understanding of biological processes on the one hand and the practices of the majority of farmers on the other. Existing knowledge has for years been capable of

evening out some of the glaring differences in agricultural productivity between the developing and the developed world. He added that agricultural extension is one of the ways of closing the gap, and that under all kinds of agricultural systems and in a wide range of political and economic environments, research workers are developing technologies for small scale agricultural producers, and extension officers are attempting to persuade farmers to adopt them. But in many instances these efforts are inadequate in amount, unfocused in direction and consequently ineffective. This shows that agricultural extension the world over faces problems, and the success with which respective extension systems have tackled them remains the major question.

Agricultural extension then is depicted in the literature both as a blessing and a curse. As a blessing, we agree with Savile (1965:6) that its aim is to find out what the farming community feels it needs, the problems involved and then to supply the answers to those problems. As a curse it flouts this noble aim. That then, it concentrates resources in terms of advice and demonstration materials for instance, on only a few wealthy farmers, neglecting and in effect demoralizing materially poor farmers who are the majority. Even with such dangers, the literature is unanimous that agricultural extension is indispensable, but that it needs to be strengthened if the necessary change is to be achieved especially in the developing World.

2.3.3. Approaches to Agricultural Extension.

Savile (1965) maintained that the success of all extension work lies in the method of approach to the problems of the farm family. Mbithi (1974) also held the same

opinion. Hunter (1978) was also in agreement. Pickering (1983:5) underscored the same point arguing that technologies affordable to the farmer should be communicated in ways farmers can understand and in terms they perceive as usable. Extensionists, therefore, need to understand the agricultural communities with which they work. More often, however, this goal has been elusive in practice.

Benor and Harrison (1977), Benor and Baxter (1984) and Benor, Harrison and Baxter (1984) maintain that in the Training and Visit (T&V) approach to agricultural extension the technical advice spreads from the extension agent through the contact farmers to other farmers by two mechanisms;

First, the non-contact farmers see what the contact farmers try in their fields and the results they achieve, this generates interest. Second, each contact farmer is asked to explain the recommendations he has received to several (up to 10) friends, relatives or neighbours and to help them adopt the recommendations. This line of argument assumes that agricultural communities are cohesive and that all farmers are keen on their neighbours'/friends' improvement of their farming practices. The contrary is often the case. Competition and jealousy often characterize rural communities.

In connection with the contact farmer approach, Ascroft et. al (1973:31-33) demonstrated that it concentrates disproportionate attention on the progressive farmer, but that the lopsided distribution of extension benefits was not solely attributable to a progressive farmer strategy. It seemed as much due to the high demand for extension help by progressive farmers. This argument, however, represents an apologist view of the progressive farmers approach. This is because as FAO (1972:151) showed the

personal influence of the extension worker is a vital force in securing cooperation and participation in extension activities and adoption of improved practices on the farm and in the home. The extensionist, therefore, ought to take the initiative to enlist the participation of the disinterested farmers.

Alila (1978:330) noted that the trickle down theory (on which the training and visit approach seems to rely) rests on the familiar assumption that the advice designed for progressive farmers is relevant to small farmers. This is often not the case, especially due to difference in scale of operation and available capital. Moreover, Leonard (1977:198-9) contended that the extension service concentrates on the progressive farmers because they are psychologically predisposed to change and so require less persuasion. Seidman (1977) held the same view. To the contrary Heyer et. al (1969) showed that junior extension staff were afraid of visiting teachers and progressive farmers for fear of embarrassment. Heyer's however, was an argument of his time when ill-trained personnel held extension positions. Presently, well trained people are in service and it is likely that they would prefer to work with teachers and progressive farmers with whom they are socio-economically compatible.

Leonard (1977) further argued that a broader range of extension contacts would probably lead to more rapid and widespread acceptance of profitable innovations. Referring to Kenya, Leonard (1977) held that a shift to group extension methods would provide the kind of framework within which supervisory control and planning would become feasible and would produce a much more effective extension service, in terms especially of reaching a large number of farmers, and of the fact that demonstrations can

be more economical. Further, there is considerable evidence, he maintained, that it is easier to persuade people to adopt innovations, when they are in groups, than when they are encountered as individuals. Even so, he did not identify the groups he envisaged or how they would be constituted if they did not exist.

Harrison (1987:93) agreed with Leonard, by asserting that an extensive study in Wedza area, Zimbabwe, documented rapid expansion and benefits of farmers' groups. In Kenya, however, the group extension approach concentrates on already existing social groups, and original objectives may be in conflict with agricultural extension activities.

According to FAO (1972:155) group methods include general meetings, method demonstrations, result demonstrations, farm walks or tours, field days or farmers' days at agricultural experiment stations, short courses of instruction, Farmers' Training Centres (FTCs), rural youth and home makers clubs and group projects. But in Kenya many of these activities have not been a reality, sometimes due to lack of resources to organize them.

2.3.4. Soil and Water Conservation.

Harrison (1987:71-79) held that the roots of Africa's problems lie in the tangled relationship between agriculture, environment and population growth. It is precisely these crucial areas that have seen the worst failure. He further argued that a more rapid diffusion of intensive and soil conserving techniques by way of nation-wide extension systems in which extension workers help farmers to combine the best of the traditional

with improved methods is prerequisite if African farmers have to intensify agricultural production.

Government initiated soil and water conservation has a long history in Kenya but heavy handed enforcement during the colonial period through forced labour in the White Highlands (settler areas) and punitive enforcement through the all empowering Chief's Act in the then African Reserves left soil and water conservation in disrepute among farmers for a long time [NSWCP Evaluation Report 1992:2). Efforts were revived with the first phase of National Soil and Water Conservation Project, which began in 1974 on a pilot basis in six districts. By 1992 it was covering 43 districts. Farmers involvement in planning soil and water conservation measures on their farms has gradually increased (ibid:2).

Since 1988, the extension service on soil and water conservation is primarily directed at farmers living within drainage catchment areas who experience similar problems in controlling water run-off and for whom part of the solution may lie in joint efforts to dig cut-off drains and artificial waterways in the upper part of the catchment area (ibid p.8). The role of the extensionist is organizational, mapping, physical marking and design, technical advise, distribution of tools and supervision of activities.

The Kisii District Development Plan (1989-93:7) declared that soil erosion is a menace and that conservation efforts need to be intensified to save the important top soil needed for agriculture. The department of agriculture in the district is expected to implement soil and water conservation programmes.

Kenya (1986:60) also held that in medium to high-potential areas, new and replanted forests will protect watersheds and prevent soil erosion. The problem of soil erosion in Kenya can not therefore, be overemphasized. The catchment approach to soil and water conservation is the most widely used in the study areas (see a list of completed projects, Nyamira District Development Plan 1994-96:94-95). Even so, soil erosion remains a serious problem and its solution the most urgently sought.

2.3.5. Agricultural improvement.

Hall (1936) thought of agricultural improvement as involving the replacement of shifting cultivation with a fixed agriculture, livestock culling and soil conservation and, therefore enabling the African farmers to produce more food, and be in a position of being incorporated into the market system through cash crop production.

The present study viewed agricultural improvement as touching on aspects of soil conservation and of adoption of improved farm practices. Agricultural improvement refers to farmers' positive response to the crops improvement programme which Chitere (1980) argued entails educating farmers about new and existing farm inputs and practices with regard to food and cash crops.

Harrison (1987:89-90) noted that many elements have to come together for the alchemy of rapid growth in yields. The first element is inputs, especially fertilizer and high yielding seeds. After inputs and credit to buy them with, the next essential element is to provide farmers with sound advice through agricultural extension workers on how

to use the inputs. But beyond the inputs what can the extension service do to improve agriculture?

La-Anyane (1985:55) held that an important attribute to extension education is that it provides a technique for enhancing the chances for increasing production without any significant quantitative increases in the factors of production - land, labour and capital. It serves primarily to improve entrepreneurship and managerial ability. This is particularly important given that land holdings per farmer are either fixed or declining.

Given the increasing pressure of population on food supplies that exists, international agencies and developing countries have to concentrate heavily at this time on finding ways to increase the yields of food crops especially food grains [Hill and Hardin 1971:14]. However, food shortages and grain imports persisted (Kenya, 1981:6), ten years after Hill and Hardin's warning. Therefore, even if ways to increase yields such as hybrid maize seeds, have been found they often have not been effectively taken up by the majority of farmers.

Hill and Hardin (1971:18) continued to argue that as agriculture shifts from traditional to modern methods of production, increasing use must be made of purchased inputs, that must be financed from current income, savings or loans. Credit systems which serve agriculture effectively are a necessary part of the infrastructure of modern agriculture. However, agricultural credit systems in Kenya have declined greatly in the recent past, and hence improved agriculture will need to be self-sustaining in the future, that is, farmers will need to plough their profits back to the farming enterprise.

The development of agriculture is not a purely technical task. It can succeed only with the cooperation of the farmer and on the basis of an understanding of the society of which the farmer is a part [De Wilde et. al 1967:45]. Hence there is need to examine agricultural extension beyond adoption of improved farm practices and attempt to capture the impact of such adoptions on food production and levels of living of farm families. Benor and Harrison (1977:4) noted that significant production gains can be achieved by using available resources more efficiently without significant increases in investment or in purchased inputs. In areas where such gains have already been realized, effective extension is needed to ensure a higher standard of agriculture with increased use of inputs and high technology.

To the contrary Geertz (1963), showed that agricultural development is not always continuous and that sometimes agriculture regresses. For example he argues that during the two decades up to 1949, agricultural production declined greatly in Indonesia. This resulted from technological dualism which involved low capacity rural technologies vis-a-vis urban modern high capacity technologies, regional imbalance in terms of resource and infrastructural allocation, and ecological involution. Another cause was concentration on industrial raw material exports at the expense of food-stuffs and fibres.

The existence of rural-urban imbalance in Kenya's development is a strong mitigating factor in the agricultural improvement equation. Agricultural extension workers will therefore, need to work harder through more aggressive extension programmes, to help reverse a possible trend toward agricultural involution especially

as the urban sector entrenches in the national development agenda through such ventures as the Export Processing Zones (EPZs), to the disadvantage of the rural sector.

The literature suggests a positive relationship between agricultural extension and agricultural improvement, in fact this is the 'raison detre' of the agricultural extension service. This inquiry seeks an understanding of the relationship on the ground.

2.3.6. Rural Food Production and Sufficiency

Harrison (1987:95) has noted that if smallholders can be helped, the problems of insufficient food production, of malnutrition, and of widespread absolute poverty will be attacked simultaneously. It is, this research contends, the agricultural extension service that is expected to help the smallholders go over the hurdle by producing more food. Leonard (1977) advances the same idea.

Indeed, Ogada (1971:36) has argued that, in order to get the results from breeding and agronomy put into practice by the farmers, the extension workers must do their job extremely well. Uma (1975), Mosher (1966), Harrison (1987) and Savile (1965) also recognize this role of extension in enabling farmers adopt improved agricultural practices, diversify and maximize production.

Moreover, increasing levels of relative food self-sufficiency at farm family level remains the basis of diversified agriculture. This is because as the World Development Report (1990:33) showed with regard to rural Tanzania, the poorer households were less likely to participate in market transactions than the non-poor, since they lacked the resources to grow cash crops and could not take the chance of a bad harvest that would

leave them dependent on the market for their food needs. This observation shows that if extension workers have to succeed in achieving a diversified agriculture, they have to target and achieve food surpluses first.

In line with the foregoing, FAO (1983:62) held that most of the farmers involved in the Fantua Agricultural Development Project (F.A.D.P.) in the Kaduna state, Nigeria, were small scale farmers, whose primary objective was "safety first" with regard to food self-sufficiency. Therefore, they approached the project very cautiously. However, the farmers demonstrated their willingness to try innovations, but they were attracted more to innovations that were substantially more profitable than their current practices, especially when the innovations helped ensure food self-sufficiency. The issue of increasing food productivity therefore, remains the base of agricultural improvement.

For instance, De Wilde et. al (1967:173) reported that the smallholder farmers in the Bugisu District of Uganda could not share fully in the benefits that flowed from the introduction of arabica coffee because they were not enabled to increase the yields of their food crops, particularly of bananas, and thus release more land for coffee.

Sprague, Osher and Finlay (1971:413) have maintained that, for many reasons it will not be feasible in the long run for part of the world to produce food for the rest of the world or even for one area of a nation to produce the food for the rest of the nation. This implies that efforts to increase food productivity at farm levels must be spread out to all parts of a country, and this is the task of the extension service.

In agriculture there is a division of labour which often creates a divergence of interests interfering with the full and efficient use of productive resources. The woman's

primary responsibility and preoccupation tends to be the cultivation of food crops required to feed the family (De Wilde et. al 1967:50- 51). Extension efforts targeting food production and hoping to succeed must therefore recognize and utilize that division of labour to its advantage.

Usually women are entitled to sell the surpluses of cereals grown primarily as subsistence crops, or alternatively, the beer which they brew from such surpluses; and they may seek to increase the surpluses of cereals so that they can brew or sell more beer (ibid:54). This kind of arrangement if recognized can be manipulated to become an asset for the agricultural extension service, because then the service will focus on a felt need.

2.3.7. **Agricultural improvement and Rural Levels of Living**

It is not the intention of this study to suggest that extension alone can enable farmers to maximize their incomes. Inputs of seeds, fertilizers and pesticides, farm credit and in some cases irrigation are required (Benor and Harrison 1977:4). This means therefore, as Macro (1965:i) argued, that the farmers' farming system must be modernized or transformed in order to maximize incomes.

Agricultural productivity is basic to rural development by any definition. Without high and/or increasing yields and production, rural income and nutrition, which are associated with other aspects of welfare, cannot be maintained in the face of rising population. Generating a surplus of resources which can be put into developmental investment also depends in large part on a dynamic agricultural base (Uphoff and Esman 1974:32). This is because as indicated for example in Kenya (1981:1, and 1986:62) the

agricultural sector remains the greatest source of food and incomes for individual rural households. Funds and other resources for rural development undertakings which impact on levels of living in rural areas will thus proceed from the agricultural sector. In rural Africa, however, De Wilde et. al (1967:58) has shown that at some point there is a tendency to regard so much income as enough and to regard additional income as not worth the extra effort required to obtain it, this is the "target income" mentality. Nevertheless, Uphoff and Esman (1974) linked agricultural improvement to Rural development. Therefore, whatever its shortcomings, due mostly to its rural location, there is no doubting the eminence of the agricultural sector in rural development, and therefore in the uplifting of rural living conditions. .

Bahemuka (1987:20) noted that a family's level of living can be estimated by size and type of houses and income from sale of farm products and other sources. On the same issue De Wilde et. al (1967:59) notes that when increases in income are devoted largely to the purchase of alcohol or articles of "conspicuous consumption", such as radios and items of this nature, this usually indicates that a regular pattern or standard of consumption and a strong desire for more income have not yet developed. This however, needs to be viewed while considering an individual's history of expenditure on other items more salient to his/her socio-economic welfare. In this area then, this study confined itself to answering the question of whether or not agricultural improvement led to higher levels of living among farm families.

2.4 Review of Kenya's Agricultural Extension Policy.

The history of agricultural policy and of agricultural extension in Kenya, shows that the colonial state was deliberately anti-African commercial agriculture at least up to the late 1920's when the 'White Highlands' were secure. Even up to 1939 when the 'White Highlands' were by law secured, the colonial state continued to pay lip service to African agriculture, in the sense that the attention afforded was low in proportion to demand (Zwanenberg, 1972, Maxon, 1989, Zeleza, 1989, Lonsdale, 1989, and Kanogo 1989).

During the war the government made some efforts to improve the agriculture, but even then the thinly spread agricultural extension services were selectively and completely biased against arid and semi-arid lands (Zeleza, 1989 and Brown, 1968).

It was only in the 1950's and thereafter that the colonial state decisively disengaged itself from the age old obsession that assistance to African areas should have taken the shape of soil conservation and maximization of food production, and hence covered commercial agriculture such as cash cropping and dairying. Within this new era that dawned on the strength of the Swynnerton Plan (1954) agricultural extension was outrightly tilted in favour of progressive areas and farmers in African reserves (Ruthenberg, 1966, Brown, 1968, Uchendu and Anthony, 1975 and Garst, 1972).

2.4.1 Agricultural Extension in the Post-Independence Period : 1965 - 1990's.

This section of the chapter surveys the agricultural extension policies as spelt out in the various five year period development plans since independence. This discussion commences with the 1964 - 70 Development Plan.

(a) The 1964 - 1970 Plan Period.¹

The development plan for this period noted that there was sound economic justification for the emphasis of development of the former African areas, where 80% of the rural population lived and which contained 80% of Kenya's high potential agricultural land.

Thus it was contended that to improve the living standards of the masses of the population as well as to create the necessary new jobs, the government must have devoted substantial resources toward increasing productivity, income and employment in peasant farming and pastoral areas.

Moreover, it had been clearly established that productivity in the peasant sector would respond to economic incentives, with the help of agricultural credit and extension services.

It was proposed that the agricultural department would continue to expand its various activities designed to help African large-scale farmers run their properties more profitably. Additional farm planners and other extension personnel, hired locally or sponsored by external aid agencies, were to be put in the field.

¹ Kenya Republic of (1964) National Development Plan; 1964-70. Nairobi: Government Printer.

The plan generally emphasized specific cash crop extensions and Farmers' Training Centres (FTCs); (with the Kenya Tea Development Authority's Tea Training Farms at Kigochi and Kaimosi hoped to expand to cater for 5000 - 6000 growers per annum).

This plan underscored the fact that government field staff must work together with local political leaders to break down the dichotomy of "food" and "cash" crops, and encourage production of food surpluses for sale to food deficit areas.

(b) The 1970 - 1974 Plan Period.²

This was the second development plan in independent Kenya. The plan averred that given the need for increased agricultural productivity and for the widespread adoption of improved farming methods, agricultural extension had a major role to play.

During 1970 - 1974, the ministry of agriculture was to undertake a major reorganization of extension services. Instead of there being a number of specialized departments, each with a parallel organization in the field, a unified extension was being created. Under this new system the farmer would be served by one extension worker who could give advice on a wide range of agricultural subjects.

It was noted that a variety of extension methods were in use, including visits to individual farmers, demonstration plots, farm field days and the use of mass media such as the radio, films and printed material. The plan notes that staff could not hope to visit all farmers individually, even with the increased levels of manpower and finance to be availed during the plan period. Thus the steadily improving levels of education and

² Kenya Republic of (1970) National Development Plan: 1970-74. Nairobi: Government Printer.

literacy among the rural population were considered conducive to effective extension through the mass media.

Other extension approaches during the plan period included Farmers' Training Centres (FTCs) - including some for large- scale farmers and agricultural training in secondary schools. It was hoped that the establishment of a faculty of agriculture at the University of Nairobi in mid-1970 could boost agriculture extension efforts in Kenya.

(c) The 1974 - 1978 Plan Period.³

In the third national development plan it was recognized that the most important feature of agricultural development strategy would be to increase the rate of public expenditure on programmes aimed at helping large numbers of farmers to intensify production. These included programmes such as agricultural extension, training and research, farm credit and input supply programmes, land adjudication and registration, disease control, cooperative development and marketing. This implied giving the highest priority to programmes aimed at developing the smallholder farming areas.

It was also noted that the aim of extension services would be to reach a very high proportion of Kenya's farmers during the new plan period. Previous tendencies, the plan maintained, to concentrate attention on the more progressive farmers would be avoided.

Various experimental approaches toward extension continued in conjunction with the Special Rural Development Programme. Because of the over-riding need to reach the majority of Kenya's farmers, it was recommended that the extension services be placing

³ Kenya Republic of (1974) National Development Plan: 1974-78. Nairobi: Government Printer.

more reliance on the mass media and group approaches rather than individual farm visits. For that reason the Agricultural Information Centre was to be strengthened.

(d) The 1979 - 1983 Plan Period.⁴

The policy during this period was to ensure better land use and provision of essential services, such as credit, extension, inputs, markets and transport, to small farmers. The plan focused on small scale agriculture and arid and semi-arid lands. Small scale farmers were to be given every opportunity to increase their participation in the monetary economy. Among small scale farmers, greater attention was to be accorded those who had been lagging behind till then. Extension and credit was to be increasingly directed at the small farmer.

It was government policy that more effort would be made during the 4th plan period to involve local level technical staff, elected representatives and members of target groups themselves in programme decision-making.

The plan identified small holder farmers - those with land who derived a large proportion, but usually not all, of their income from working on the land, as one of the target groups, in programmes to alleviate poverty. Research and extension services were to be oriented to alleviating the production constraints in small holder farming systems.

Like the one before it, the 4th plan recognized that most of the beneficiaries of the extension service, had continued to come from the above average sized and progressive farmers, who formed only a small proportion of the farming community. Thus the emphasis on poverty alleviation was to centre on the preparation of specific

⁴ Kenya Republic of (1979) National Development Plan : 1979-83. Nairobi: Government Printer.

development programmes for the below average farmers. This required the extension service to substantially re-orientate itself to the needs of large numbers of these farmers.

The plan spelt out the policy that group extension programmes designed to reach more farmers would become the normal approach, and that the use of appropriate media for disseminating information to a wider audience would be encouraged.

Small farmer development programmes and projects were a key element to this plan. The Integrated Agricultural Development Programme (IADP) was the main programme for small holder development. The major objective was to alleviate poverty through mobilization of small farm resources for food and cash crop production. The programme's central component was a package of highly profitable innovations in crop and livestock production including increased application of inputs and improved technologies appropriate to small scale farmers.

The plan noted that the solution of the soil - and - water conservation problem lay with the spread of resource conserving land use systems which were profitable from the point of view of farmers. Soil and water conserving husbandry practices needed to be a permanent feature of the agricultural production process. Farmers, extension workers, administrators, politicians and the general public had to be made conscious of the threat to the future food base of the nation which was caused by erosion.

On-farm conservation measures were to be complemented by investments in small-scale communal projects such as cut-off drains, stoppage of gullies, drainage works, minor dams and re- afforestation. These projects were to be based on local participation in decision-making and implementation. The beneficiaries were expected to

form farmers' associations responsible for the maintenance of the structures established with public funds.

(e) The 1984 - 1988 Plan Period.⁵

The sectoral objectives of the Fifth Development Plan, 1984 to 1988, included increased food production, growth in agricultural employment, expansion of agricultural exports, resources conservation and poverty alleviation. These objectives were basically the same as those of the Fourth Development Plan - 1979 - 1983.

The plan indicated that most of the nation's food requirements had to continue being met from domestic supplies and, therefore, a major strategy of the fifth plan was to maintain broad self-sufficiency in basic foodstuffs.

Major thrusts to facilitate the achievement of plan objectives included the provision of agricultural and livestock services that would supply relevant new technologies for crop and livestock production together with a mechanism which would transfer the necessary knowledge and skills to enable small farmers to adopt the new technology.

Policies and projects were to be formulated and developed to give special attention to such areas as small farm focus, more intensive resource use through improved crop and livestock husbandry practices, technology improvement through an increased research and extension effort, market incentives, increased emphasis on arid and semi-arid lands (ASAL) and improved management and administrative procedures.

⁵ Kenya Republic of (1984) National Development Plan : 1984-88. Nairobi: Government Printer.

The national extension project was to revitalize agricultural extension by introducing a new extension management system based upon regular visits to contact farmers and the fortnightly inservice training of front-line staff. Agricultural research policy was to focus on development of technologies appropriate to the ASAL and on development of labour-intensive technologies appropriate to smallholder food production.

While the emphasis of the plan was on increasing food production on small farms, attention was also to be given to other crops. Production of industrial and export crops was to be raised through crop-specific projects.

(f) The 1989 - 1993 Plan Period.⁶

The Sixth Development Plan recalled that agriculture is the mainstay of Kenya's economy providing as it does the basis for the development of other sectors of the economy. Priority ranking in the sector centered on food production, generation of raw materials for local industries and graduated processing of production for export.

The overall thrust of agricultural policy was first, to achieve internal self-sufficiency; second, to maintain adequate levels of strategic reserves and third, to generate additional supplies for export. Scientific and technological applications were to be fully employed to ensure adequate supplies of all staples.

Agricultural extension was largely controlled by the Ministry of Agriculture through the Extension and Agricultural Services Division and the Ministry of Livestock Development through the Departments of Livestock Production and Veterinary Services.

⁶ Kenya Republic of (1989) National Development Plan : 1989-93. Nairobi: Government Printer.

Tea extension was, however, carried out by the Kenya Tea Development Authority (KTDA), while private companies such as Kenya Breweries Limited (KBL) , British American Tobacco (BAT) and East African Industries (EAI) carried out their own extension for barley, tobacco and oil seeds respectively.

The Plan pointed out that the underlying philosophy in crop and livestock extension was reflected in the Training and Visit (T&V) approach. Since it was started in the early 1980's, the Plan noted, the system had proved effective in the transmission of modern farming techniques in rural areas where it had so far operated well inspite of serious transportation constraints. The plan indicated that the government was to continue using the T&V approach during the sixth plan period.

It was appreciated that although the government was to retain dominance in the administration of the extension system, measures were to be taken to encourage the private sector to play an increasing role. Linkages were to be fostered between the farming communities and agro-industry, farmers' cooperatives and unions were also expected to play their part.

In conclusion, the colonial state left behind for the Republic, a legacy of lopsided agricultural extension service. It is this lopsidedness that the agricultural bureaucracy seems to have been fighting throughout the 30 or so years of independence. All post-independence development plans have something to do with reaching the majority of the farming community. The implication is that the legacy of a lopsided agricultural extension service, has unfortunately persisted throughout Kenya's agricultural history.

2.5 Conceptual Framework

The modernization and communication theories, have certain implications to agricultural extension which are basic to this study. From the modernization perspective agricultural extension was understood as the vehicle of the "modernizing" technological and organizational packages, and from the communication perspective these are information packages which must reach the audience (farming community) and elicit certain responses, either positive implying agricultural change or improvement, or negative implying stagnation. This study assumes that channels of communication which allow farmers' inputs to its decision-making process leads to positive responses or 'practice' in the communication perspective and 'development' in the modernization perspective. That these positive responses which this study refers to as 'agricultural improvement' may be partly reflected in terms of relative food self-sufficiency and higher standards of living among farm families.

Therefore, the theories of modernization and of communication, and the substantive studies reviewed above, demonstrated the critical place of agricultural extension in agricultural improvement. Despite that point of convergence, there is no agreement on the appropriate methodology for agricultural extension. Neither is it clear whether or not farmers may contribute to decision-making in the agricultural extension process and if so to what extent. The literature is not decisive on the place of food crops in the agricultural extension agenda, nor is the role of agricultural improvement in the betterment of life at farm family level shown. This researcher therefore, proposes to specify the implications of agricultural extension to agricultural improvement (understood

as adoption of improved agricultural practices), show the implications of farmers' participation and of the various agricultural extension methodologies to improvement and more importantly find out if there is a link between agricultural improvement and food production on the one hand and levels of living of farm families, on the other. In this vein therefore, and in view of lessons from theories and literature considered the study advanced a number of hypotheses.

2.6 Research Hypotheses:

1. Farmers' participation in the process of agricultural extension positively affects their adoption of improved farm practices.
2. The Agricultural extension methodology employed influences farmers' adoption of improved farm practices.
3. Farmers' adoption of improved farm practices positively correlates with self-sufficiency in food production.
4. Farmers' adoption of improved farm practices positively influences the levels of living of farm families.

CHAPTER III

METHODOLOGY

In this chapter, firstly, a geographic description of the study area is carried out. Secondly, the sampling design is presented. Thirdly, the data collection methods are explained. Fourthly, the methods of data analysis are stated. Finally, the variables are specified as used in each of the hypotheses and the process of their measurement described.

3.1 Geographic area of study

Data in this study was collected in Nyamira District, Nyanza province, Kenya. The district is one of six in the Province. The district covers an area of 844 sq. Kms. It is bordered by; Kisii district to the south and west, Narok district to the south-East, and Kericho and Homa-Bay districts to the North. To the East are Kericho and Bomet Districts.

Nyamira District is divided into five administrative divisions. These are; Borabu, Nyamira, Ekerenyio, Rigoma and Manga. Borabu and Nyamira Divisions have three and six locations respectively. The rest of the divisions have four locations each. The district has a total of 21 administrative locations and 68 administrative sub-locations. The district has three constituencies; West Mugirango, North Mugirango-Borabu and Kitutu Masaba, each is represented by a member of parliament.

The district's climate is of the highland equatorial zone. There are hardly any climatic variations. The rainfall is bi-modal with the long rains starting from March and

April and continuing until June. The short rains begin in October and end in December. The district has an average annual rainfall of 2000mm. January and August record less than 100mm, while April has the highest precipitation of over 300mm. The minimum night temperatures average 10.1 degrees centigrade and the maximum day temperatures average 28.7 degrees centigrade throughout the year (Kisii District Development Plan 1989:2, Uchendu and Anthony 1975:12). The main permanent rivers and streams which drain the area into lake Victoria, include Gucha and Sondu. There are many valley bottoms and depressions, most of which are marshy. Altitude ranges from just below 1500m to well over 1800m above sea level.

According to the Kisii District Development Plan (1989:4) most of the land has red volcanic soils, which are deep and rich in organic matter. These are suitable for agriculture. There are also areas with clay soil, others with red loams which are rich in iron nutrients and other areas have sandy soils. Within the valley bottoms is found black cotton soils and organic peat soils.

Nyamira district is agro-ecologically of high potential. There exist fertile types of soil and reliable rainfall. Most of the soils support crops such as coffee, tea, pyrethrum, bananas, maize (both local and hybrid), finger-millet, sorghum, beans and an assortment of horticultural crops. Maize and beans form the staple food in the area. The peoples' traditional food crops include millet as the staple, and spider weed, pig weed, and night shade as the main vegetables.

According to the District's Socio-cultural profile, it is inhabited by the Abagusii people. Migrants to the area mainly constitute Luo, Luhya, Kikuyu and Kalenjin peoples. The Luhya dominate in number among the migrants.

The Nyamira District Development Plan (1994:9-10) shows that in 1979, the district had 300,956 people and an estimated 443,561 people in 1993. Inter-censual growth rate was put at 4.0% per annum between 1969-79 and 2.7% per annum between 1979-89. Projected population estimate for 1994 was 457,311 people. According to the Kisii District development Plan (1989:17) out-migration from the district is limited so that most of the population live in the rural areas and are mostly engaged in agricultural activities.

3.2. Sampling design

This study was conducted through a survey of farm families and the interviewing thereof, of household heads in Nyamira district. The district was purposely selected for this study due to a number of reasons. First, it is this researcher's home district and to keep down the cost of the study it was only logical that he operates from home. Second, and more important the district is representative of Kenya's rainfed agriculture and hence the study's findings are expected to be as good as they would have been if the study was carried out in any other district within the same agro-ecological zone. Finally, Ekegusii, the first language of this researcher is predominantly used in the district and this was advantageous in the course of data collection. Therefore, both probability and

non-probability sampling techniques were used to secure the sample of heads of households for study.

Sampling was necessary in the research process because of reasons of cost and time limit. It was not possible to study a population of the magnitude that confronted us; i.e., the whole population of farm families in Nyamira District.

As Godfrey (1977:66-67) argued, sampling is unavoidable. Moreover, he continued, one can judge the population of interest by looking at a sample drawn from it. Nyamira district was selected for the study and a multi-stage cluster sampling design was utilized to get the final sample of heads of households. In this design the population is broken down into groups called clusters (Godfrey 1977, Singleton, Straits and Straits 1993) and each cluster is defined by some characteristics. In this case the study used administrative divisions, locations and sub-locations. In the first stage, three administrative divisions were randomly sampled (using lottery technique) from the existing five administrative divisions. In the second stage, one administrative location was randomly picked from each of the three divisions sampled in the first stage using the lottery method. In the third stage, one sub-location was randomly selected (using the lottery method) from each of the three locations sampled in the second stage. In the fourth and final stage and with the aid of the lottery technique, heads of 35 households were randomly sampled from each of the three sub-locations sampled in stage three. In total 105 heads of households were sampled and interviewed using a standard interview schedule. A pre-survey was conducted in each of the sub-locations sampled and with the aid of village headmen a sampling frame for the heads of households was prepared. The

village headmen provided the lists of household heads in their villages and this constituted sampling frames for the three sub-locations sampled for study.

Table 3.1 Distribution of the sample according to sub-locations.

| Name of sub-location | Total no. of House-holds | No. of House-holds sampled |
|----------------------|--------------------------|----------------------------|
| Irianyi | 639 | 35 |
| Manga-Raitigo | 619 | 35 |
| Siamani | 842 | 35 |
| TOTAL | 2,100 | 105 |

Source: 1993 Survey Data.

The one hundred and five heads of households were considered representative of the farming community in the study areas. As the study expected contact farmers for the training and visit extension approach, members of social groups such as welfare groups, men and women who had participated in the catchment approach to soil conservation, men and women who attended barazas and others who did not, and/or men and women who had not come into contact with the agricultural extension service at all, were also represented in the sample.

To supplement information from the heads of households certain key informants were also interviewed. These included agricultural extensionists (Technical Assistants) in charge of the three sub-locations sampled, chairpersons of women's groups, chairmen of welfare groups, chairmen of youth groups and some village headmen. The study concentrated on three respondents for every type of group mentioned and both traditional and modern groups were covered.

3.3 Methods of data collection

There are a number of techniques for data collection available for social science research. The one or combination to be used depends on the nature of research, time and cost limits, and the researcher's training. With such in mind, this study utilized structured interviews by way of standard interview schedules addressed to household heads and bearing both open-ended and closed-ended questions. Key informants were interviewed informally. Observation and secondary data was also utilized. Let us consider each in turn.

Interview Schedules: These consisted of both open-ended and closed-ended questions, and were addressed to the heads of households. The interview schedules were administered in face-to-face interviews and the responses were recorded in the spaces provided or were ticked in cases of closed questions. The study strived to balance the use of closed-ended questions and open-ended ones, but in the end closed-ended questions were more.

Informal Interviews: These were conducted with the key informants mentioned above. The aim of these interviews was to clarify certain issues which we thought were not adequately captured in the interview schedules addressed to the heads of households. This technique provided varied qualitative information that was useful for this study. This technique accommodated opinions and expectations, which were filtered usefully during data analysis.

Observation: This technique is the core of social science research and yields some of the most useful and instantly relevant data. For the same reasons however, it has been

accused of being mostly subjective in orientation. This study therefore used it cautiously and selectively. The researcher attended agricultural demonstrations, barazas, women group meetings, youth group meetings and welfare group meetings at times when the extensionist was in attendance to observe the nature of interaction, record the items discussed and their flow in discussion, and the place of agricultural extension in group activities.

Secondary Data: Monthly reports and statistical records both in the possession of technical assistants and at the divisional headquarters were used. Archival materials were also utilized.

3.4 Statistics used in analysis

The data obtained from this study was analyzed using both descriptive and inferential statistics. Godfrey (1977:5) has shown that descriptive statistics comprises ways of reducing such an indigestible mass into forms which can be clearly appreciated. In other words, it makes the figures convey more vividly the information they represent. Inferential statistics go beyond that to deal with relationships and associations between two or more variables and variations within them. The quantitative statistics utilized are: the chi-square (X^2) test and the coefficient of correlation (r). The computer was largely relied on in the data analysis exercise. First, descriptive analysis using the statistical package for social sciences (SPSS) was employed to give a general picture on farmers' participation, food production, farmers' adoption of improved farm practices and levels of living. Indicators for the various variables were allocated one score each and the

scores aggregated for each variable and respondent. On the basis of aggregate scores, categories were created on which cross-tabulation and statistical analysis was hinged. Second appropriate statistical tests such as the Chi-square (X^2) test and the coefficient of correlation (r) were used with the assistance of the computer in understanding whether or not relationships existed between variables, their strengths and in the testing of hypotheses. Each is briefly explained.

Chi-square (χ^2) test: This is a test of the overall fit of one set of data with another. The null hypothesis is that there is no difference between the two populations from which the data came, that is, that the fit ought to be perfect apart from sampling errors in collecting the data (Godfrey (1977:118). The test is used in testing the association between two variables (independent and dependent variables). In this case, it was for instance used in testing for association or lack of it between agriculture extension methodology employed and farmers' adoption of improved agricultural practices. This was used for testing all hypotheses.

Pearson's Coefficient of Correlation (r): This is used to determine the degree of association or relationship between pairs of variables (the independent and the dependent). It was used for the same purpose. The Pearson's coefficient of correlation was used in testing hypotheses 1, 3 and 4.

3.5 Operationalization of variables

This section of the paper acts as the key to the whole. There are almost as many perceptions of a concept in the social sciences as there are investigators. It therefore

becomes compelling to show what the various concepts in the hypotheses mean in this study and more importantly show how they were measured.

HYPOTHESIS 1.

Farmers' participation in the process of agricultural extension is the independent variable in this hypothesis. This variable was perceived as farmers' active involvement in extension activities such as seeking out for extension advice, attending educational films and field days. This variable was measured by assigning one score for each indicator demonstrated by a farmer. The indicators were:

- . Farmer identified own farm problems.
- . Farmers' own initiative to seek and secure solutions to farm problems.
- . Farmer approached extensionists for agricultural information.
- . Farmer set priorities for extension advice.
- . Farmer's involvement by extension agents in their advice process.
- . Farmer's membership in local welfare / women's groups involved in farm activities.
- . Farmer's involvement in public functions (barazas, agricultural shows, field days, educational trips/films etc.
- . Farmer's readership of newspapers and agricultural magazines.
- . Farmer's own innovativeness.
- . Farmer's sharing of own innovations with other farmers and agriculture extension agents.

The scores ranged from zero (0) for those farmers who were non-participative in the agriculture extension process to ten (10) for those who were fully participative. On the basis of the scores, participation was considered at three levels :

Low (< 3 scores).

Average (4 - 7 scores).

High (> 8 scores).

Adoption of improved farm practices is the dependent variable in the hypothesis. This referred to the actual take-up and utilization of certain new or improved agricultural techniques as recommended by agriculture extensionists. This variable does not include the whole concept of agricultural development, it only covers agricultural improvement. This variable was measured with such indicators as:

- . Use of hybrid maize seeds for planting every planting season.
- . Planting maize in rows.
- . Use of chemical fertilizers for planting.
- . Use of chemical fertilizers for top-dressing perennial crops.
- . Use of pesticides for protection of crops and livestock.
- . Use of credit for agricultural activities.
- . Take-up of cash crops such as tea, coffee and pyrethrum.
- . Take-up of soil and water conservation measures such as contours and their maintenance.
- . Take-up of afforestation.
- . Take-up of farm record keeping.

The various indicators of the variable, adoption, were allocated one score respectively wherever they occurred. The scores ranged between zero (0) for those who had not adopted any of the farm practices to ten (10) for those who had adopted the highest number of items. Adoption was then perceived at three levels :

Low (< 3 scores),

Average (4 - 6 scores), and

High (> 7 scores).

HYPOTHESIS 2.

Agriculture extension methodology is the independent variable in this hypothesis. This variable refers to the channel by which the farmer mostly received agricultural information. Three methodologies were conceived as follows:

- Whether a respondent received agricultural messages directly as contact farmer or host/visitor of agricultural extensionist?
- Whether a respondent received agricultural messages in group situations?
- Whether a respondent received agricultural messages indirectly from friends, relatives and/or neighbours?

Adoption of improved farm practices is the dependent variable in this hypothesis and was viewed and measured as indicated under hypothesis 1 above.

HYPOTHESIS 3.

Farmers' adoption of improved farm practices is the independent variable in this hypothesis and was measured and perceived as shown under hypothesis one.

Self-sufficiency in food production is the dependent variable. This refers to the farm family's ability to produce within their farm units, enough food particularly in terms of staples and vegetables, to feed the family for a whole season without buying to supplement.

This variable was measured by assigning one score to each occurrence of the following indicators:

- . Farmer's planting food crops on own farm.
- . Farmer did not purchase maize for consumption during year prior to interview.
- . Farmer did not receive any food relief during year prior to interview.
- . Farmer had half or more of his/her land acreage under food crops during year of interview.
- . Farmer's house-hold had three or more meals per day.
- . Farmer had not given up any food-crops since adopting new farming practices.
- . Farmer felt had capacity to provide staples for own house-hold throughout the year.
- . Farmer assessed his or her house-hold's nutritional status as high or very high.

The total scores ranged between zero (0) for those without relative food self-sufficiency and eight (8) for those with the highest relative food self-sufficiency. The variable was categorized to three levels :

Low (< 3 scores),

Average (4 - 5 scores), and

High (> 6 scores).

This hypothesis sought to find out if those farmers who had adopted a greater number of improved agricultural practices also manage to produce sufficient food for their families.

HYPOTHESIS 4.

Several studies (Rogers (1969), Chitere (1976) and, Chitere (1991), have analyzed and established the role of personal characteristics and Socio-economic Status variables among others, in the adoption of new or improved farm practices. The present study will therefore not revisit the variables, it branches in another direction to find out whether farmers' adoption of new or improved farm practices leads to improved living conditions among farm families. This hypothesis seeks that out.

The variables in this hypothesis are:

Adoption of improved farm practices is the independent variable and was treated and measured as indicated under hypothesis 1 above.

Levels of living of farm families is the dependent variable. This variable basically referred to the farm families' levels of socio-economic welfare. This variable also targeted data on motives behind farmers' adoption of improved farm practices.

In measuring this variable for purposes of statistical analysis, the presence of the following conditions were allocated one score each:

- Farmer had permanent or semi-permanent main house.

- . Farmer's agricultural income was increasing during the period 1991 - 1992.
- . Farmer's total income in 1992 was US \$ 375 (Kshs 11,000) or more.
- . Farmer operated other businesses other than farming.
- . Farmer had all children duly enrolled in schools.
- . Farmer owned radio(s).
- . Farmer owned television set(s).
- . Farmer owned vehicle(s).
- . Farmer owned wheel barrow(s).
- . Farmer owned bicycle(s).
- . Farmer owned water tank(s).
- . Farmer owned water well(s)/borehole(s).
- . Farmer adopted modern agricultural practices mainly to increase yields and secure income for other businesses.

The scores were summated for each respondent , and they ranged between zero (0) for those with the lowest level of living to thirteen (13) for those with the highest level of living. The variable was on that basis perceived at three levels:

Low (< 4 scores),

Average (5 - 8 scores), and

High (> 9 scores).

3.6 Conclusion

In this chapter, variables were operationalized and it was shown that data for this study was collected in Nyamira District. Sampling was done through multi-stage cluster technique, and the survey drew 35 household heads from each of the three administrative sub-locations sampled.

It was stated that the data analysis exercise utilized descriptive statistics as well as inferential statistics including the chi-square test, and the coefficient of correlation.

CHAPTER IV

DATA PRESENTATION

This chapter provides data on the major variables of this study: farmers adoption of improved farm practices, their participation in agricultural extension, the agricultural extension methodologies employed, farmers's self-sufficiency in food production and their levels of living at farm family levels.

4.1 Farmers' Adoption of improved Farm practices.

The present study held that the ultimate goal of agricultural extension was to elicit adoption of modern or improved agricultural practices among farmers (clients). The main assumption of this study was that agricultural extension service bore information on improved agricultural practices and that the service's 'raison detre' was to have farmers adopt the practices. The study therefore sought to study the adoptions.

In this section data in the adoption of each of the improved farm inputs and practices which are re-stated below are presented:

- . Hybrid maize seeds
- . Chemical fertilizers for planting
- . Chemical fertilizers for top-dressing
- . Farm credit
- . Pesticides
- . Planting maize in rows
- . Soil and water conservation

Agroforestry

Farm record keeping

Cash crops

a) Hybrid maize seeds. Maize is the staple food in Nyamira District. This study contended that improvement in maize husbandry would commence with acceptance of the high yielding hybrid maize seeds. It was expected that this could raise yields per hectare and go along way to ameliorate food shortages in the district. Respondents were asked to state whether or not they used hybrid maize materials for planting, and their responses were as shown in Table 4.1 below.

Table 4.1 Distribution of Respondents According to usage of hybrid maize seeds.

| Hybrid maize seeds | Frequency | Percent |
|--------------------|-----------|---------|
| Yes | 90 | 85.7 |
| No | 15 | 14.3 |
| Total | 105 | 100 |

Source: 1993 Survey Data.

As shown in Table 4.1, 85.7% of the respondents had accepted hybrid maize seeds for planting while 14.3% had not accepted the planting materials. As expected therefore acceptance of the superior planting materials, hybrid maize was high in the study areas.

The respondents were then asked how frequently they used hybrid maize seeds for planting and it was found that 80.0% of the respondents had used hybrid maize seeds every planting season, 5.7% used them occasionally and 14.3% did not use them at all.

Actual usage of hybrid maize seeds was therefore found to be high and regular among the farmers sampled.

b) **Chemical Fertilizers.** This study held that the use of chemical fertilizers by farmers was likely to lead to a great improvement in their agricultural practices, especially because of shrinking acreage occasioned by rising population. Respondents were asked whether or not they used chemical fertilizers and their responses are shown in Table 4.2 below.

Table 4.2 Distribution of the Respondents According to their use of Chemical Fertilizers.

| Used chemical fertilizer? | Frequency | Percent |
|---------------------------|-----------|---------|
| Yes | 95 | 90.5 |
| No | 10 | 9.5 |
| Total | 105 | 100 |

Source: 1993 Survey Data.

Table 4.2 shows that majority of the respondents (90.5%) used chemical fertilizers in their fields while a lower percentage (9.5) did not use chemical fertilizers at all. The implication is that fertilizer use in farming activities among the respondents was high.

The respondents were asked how frequently they used the chemical fertilizers in their fields. This was in order to determine the persistence of use of chemical fertilizers among farmers in the study areas. It was found that 1.0% of the respondents used chemical fertilizers every planting season while 39% of them used fertilizers, both yearly

for perennial crops such as tea and coffee and every planting season for annual crops. Some 50.5% of the respondents used chemical fertilizers yearly for perennial crops alone, and 9.5% of the respondents did not use chemical fertilizers on their farms. What emerges clearly from these data is that most of the chemical fertilizers used in the study areas was used on perennial crops which are mainly tea and coffee. As expected, in general chemical fertilizers were widely used by the respondents.

c) **Farm Credit.** Agriculture is the mainstay of the Nyamira District economy. This study contended that farmers who hoped to commercialize their farming could rely largely on their agricultural base to increase their working capital and diversify their farming activities. Use of farm credit was therefore considered a significant innovation and a big stride in the direction of agricultural improvement. Respondents were asked to state whether or not they had received any agricultural credit for use in their farms and their responses are tabulated in Table 4.3.

Table 4.3 Distribution of the respondents according to receipt of Agricultural credit.

| Received Agricultural Credit? | Frequency | Percent |
|-------------------------------|------------|--------------|
| Yes | 5 | 4.8 |
| No | 100 | 95.2 |
| TOTAL | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that only 4.8% of the respondents had received agricultural credit for use in their farms, while the majority (95.2%) had not received any credit.

The implication was that agricultural credit facilities were poorly used or were actually scanty in the study areas.

When inquiry was made on how the credit received was expended, the responses were that 2.9% of the respondents used the agricultural credit they received to purchase cows while 1.9% of them used the credit in buying both cows and pyrethrum seedlings. The remaining 95.2% of the respondents had not received any credit. The implication was that agricultural credit received by farmers in the study area was put into good and relevant use, and invariably that a wider coverage by the credit facilities will go a long way in improving agriculture in the study areas.

This study also sought to know the security that was provided for the agricultural credit. When the question on loan security was posed to the respondents, 4.8% who had received agricultural credit used land title deeds as the security for acquiring the loans. The 95.2% remaining had not received agricultural credit. The importance of land title deeds in the acquisition of loans and invariably in agricultural improvement can therefore not be overemphasized.

Finally, this study held that the acquisition of agricultural credit without its full and timely repayment could be dysfunctional to the farming community and to the wider society which facilitates the availability of credit funds. The respondents were therefore asked to state whether or not they were able to repay the loans fully and on time. It was found that 2.9% of the respondents were able to repay their loans fully and on time while 1.9% of them were unable to do so. About 95% had not received agricultural credit. No decisive conclusion can be made about the default as the number of cases are too few.

d) Use of Pesticides. This study recognized that unabated prevalence of pests may cause havoc to the agricultural enterprises. It was therefore averred that an improved agriculture should be able to check pests, especially by way of applying pesticides. Respondents were asked to state whether or not they applied pesticides in the course of their farming activities and their responses are shown in Table 4.4 below.

Table 4.4 Distribution of the respondents according to their use of pesticides.

| Pesticides? | Frequency | Percent |
|-------------|-----------|---------|
| Yes | 90 | 85.7 |
| No | 15 | 14.3 |
| Total | 105 | 100 |

Source: 1993 Survey Data.

According to Table 4.4, 85.7% of the respondents applied pesticides in their agricultural activities while 14.3% of them did not. It was therefore likely that agricultural destruction due to pests was minimized through the use of these pesticides.

In order to cross-check the information in Table 4.4 and to find out the respondents' understanding of pesticides usage, they were asked to state the use into which they put pesticides. Their responses were that 47.6% of them used pesticides treating maize seeds in storage, 3.8% of them used pesticides on tomatoes and peas, and 2.9% of them used the pesticides on vegetables. Some 3.8% of the respondents used pesticides treating vegetables and peas as well as maize in storage. On the other hand 27.6% used pesticides both to treat maize in storage and on vegetables.

e) Pattern of planting maize. This study contended that with shrinking farm sizes in the study areas, farmers hoping to improve their farming could follow agricultural extension agents' recommendations on maize planting. The recommendations investigated by this study were to do with planting maize in rows using the required spacing.

Respondents were asked to state whether or not they planted maize in rows on their farms and their responses are indicated in Table 4.5, below.

Table 4.5 Distribution of the respondents according to whether or not they planted maize in rows.

| Planted Maize in rows? | Frequency | Percent |
|------------------------|-----------|---------|
| Yes | 100 | 95.2 |
| No | 5 | 4.8 |
| Total | 105 | 100 |

Source: 1993 Survey Data.

Table 4.5 reveals that 95.2% of the respondents planted maize in rows while 4.8% of them did not. Those who did not, usually had small farm units and planted haphazardly, although they did not broadcast the seeds. Spacing of maize seeds at the time of planting comes to bear on the yields to be expected at the point when maize plants compete for light, nutrients and space. This study contended that observation of the technically recommended spacing (about 75cm by 25cm)⁷ could lead to maximization

⁷ Personal communication with Technical Assistant, North Kitutu location, Nyamira District (1993).

of maize yields per hectare. Respondents were asked to state the spacing they used in planting their maize and their responses were that 23.8% of them used a spacing of 60 cms by 60 cms, 15.2% of them used a spacing of 75 cms by 30 cms. Some 15.2% of them used a spacing of 60 cms by 30 cms, 31.5% of them used a spacing of 75 cms by 60 cms, and 9.5% of them employed a spacing of 90 cms by 30 cms. As indicated earlier 4.8% of the respondents did not plant maize in rows and hence did not use the above spacing. The implication is that majority of the respondents did not adhere to technically recommended spacing.

f) **Farmers' soil and water conservation efforts.** Soil and water conservation efforts at farm level were considered by this study a strong indicator of farmers' improvement of farm practices. This was because soil and water conservation assured increased farm output then and in future. For those reasons respondents were asked to enumerate the soil and water conservation measures they undertook on their farms and their responses are shown in Table 4.6 below.

Table 4.6 Distribution of the respondents according to the measures they took against soil erosion and water loss.

| Measure(s) | Frequency | Percent |
|---|------------|--------------|
| None | 7 | 6.7 |
| Contours | 25 | 23.8 |
| Napier grass planting | 4 | 3.8 |
| Terracing | 3 | 2.9 |
| Planting trees | 9 | 8.6 |
| Contours and napier grass planting | 22 | 20.9 |
| Contours and terracing | 9 | 8.6 |
| Contours and tree planting | 2 | 1.9 |
| Terracing and napier grass planting | 5 | 4.7 |
| Napier grass and tree planting | 5 | 4.7 |
| Terracing and tree planting | 3 | 2.9 |
| Contours, terracing & napier grassing | 4 | 3.8 |
| Contours, napier grassing & tree planting | 7 | 6.7 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

As exhibited in Table 4.6, only 6.7% of the respondents did not take any water and soil conservation measures. The remaining 93.3% took one soil and water conservation measure or another, or a combination of them. It is clear from Table 4.6, that contours were the most popular measure taken to conserve soil and water as 23.8% of the respondents used it as the only measure, and a further 20.9% combined it with napier grass growing, 8.6% and 1.9% of them combined it with terracing and tree planting respectively and at least 10.5% of the respondents combined it with two other methods. What emerges from the Table is that water and soil conservation efforts were widely made by the farmers sampled.

g) *Farmers' adoption of agroforestry.* Agroforestry is now widely recommended in rural areas, for it is a practice that attempts a solution to many rural problems including food shortage, and shortage of fuel wood. This study considered its adoption as a step in the direction of agricultural improvement. Respondents were asked to state whether or not they practiced agroforestry and their responses are shown in Table 4.7 below.

Table 4.7 Distribution of the respondents according to their adoption of agroforestry.

| Adopted agroforestry? | Frequency | Percent |
|-----------------------|-----------|---------|
| Yes | 95 | 90.5 |
| No | 10 | 9.5 |
| Total | 105 | 100 |

Source: 1993 Survey Data.

The data displayed in Table 4.7 reveals that 90.5% of the respondents had adopted agroforestry, while 9.5% of them had not. This implied that agroforestry was a widespread practice among the respondents.

The study pursued the issue of agroforestry further, by inquiring into the reasons for its practice. In response, the respondents enumerated the reasons as firewood (6.7%), soil conservation (2.9%), firewood, construction and timber (24.7%), firewood and timber (17.1%), firewood, soil conservation and construction (7.6%) and firewood, fencing and construction (23.8%). Other reasons were; construction and soil conservation (2.9%), and firewood, soil conservation and timber (4.8%).

The implication is that agroforestry related to soil conservation and fencing which had direct consequences for agricultural improvement, was widely practiced by the respondents. Income realized from the sale of firewood derived from agroforestry would probably likely bear on agricultural improvement by way of a shift of expenditure from fuel wood to farm inputs or acquisition of farm labour.

h) **Farm record keeping.** This study held that improvement or refinement of any practice such as agriculture comes out of experience and that experience is a result of memory retrievals or reference to records kept over time. It was expected that farmers would keep records in order to accumulate experience that would keep them informed of the costs of their farm operations.

Respondents were asked to state whether or not they kept farm records and the results were as exhibited in Table 4.8 below.

Table 4.8 Distribution of the respondents according to their take-up of farm records keeping.

| Taken up record keeping? | Frequency | Percent |
|--------------------------|-----------|---------|
| Yes | 30 | 28.6 |
| No | 75 | 71.4 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

Table 4.8 shows that 28.6% of the respondents had taken up farm record keeping while 71.4% of them had not adopted the practice. What emerged then was that farm

record keeping was not widely practiced by the respondents. This was as expected in a rural community that is largely less literate.

The study also undertook an inquiry into the types of records farmers kept and the responses elicited were that financial records were the most widely kept as 9.5% of the respondents kept them, followed by records combining inventories (records of all possessions), financial and farm operations kept by 4.8%, farm operations records kept by 3.8%, inventories and a combination of financial and farm operations records kept by 2.8% and combinations of inventories and farm operations records and inventories and financial records kept by 1.0% of the respondents. Other types of records such as sources of farm inputs and dates of visits by agricultural extensionists were kept by 6.7% of the respondents.

Overall, a wide array of records were kept by the farmers sampled. A majority of the respondents (71.4%) did not keep records. The assumption was that if the practice of farm record keeping were widely accepted then there is potential for comprehensive records and farm planning, and decision making would proceed from a position of strength.

i) *Farmers' adoption of cash crops.* Since the colonial days cash crops have been considered the hall mark of agricultural improvement (for instance see Hall, 1936). This study held that the adoption of cash crops was a necessary part of agricultural improvement as it generated income for farm families and provided opportunities for diversification and refinement of agricultural activities. Respondents were asked to state which cash crops they had adopted and their responses were as shown in Table 4.9 below.

Table 4.9 Distribution of respondents according to cash crops adopted

| Cash crop | Frequency | Percent |
|--------------------------------|-----------|---------|
| None | 12 | 11.4 |
| Tea | 48 | 45.7 |
| Coffee | 3 | 2.9 |
| Pyrethrum | 2 | 1.9 |
| Passion fruits | 1 | 1.0 |
| Sugar Cane | 3 | 2.9 |
| Tea and Coffee | 20 | 19.0 |
| Tea and Pyrethrum | 6 | 5.7 |
| Tea and passion fruits | 2 | 1.9 |
| Tea and Sugar cane | 2 | 1.9 |
| Tea, Coffee and Pyrethrum | 4 | 3.8 |
| Tea, Coffee and Passion fruits | 2 | 1.9 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 11.4% of the respondents had not adopted any cash crop. It further shows that tea was the most widely adopted cash crop as 45.7% of the respondents had it as the sole cash crop, 19% of the respondents combined it with coffee, 5.7% combined it with pyrethrum, 1.9% combined it with sugar cane, 3.8% and 1.9% combined it with coffee and pyrethrum and, passion fruits and coffee respectively. As sole cash crops for farmers, coffee and sugarcane were second to tea in importance with each having been grown respectively by 2.9% of the respondents. Passion fruits and pyrethrum were grown as the main cash crops by 1.0% and 1.9% of the respondents respectively.

It is clear from the data in Table 4.9 that cash crop farming was widespread in the study areas and that while a majority of the respondents (51.5%) grew one cash crop, 37.1% combined two or more cash crops.

j) *Distribution of the respondents According to their adoption of improved farm inputs and practices.* The scores obtained by each respondent on all of the ten indicators of the variable adoption listed earlier, were aggregated and they were distributed as shown in Table 4.10 below.

Table 4.10 Distribution of the respondents according to their levels of adoption of improved farm practices.

| Adoption scores | No. of respondents | Percent |
|-----------------|--------------------|--------------|
| High (> 7) | 17 | 16.2 |
| Average (4 - 6) | 74 | 70.5 |
| Low (< 3) | 14 | 13.3 |
| TOTAL | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that the level of adoption was high among 16.2%, average among 70.5% and low among 13.3% of the cases. The implication was that majority of farmers in the study areas were average with regard to agricultural improvement.

4.2 Farmers' Participation in Agricultural Extension Process.

This study contended that farmers' participation in the agricultural extension process positively affected their adoption of improved farm practices. That farmers who participated in the agricultural extension process were more likely to make a wide range of adoptions.

Data on participation of farmers in agricultural extension is presented in this section and the indicators dealt with are restated below:

- . Farmer's knowledge of farm problems
- . Farmer's attempts to solve farm problems
- . Farmer's initiative to consult agricultural extensionists
- . Farmer's setting priorities for agricultural extension advice
- . Farmer's involvement by extension agents in their advice process
- . Farmer's membership in self-help/women's groups
- . Farmer's attendance of public functions
- . Farmer's readership of Newspaper/agricultural magazines
- . Farmer's innovativeness at farm level
- . Farmer's sharing of own innovations with other farmers and extension agents

a) **Farmers' knowledge of farm problems.** Agricultural extension basically attempts to enable farmers solve farm problems. Farmers' knowledge of own farm problems was considered a strong indicator of their participation in the extension process, for that knowledge would be the basis of extension agents' intervention.

In the present study, respondents were asked to state the problems they faced in their farming activities and a summary of their responses is shown in Table 4.11 below.

Table 4.11 Farm problems.

| Problems | Frequency | Percent |
|--|-----------|---------|
| Lack of extension advice | 2 | 1.9 |
| Lack of finance | 2 | 1.9 |
| Meagre acreage | 1 | 1.0 |
| Lack of advice in combination with lack of finance and meagre acreages | 79 | 75.2 |
| Others | 21 | 20.0 |
| Total | 105 | 100 |

Source: 1993 Survey Data.

The Table shows that all the respondents were able to mention one farm problem or other. It further shows that 1.9% of the respondents mentioned lack of advice from agricultural extensionists as their only problem, while 75% of them mentioned lack of advice from agricultural extensionists in combination with lack of finance and meagre acreages. The implication was that at least 77% of the respondents realized the need for agricultural extension service as a basis for their agricultural improvement. In that respect the respondents were highly participative in the extension process by way of identifying problems affecting their farming activities.

b) *Farmers' attempts to solve farm problems.* This study also sought to know how the respondents proceeded to solve the various problems that they mentioned. The responses recorded are shown in Table 4.12 below.

Table 4.12 Distribution of the respondents according to how they proceeded to solve their farm problems.

| Response | Frequency | Percent |
|---|------------|--------------|
| Go out for advice from friends | 45 | 42.8 |
| Go out for advice from agric. extensionist | 15 | 14.2 |
| Waits until extensionist visits farm | 3 | 2.9 |
| Takes no step | 5 | 4.7 |
| Seek advice from traditional cooperative | 9 | 8.6 |
| Consults agricultural text books | 1 | 1.0 |
| Seeks advice from friends and extensionists | 25 | 23.8 |
| Seeks advice from friends and trad. cooper. | 1 | 1.0 |
| No response | 1 | 1.0 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 42.8% of the respondents approached friends for advice in solving their farm problems while 14.2% of them approached agricultural extensionists. Some 4.7% of the respondents took no step to solve their farm problems as 2.9% waited for agricultural extensionists to visit them in order to solve their farm problems. Eight percent sought advice from traditional cooperative groups, 1.0% consulted agricultural textbooks, 23.8% combined friends and agricultural extensionists as their source of advice while 1.0% utilized both friends and traditional cooperative groups for advice in solving their farm problems. Overall 91% of the respondents took their own initiative to seek advice or assistance, whether official or informal to solve known farm problems. This way they also influenced the kind of advice they received from agricultural extension agents by sensitizing the agents to their specific farm problems.

c) *Farmers' initiative to consult agricultural extensionists.* The respondents were asked to state how frequently they had approached agricultural extensionists for advice in the previous year. Their responses are presented in Table 4.13 below.

Table 4.13 Distribution of respondents according to how frequently they approached agricultural extensionists for advice 1992.

| Regularity | Frequency | Percent |
|------------------|-----------|---------|
| Weekly | 3 | 2.9 |
| Monthly | 3 | 2.9 |
| Quarterly | 27 | 25.7 |
| Never approached | 72 | 68.6 |
| Total | 105 | 100 |

Source: 1993 Survey Data.

Table 4.13 demonstrates that 2.9% of the respondents visited agricultural extensionists weekly, 2.9% monthly and 25.7% quarterly. Majority of the respondents (68.6%) did not visit agricultural extensionists for advice. To this end therefore the respondents were on overall less participative in the extension process, in so far as they largely took no initiative to visit the agricultural extension agents. This implies that channels of communication between farmers and extension agents were ineffective. This is reinforced by the high number of farmers (see Table 4.15) who never had contact with agents.

d) *Farmers' priorities for agricultural advice.* The priority areas the respondents stated for agricultural advice are shown on Table 4.14 below.

Table 4.14 Distribution of the respondents according to their priority areas for advice.

| Priority areas | Frequency | Percent |
|-------------------------------------|------------|--------------|
| Tea | 41 | 39.0 |
| Coffee | 1 | 1.0 |
| Maize | 4 | 3.8 |
| Beans | 2 | 1.9 |
| Irish potatoes | 31 | 29.5 |
| Tea and maize | 11 | 10.4 |
| Maize and beans | 1 | 1.0 |
| Millet and beans | 2 | 1.9 |
| Tea, maize and vegetables | 2 | 1.9 |
| Maize, beans and millet | 4 | 3.8 |
| Tea, maize, millet and beans | 1 | 1.0 |
| Maize, millet, beans and vegetables | 1 | 1.0 |
| Tea, coffee, maize, beans, millet | | |
| Pyrethrum and vegetables | 1 | 1.0 |
| No response | 3 | 2.8 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that on overall 97.2% of the respondents were able to state one priority or other or a combination of them. This shows that the farmers were participative with regard to setting priorities for agricultural advice. It is to be noted that tea was the modal priority area with 39.0% of the respondents giving it priority, followed by irish potatoes prioritized among 29.5% of the respondents. Other than irish potatoes, which surprisingly is not a common food crop in the study areas, food crops were least prioritized by the respondents for technical advice. For instance maize and beans, the staple food combination in the district was prioritized by a mere 1.0% of the respondents.

e) Farmers' involvement by extension agents in their advice process. When the respondents were asked about the agricultural extensionists technique in the process of advising them, their responses were as shown on Table 4.15 below.

Table 4.15 Distribution of the respondents according to their involvement by agricultural extensionists in the advice processes.

| Extensionists' manner of advice | Frequency | Percent |
|-----------------------------------|-----------|---------|
| Giving alternatives for selection | 18 | 17.1 |
| Persuading | 43 | 41.0 |
| Directing | 13 | 12.4 |
| No contact | 28 | 26.6 |
| No responses | 3 | 2.9 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

Table 4.15 shows that 17.1% of the respondents were given alternatives from which to choose, 41.0% were persuaded to make some adoption while 12.4% were directed to make adoptions. What emerged was that on the overall 58.1% of the respondents had opportunities to participate in reaching decisions for their farm actions, compared to 12.4% who were directed in the extension process. However, 26.6% of the respondents indicated they had no contact with extension agents.

f) Farmers' membership in self-help/women's groups. This study contended that membership of farmers in self-help or women's groups constituted a basis for participation in the extension process. Indeed it was expected that those who maintained membership had more chances of encountering agricultural extension agents or at least

some new or improved farming idea, than could be the case for non-members. The respondents were asked whether or not they were members of self-help or women's groups and their responses are shown in Table 4.16 below.

Table 4.16 Distribution of the respondents according to whether or not they were members of self-help or women's groups.

| In membership? | Frequency | Percent |
|----------------|-----------|---------|
| Yes | 74 | 70.5 |
| No | 31 | 29.5 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

It can be observed from Table 4.16 that 70.5% of the respondents were members of self-help or women groups while 29.5% were non-members. The implication was that the majority of respondents (70.5%), participated in group activities and were therefore potentially highly participative in the agricultural extension process.

When the respondents were asked how their farming activities had benefitted from the groups in which they were members, their responses were; 8.6% of the respondents had not benefitted from self-help and women's groups, 48.6% of them had received information on better farming methods, 3.8% of them had received information on sources of farm inputs and some 2.8% of the respondents had received information on marketing outlets for their farm produce.

Despite the fact that benefits from self-help or women's groups did not apply to 36.2% of the respondents, as expected majority of the respondents (55.2%) had

benefitted from self-help and women's groups. This finding confirms the study's initial expectation that group membership constituted a basis for active participation in agricultural extension process.

g) *Farmers' attendance of public functions.* This study anticipated that farmers who attended public functions such as agricultural shows, public barazas, self-help group meetings, women's group meetings, educational films and trips, as well as agricultural demonstrations, would have a chance to participate in the agricultural extension process better than those who otherwise did not attend the functions. The study contended that agricultural issues dominated the agenda of the said public functions. A summary of the responses on attendance of the functions is shown in Table 4.17.

Table 4.17 Distribution of the respondents according to their attendance of public functions of agricultural importance.

| Function(s) | Frequency | Percent |
|---|------------|--------------|
| Agricultural shows | 7 | 6.7 |
| Public barazas | 16 | 15.2 |
| Self-help groups (SHG) meetings | 4 | 3.8 |
| Women group meetings | 1 | 1.0 |
| Agricultural demonstrations & shows | 1 | 1.0 |
| Agricultural demonstrations & public Baraza | 2 | 1.9 |
| Agricultural demonstrations & SHG meetings | 1 | 1.0 |
| Agricultural shows & educational films | 1 | 1.0 |
| Agricultural shows & public barazas | 14 | 13.3 |
| Public barazas & educational trips | 7 | 6.7 |
| Various other combinations of functions | 48 | 45.5 |
| Non-attendance | 3 | 2.9 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 6.7% of the respondents attended agricultural shows, 15.2% attended public barazas, 3.8% attended self-help group meetings, 1.0% attended women's group meetings, 1.0% attended agricultural demonstrations/field days and shows, 1.9% attended a combination of agricultural demonstrations/field days and public barazas, and 1.0% attended both agricultural demonstrations/field days and self-help groups meetings. It is to be noted further, that 1.0% attended both agricultural shows and educational films, 13.3% attended both agricultural shows and public barazas and 6.7% attended both public barazas and educational trips.

About 45% attended one combination or other of the functions mentioned on Table 4.17 while 2.9% did not attend any functions. As expected therefore, majority of the respondents (97.1%) attended one or other function, or some combination of functions which this study considered of importance to agricultural improvement. The respondents were in this respect participative in the extension process.

This study further contended that participation in the various functions shown in Table 4.17 would benefit the participants with regard to their agricultural activities.

When the question on how they had benefitted from the functions was posed to them, their responses were that 9.5% of the respondents benefitted from the functions they attended by way of being able to grow more food crops, 1.0% by growing napier grass, 55.2% by adopting various better methods of farming, 1.0% by adopting poultry raising and 3.8% by growing more food crops and napier grass.

Some 10.5% were able to grow more food crops and to adopt modern farming methods while 2.9% grew napier grass and had adopted better farming methods as a

result of attending the various functions, while 3.8% of the respondents benefitted from attending the functions by growing more food crops, nippier grass and adopting various better farming methods, 12.3% of the respondents, had not benefitted from the functions.

On the overall majority of the respondents (87.7%) had benefitted from attending the various public functions in one way or another. The implication was that their participation in the various functions helped to improve their agricultural practices.

h) *Farmers' Readership of Newspapers/Agricultural Magazines.* The study averred that certain agricultural magazines and even daily papers constituted a powerful source of agricultural information and that their readership formed a strong indicator of participation in the agricultural extension process. An inquiry into the respondents' readership of magazines yielded the data on Table 4.18 below.

Table 4.18 Distribution of the Respondents according to their Readership of Agricultural Magazines and Newspapers.

| Readership Regularity | Frequency | Percent |
|-----------------------|-----------|---------|
| Monthly | 6 | 5.7 |
| Quarterly | 3 | 2.9 |
| Does not read at all | 76 | 72.4 |
| Not applicable | 20 | 19.0 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table demonstrates that 5.7% of the respondents read Newspapers and agricultural magazines once monthly, 2.9% of them read the same once quarterly, 72.4% did not read at all, while 19% of the respondents had no idea about the literature or

thought the same did not apply to them. The outstanding finding was that readership of agricultural magazines was very low and infrequent. The implication of this finding was that in so far as readership of agricultural magazines was concerned participation of the farmers in the agricultural extension process was very low.

i) **Farmers' innovativeness at Farm Level.** This study held that agricultural extension that was participative would draw from farmers' knowledge much as it added to the same knowledge. In ascertaining whether or not the farmers had anything to offer to the extension process, respondents were asked if in the course of their usual farming activities they had come across any idea(s) or practice(s) which they thought would improve farming in their area. Their responses to the question are shown in Table 4.19 below.

Table 4.19 Distribution of Respondents According to whether or not they had come across a farm innovation.

| Come across a farm innovation? | Frequency | Percent |
|--------------------------------|-----------|---------|
| Yes | 71 | 67.6 |
| No | 32 | 30.5 |
| No response | 2 | 1.9 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that majority of the respondents (67.6%) had in the course of their farming activities come across ideas or practices which they considered capable of improving agriculture in their area, while the minority (30.5%) had not come across any

such ideas or practices. The implication is that the respondents are a very conscious group in terms of their farming techniques. This way they can be seen as highly participative.

When this study sought to know the type of innovations which the respondents had come across, it was found that banana variety was the modal innovation having been encountered singly by 21.9% of the respondents, besides the several incidences in which that idea was in combination with others. This dominance of bananas was due to the fact that bananas are widely grown in Nyamira District and are an important part of the wider Gusii economy. It is clear that many of the farm innovations were on food crops. This finding corroborates FAO's (1983: 62) that the small holder farmers in Fantua, Kaduna state, Nigeria were attracted to more profitable innovations especially those that helped food self-sufficiency. In terms of participation therefore it is appreciated that the respondents sought after innovations that could increase their food production. This was much clearer when the respondents were asked how they had used the innovations.

j) *Farmers' sharing of their own innovations with others* The study found out that 20.0% of the respondents perfected the innovations they encountered for their own benefit, 29.5% of the respondents shared the innovations with neighbours, 6.6% told the agriculture extensionists about the innovations, 1.9% perfected for own benefit as well as sharing with neighbours, 4.8% perfected the innovations for own benefit as well as told extensionists and a further 3.8% shared with neighbours and at the same time told it to agricultural extensionists. One percent of the respondents perfected the innovations for own benefit, shared with neighbours as well as telling the extensionists about the

innovations. What emerges then is that 48.6% of the respondents shared the innovations they encountered in one way or another. It is also clear that the agricultural extensionists were one group which also received ideas from ordinary farmers. The implication then is that farmers participated to a substantial extent in the agricultural extension process by way of having an input in to the process.

Distribution of the respondents according to their participation in the agricultural extension process. The scores obtained by each of the respondents on all of the 10 indicators of the variable participation listed earlier, were added up and the distribution was as shown in Table 4.20 below.

Table 4.20 Extent to which farmers participated in the agricultural extension process.

| Level of participation (scores) | Frequency | Percent |
|---------------------------------|-----------|---------|
| High (> 8) | 18 | 17.1 |
| Average (5-7 scores) | 74 | 70.5 |
| Low (< 4 scores) | 13 | 12.4 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that the level of participation was high among 17.1%, average among 70.5% and low among 12.4% of the respondents. The implication is that majority of the farmers in the study areas participated averagely in the extension process.

4.3 Agricultural extension methodologies employed.

This study held that the methodologies agricultural extensionists employed in their work with farmers determined the farmers' receptivity of their ideas and recommendations. In the same vein, the study expected agricultural extension methodology to affect the farmers' adoption of improved farm practices.

a) *The individual approach.* Nyamira is one of the districts in Kenya where the Training and Visit (T&V) approach to agricultural extension operates. This study expected that some farmers could be contact farmers receiving agricultural information from extension staff thereof. Respondents were asked to state whether or not they were 'contact farmers' for the Training and Visit (T&V) extension programme. Their responses were as shown in Table 4.21 below.

Table 4.21 Distribution of the farmers according to whether they were contact farmers of the Ministry of Agriculture.

| Contact farmers? | Frequency | Percent |
|------------------|-----------|---------|
| Yes | 8 | 7.7 |
| No | 97 | 92.3 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 7.7% of the respondents were contact farmers while the remaining 92.3% were not. The implication of this finding is that contact farmers were few in the study areas and that the contact farmer approach had not taken root.

The primary assumption of the contact farmers' approach in extension is that the information given to contact farmers will eventually trickle down to other farmers. Benor and Harrison (1977) and Benor and Baxter (1984) have shown that one mechanism through which technical advice spreads from the extension agent to other farmers is through contact farmers. They indicate that when the follow-up farmers see what the contact farmers try in their fields and the results they achieve, this generates interest. This assertion is based on the assumption that interaction between contact farmers and other farmers is smooth, continuous and worthwhile. This however, may not be the case always. In this connection respondents who were contact farmers were asked to state the approximate number of farmers who visited their farms per month to learn from them. Their responses were as shown in Table 4.22 below.

Table 4.22 Distribution of the respondents according to the number of follow-up farmers they hosted each month.

| No. of visits | Frequency | Percent |
|----------------|-----------|---------|
| 1 - 100 | 1 | 1.0 |
| 101 - 200 | 4 | 3.8 |
| 201 - 300 | 3 | 2.9 |
| Not applicable | 97 | 92.3 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 1.0% of the respondents hosted between 1 and 100, 3.8% hosted between 101-200 and 2.9% hosted between 201-300 follow-up farmers each month. The implication was that the few contact farmers hosted large numbers of follow-

up farmers each month. This showed that if the number of contact farmers was increased then more and more farmers could be reached by the extension service.

It was imperative on this study to inquire into the problems contact farmers faced in their capacity as contact farmers. It was expected that this could bring out some of the weaknesses of the contact farmers' approach and therefore lead the way for future policy reconsideration.

When respondents were asked to state their problems as contact farmers their responses were that 4.8% of them reported the problem of other farmers being jealousy, especially on account of the farm demonstration materials they were given free by the Ministry of Agriculture. Some 2.9% of the respondents reported the problem of time wasting visits from other farmers. These latter farmers who complained of other farmers wasting their time were presumably not inclined to assisting other farmers to improve their farming, and were therefore not worth being contact farmers.

These results suggest that, the greatest problem the contact farmers approach to extension faced was that sometimes arrogant and selfish contact farmers were recruited and they prevented the trickle down of technical advice and in effect undermined the approach. The other problem, jealousy from other farmers that contact farmers experienced may be a drawback to communication between contact and other farmers owing to the reduced level of trust between them. This finding demonstrates that the unabated diffusion of innovations envisaged by the proponents of the T & V approach may not always be a reality. It is clear that farmer-farmer interaction in the study areas was curtailed by certain problems and that approaches to agricultural extension need to

plan to contend with such eventualities by probably shifting more and more to social groups where farmer's alliances and interaction are already defined, as is being done now in Kenya.

This study maintained, first, that contact farmers' acceptance to be identified so represented a positive attitude to that position. Equally it was held that those contact farmers who delighted themselves in being identified in this manner, could attract the attention of their follow-up neighbours. This could speed-up the trickle down process. It was held in this study that contact farmers would assist other farmers to make adoption of improved farm practices.

The respondents who were contact farmers were asked to state whether they liked being identified so (Table 4.23 below).

Table 4.23 Distribution of the respondents according to whether they liked being identified as contact farmers.

| Response | Frequency | Percent |
|----------------|-----------|---------|
| Yes | 6 | 5.7 |
| No | 2 | 1.9 |
| Not applicable | 97 | 92.4 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that 5.7% of the respondents who were contact farmers liked being identified in that manner, while 1.9% of them did not like being identified so.

What emerges from the data on Table 4.23, is that a majority of the contact farmers in the sample liked being identified as contact farmers of their communities. These contact farmers who favoured being identified as role model farmers of their communities were likely to be useful in disseminating technical advice to other farmers. Their acceptance to be identified as contact farmers implied that they were ready to live up to the expectations of these positions including helping other farmers make adoptions of improved farm practices.

Secondly, the study also held that contact farmers who considered that they deserved the positions were more likely to pursue the expectations accompanying the positions more vigorously than those who thought otherwise. The assumption was that one who knew he/she deserved the position would equally know what his obligation was, and this increased his/her chances to deliver the goods.

The contact farmer respondents, were for these reasons, asked to state whether or not they thought they deserved the positions. Their responses were as shown in Table 4.24 below.

Table 4.24 Distribution of the contact farmers according to whether they thought they deserved their positions.

| Deserved position? | Frequency | Percent |
|--------------------|-----------|---------|
| Yes | 6 | 5.7 |
| No | 2 | 1.9 |
| Not applicable | 97 | 92.4 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that 5.7% of the contact farmer respondents thought that they deserved while 1.9% of them did not think they deserved the positions.

The fact that some contact farmers felt that they did not deserve those positions implied that the process of their recruitment was questionable. This was because a method of selection based on merit should have ensured choice of contact farmers who were convinced that they deserved their positions and above all willing to live up to the expectations of their roles. Following these data it is probable that some contact farmers may have been handed the positions on the basis of friendship or other considerations.

Thirdly, it was considered that the contact farmers who thought that they deserved their positions should have known the reasons behind their entitlement to the positions. The study held that contact farmers who knew that they deserved their positions and why they did so were likely to be in a position to play their roles effectively. This being the case, the contact farmer respondents were asked to state why they thought they deserved those positions. Their responses were as shown in Table 4.25 below.

Table 4.25 Distribution of the respondents according to why they thought they deserved the positions of contact farmers.

| Reasons | Frequency | Percent |
|-----------------------|-----------|---------|
| Had farm well managed | 6 | 5.7 |
| Not applicable | 99 | 94.3 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 5.7% of the contact farmer respondents thought that they deserved those positions because their farms were well managed. The implication is that a majority of the contact farmers sampled knew why they merited their positions and the reason they provided of having managed their farms well implied that they fully understood their roles as contact farmers. This result is justified in view of the fact that it is from well managed farms that improved farming techniques can trickle down to other farms.

Finally the study maintained that contact farmers worth their positions had to be accessible to other farmers for advice and that this was likely to facilitate the flow of technical advice to the other farmers. It was held that contact farmers who were inaccessible were likely to slow down the spread of improved farming techniques. The study inquired from the non-contact farmer respondents what they thought about contact farmers they knew in terms of their accessibility for advice. Their responses are tabulated in Table 4.26 below.

Table 4.26 Distribution of the Respondents according to their Assessment of contact Farmers.

| Response | Frequency | Percent |
|-------------------------------|-----------|---------|
| Too Rich and Arrogant | 42 | 40 |
| Too christian and intolerant | 8 | 7.6 |
| Hospitable and assists freely | 46 | 43.8 |
| A witch,inaccessible | 1 | 1.0 |
| Not Applicable | 8 | 7.6 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that 40% of the respondents considered the contact farmers they knew to be too rich and arrogant, 7.6% considered them as too christian and intolerant, 43.8% regarded them as hospitable and willing to assist. Finally one percent considered them to be witches and inaccessible. The result implies that substantial numbers of contact farmers were perceived as unsuitable for their positions and that the farmers were not involved in their selection.

b) **The Group approach** This study held that soil and water conservation activities constituted a significant part of agricultural improvement and set out to inquire into the catchment approach which is used in these activities in high potential areas such as the study areas.

The inquiry centred on whether the farmers had participated in the activities, who had invited them to take part and their assessment of the approach. First, the respondents were asked to state whether or not they had taken part in group soil conservation activities in catchment areas. Their responses were as shown in Table 4.27 below.

Table 4.27 Distribution of the Respondents According to whether they had participated in catchment conservation activities.

| Engages? | Frequency | Percent |
|----------|-----------|---------|
| Yes | 75 | 71.4 |
| No | 30 | 28.6 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table demonstrates that 71.4% of the respondents had taken part in the activities. The implication is that the catchment approach to soil and water conservation is widely used in the study areas and that a majority of the farmers took part in the activities. Second, in order to establish the process of community mobilization for soil and water conservation activities, the study sought to find out who invited the farmers to take part in the catchment conservation activities. Their responses are shown in Table 4.28 below.

Table 4.28 Distribution of the Respondents According to who invited them to take part in catchment conservation activities.

| Who invited? | Frequency | Percent |
|--|------------|--------------|
| Assistant chiefs | 56 | 53.3 |
| Agricultural Extensionists | 10 | 9.5 |
| Both agricultural Extensionists & Ass.Chiefs | 2 | 1.9 |
| Village Headmen | 7 | 6.7 |
| Not applicable | 30 | 28.6 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 53.3% of the respondents were invited to take part in catchment conservation activities by assistant chiefs, 9.5% by agricultural extensionists, 1.9% by both agricultural extensionists and assistant chiefs and 6.7% by village headmen. What emerged from the data in Table 4.28 is that agricultural extensionists were fairly involved in mobilizing farming communities for participation in soil and water conservation activities. However, it was clear that the provincial administration

through the use of assistant chiefs and village headmen dominated the mobilization exercise.

The dominant presence of assistant chiefs and their headmen in mobilization of people could be explained through their capacity to reach farmers even at short notice. However, the technical aspects of catchment conservation were handled by the agricultural extensionists.

From the participatory R & D perspective it was unfortunate that agricultural extensionists were not in contact with farmers on a continuous basis as expected of them and consequently appeared to have abdicated their role of mobilizing farmers for participation in conservation activities to local bureaucrats such as assistant chiefs.

The study then examined the farmers' perceptions of the catchment approach to soil and water conservation by asking respondents what they thought of the approach. Their responses are shown in Table 4.29 below.

Table 4.29 Distribution of the Respondents According to their perceptions of the catchment Approach.

| Perceptions | Frequency | Percent |
|--------------------|-----------|---------|
| Very appropriate | 14 | 13.3 |
| Appropriate | 79 | 75.2 |
| Inappropriate | 8 | 7.6 |
| Very inappropriate | 2 | 1.9 |
| No response | 2 | 1.9 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that 13.3% of the respondents rated the approach as very appropriate, 75.2% considered it appropriate, 7.6.% viewed the approach as inappropriate and 1.9% thought the approach was very inappropriate.

Overall this approach to water and soil conservation was viewed favourably by the respondents since a majority of them rated the approach either as very appropriate or appropriate. The main reason for this favourable perception of the approach by a majority of the respondents was that Nyamira district is hilly and the farms run mostly from the hills to the valleys. This increases the problem of soil erosion in the district.

The study contended that besides the catchment method, the group approach to extension had used public barazas, farm groups and women's group meetings to reach and involve farmers in farm improvement activities and that the farmers had formed opinions about its suitability to their situations. The respondents were therefore asked to rate it and their responses are tabulated in Table 4.30 below.

Table 4.30 Distribution of the respondents according to their assessment of the group extension approach.

| Assessment | Frequency | Percent |
|--------------------|-----------|---------|
| Very appropriate | 10 | 9.5 |
| Appropriate | 78 | 74.3 |
| Inappropriate | 14 | 13.3 |
| Very inappropriate | 3 | 2.9 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that 9.5% of the respondents thought the group extension approach was very appropriate, 74.3% rated it as appropriate, 13.3% judged it as inappropriate and 2.9% of the respondents rated it as very inappropriate. From the data presented in Table 4.30 it is clear that a majority of farmers sampled considered the group extension approach favourably by rating it either as very appropriate or appropriate.

This study held that no groups that were utilized by the group extension approach had been formed with that objective in view. That is the group members encountered extension as an objective that had not originally been planned for. Even the public baraza which was commonly used by the group extension approach did not originate with the extension function in perspective. It was owing to this view that this study undertook to find out what farmers who were members of the groups that were receiving extension messages, thought of the effect of extension on their groups. The data obtained was as shown in Table 4.31 below.

Table 4.31 Distribution of the respondents according to what they thought was the effect of extension on their groups.

| Effect | Frequency | Percent |
|-------------------------------------|-----------|---------|
| Strengthened the groups | 79 | 75.2 |
| Sidelined original group objectives | 14 | 13.3 |
| Completely disrupted the groups | 4 | 3.8 |
| Not applicable | 8 | 7.7 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 75.2.% of the respondents believed that the utilization of social groups as fora for agricultural extension had strengthened the groups. To the contrary, 13.3% of the respondents thought that the introduction of extension to the groups had sidelined their original objectives. Finally, 3.8% of the respondents felt that the introduction of extension to the groups had led to their disruption.

Overall a majority of the farmers sampled thought that introduction of extension messages to their groups had strengthened them. That is contrary to this study's contentions, extension seemed to be consistent with the functioning of many of the groups despite the fact that the groups did not originally plan for it. The result appears to stem from the general hunger for technical innovations consistent in an area where population pressure has intensified the problem of land scarcity.

The indirect approach. Farmers receive agricultural information continuously from a myriad of sources. That notwithstanding, this study held that each farmer had one source from which he/she consistently received information. The study held that such sources fundamentally influenced the respective farmers' accessibility to agricultural information and subsequently their adoption of improved farm practices. Data relating to the sources from which farmers mostly received agricultural information is displayed in Table 4.32 below.

Table 4.32 Distribution of the farmers according to the most important source from which they received agricultural information.

| Source | Frequency | Percent |
|---------------------------------|-----------|---------|
| Agric. extensionists directly | 16 | 15.2 |
| Nearby contact farmer | 2 | 1.9 |
| At public baraza | 67 | 63.8 |
| At welfare group meeting | 5 | 4.8 |
| From neighbours and friends | 14 | 13.3 |
| Reading agricultural literature | 1 | 1.0 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 15.2% of the respondents received their information from agricultural extension agents, 1.9% from nearby contact farmers, 63.8% from public barazas, 4.8% from welfare group meetings, 13.3% from neighbours and friends and 1.0% received the information through reading books, bulletins, magazines, etc. on agriculture.

The data in Table 4.32 shows that the most important source of agricultural information for the farmers sampled was the public barazas, followed by agricultural extensionists, neighbours and friends, contact farmers and reading materials in that order. Agricultural extension agents in a bid to reach the very large number of farmers in the study areas have in most cases used the group extension approach. The barazas which are convened by chiefs and assistant chiefs seem to have become handy in reaching the large number of farmers.

Distribution of the respondents according to the approaches by which they received farm information

Data on the methods by which the farmers sampled had mostly received agricultural information, is summarized in Table 4.33.

Table 4.33 Distribution of the respondents according to the extension approach from which received farm information.

| Approach | Frequency | Percent |
|------------|-----------|---------|
| Group | 72 | 68.6 |
| Individual | 16 | 15.2 |
| Indirect | 17 | 16.2 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 68.6% of the respondents received their agricultural information through the group, 15% by way of individual and 16.2% by way of indirect approach.

As expected the group approach was the main forum through which agricultural information was disseminated and received by the farmers sampled. Large numbers of farmers attended group fora such as barazas which were convened by chiefs and their assistants. As expected few of the farmers received information through the individual approach owing mainly to the large amount of effort needed for such individual contacts.

4.4 Farmers' food self-sufficiency

This study held that farmers' adoption of improved farm practices had a positive impact on their relative self-sufficiency in food production. On that basis the variable food self-sufficiency was examined. The indicators of this variable are re-stated below.

- . Farmers planted food crops on his/her farm
- . Farmers did not purchase maize for consumption during year prior to interview
- . Farmer did not receive any food relief during year prior to interview
- . Farmer had half or more of his/her land under food crops during year of interview
- . Farmer's household had three or more meals per day
- . Farmer had not given up any food crops since adopting new farming practices.
- . Farmer felt had capacity to produce staples for own household throughout the year
- . Farmer assessed his/her household's nutritional status as high or very high

a) **Food Crops Grown by Farmers in the study areas.** Nyamira is an agricultural district and this study contended that farmers produce their own food, particularly the staples; maize, millet, beans and vegetables. It is expected that farmers who grow a variety of food crops have a higher chance of being self-sufficient in food.

The respondents were asked to state the food crops they grew on their farms and their responses were as shown in Table 4.34.

Table 4.34 Distribution of the Respondents According to the food crops they grew.

| Food crop(s) | Frequency | Percent |
|---|-----------|---------|
| Maize | 2 | 1.9 |
| Maize and beans | 2 | 1.9 |
| Maize and vegetables | 1 | 1.0 |
| Maize, beans and millet | 4 | 3.8 |
| Maize, beans and vegetables | 4 | 3.8 |
| Maize, millet and vegetables | 2 | 1.9 |
| Maize, bananas and vegetables | 1 | 1.0 |
| Millet, bananas and vegetables | 1 | 1.0 |
| Maize, beans, millet and vegetables | 9 | 8.6 |
| Maize, beans, vegetables and bananas | 1 | 1.0 |
| Maize, beans, millet, vegetables, bananas and other | 78 | 74.3 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates the crop combinations that were adopted by the farmers which were: maize (1.9%), maize and beans (1.9%), maize and vegetables (1%), maize, beans and millet (3.8%), maize, beans and vegetables (3.8%), maize, millet and vegetables (1.9%) and maize, bananas and vegetables (1.0%). Other combinations were: millet, bananas and vegetables (1.0%), maize, beans, millet and vegetables (8.6%), maize, beans, vegetables and bananas (1.0%) and maize, beans, millet, vegetables, bananas and other food crops (74.2%).

Table 4.34 suggests that majority of the farmers in the sample grew a combination of maize, beans, millet, vegetables and bananas. As expected therefore, farmers in the sample sought to produce their own food, especially the staple foods. The study found out that all respondents grew maize at least and that majority grew millet; the latter seemed to rival maize as the staple food crop. Vegetables and beans were grown by an

overwhelming majority of the respondents and this gave the impression that beans and vegetables were supposed to be produced at farm level rather than be purchased from outside for consumption.

The conclusion emerging from these data is that maize and millet are the basic foods of families in the study areas. It was observed that the market price of millet was at all times higher than that of maize. Consequently, wherever both maize and millet stocks were exhausted at family level, a famine was likely to take place. However, only the cheaper commodity, maize, could be purchased to make up for deficits.

This study also sought to find out the hectarage put to each of the food crops at farm family levels with a view to determining the crop on which most land resources were concentrated. This also aimed at finding out how farmers in the study areas utilized the meagre land resources at their disposal so as to obtain the varieties of food crops they got. Respondents were asked to state how much land was devoted to each of the food crops they reported having grown (Table 4.35).

Table 4.35 Distribution of the Respondents According to Hectarage they reported having put to various food crops.

| Acreage | Maize & beans (%) | Millet (%) | Vegetables (%) | Bananas (%) | Other crops (%) |
|--------------|-------------------|--------------|----------------|--------------|-----------------|
| 0 | 1.0 | 10.5 | 7.6 | 22.9 | 25.7 |
| 0.005 - 0.5 | 59.0 | 89.5 | 92.4 | 77.1 | 66.7 |
| 0.6 - 1.0 | 18.1 | - | - | - | 7.6 |
| 1.1 - 1.5 | 7.6 | - | - | - | - |
| 1.6 - 2.0 | 8.6 | - | - | - | - |
| 2.1 - 2.5 | 1.9 | - | - | - | - |
| 2.6 - plus | 3.8 | - | - | - | - |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

N = 105

Source: 1993 Survey Data.

The Table shows the percentages of respondents who planted various hectarages of food crops. Majority of the respondents (59%) utilized between 0.005-0.5 hectares for maize and beans only, a minority (5.7%) utilized more than 2 hectares for maize and beans. Conversely, majority of the respondents used between 0.005 and 0.5 hectares for millet, vegetables and bananas respectively. The general implication is that small scale agricultural production dominates the study areas.

Farmers in the sample grew several other crops and the Table shows that 66.7% of the respondents utilized < 0.5 ha. and 7.6% had put 0.6 - 1.0 ha. for the several other food crops they grew. These other food crops included arrow roots, cassava, wheat, irish potatoes, sweet potatoes, fruits (avocados, guavas, straw berries, oranges

and passion), pumpkins and gourds. The crops were grown by the farmers in various combinations.

The implication of the various hectarages that were put to various food crops was that land scarcity in the study areas affected amount of land that was put under food crops. Whereas maize was widely grown most farmers utilized about 0.6 ha. for its production. Those who planted more on than 0.6 ha. were mostly to be found in the settlement scheme areas of Manga and Raitigo where land was not very scarce. It is clear from the Table too that millet, vegetables and bananas were widely grown although very limited hectarages was devoted to them. Overall, food crop production in the study areas except in very isolated areas, especially in the settlement scheme, seemed a subsistence undertaking.

This study further held that it was easier for people to evaluate a problem and even pass objective judgement, as long as they thought of the problem with regard to other people other than themselves. It was for this reason that the respondents' attitude toward other farmers' inability to produce sufficient food was sought, before their own food production/security situation was inquired into. They were asked why in their opinion some farmers had been unable to produce enough food and their responses were as shown in Table 4.36 below.

Table 4.36 Distribution of the Respondents According to their opinions on why others had been unable to produce enough food.

| Reason(s) | Frequency | Percent |
|---------------------------------------|------------|--------------|
| Laziness | 6 | 5.7 |
| Poverty | 1 | 1.0 |
| Ignorance | 30 | 28.6 |
| Land shortage | 5 | 4.8 |
| Laziness & drunkenness | 9 | 8.6 |
| Laziness & ignorance | 19 | 18.0 |
| Laziness & land shortage | 2 | 1.9 |
| Poverty & ignorance | 3 | 2.9 |
| Drunkenness & ignorance | 2 | 1.9 |
| Ignorance & land shortage | 1 | 1.0 |
| Laziness, poverty & ignorance | 8 | 7.6 |
| Laziness, drunkenness & ignorance | 8 | 7.6 |
| Laziness, drunkenness & land shortage | 11 | 10.4 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that the respondents thought that the basic causes of food shortages at farm family levels were ignorance at farm family level (28.6%), laziness and ignorance (18.0%), laziness (5.7%), laziness, drunkenness and land shortage (10.4%), and laziness, drunkenness and ignorance (7.6%). Other reasons were laziness, poverty and ignorance (7.6%), ignorance and land shortage (1.0%), drunkenness and ignorance (1.9%), poverty and ignorance (2.9%), laziness and land shortage (1.9%), laziness and drunkenness (8.6%), land shortage (4.8%) and poverty (1.0%).

The implications emerging from the Table point to the fact that the problems compounding food insufficiencies were internal to the farm family systems. A further implication was that the problems could be at least ameliorated by agricultural extension

interventions. Agricultural extension advice could, for instance, reduce ignorance and tackle the problem of meagre hectarage by introducing more intensive land usage practices and forestall the problem of poverty by advising farmers to attempt production for the market. This study tentatively concluded that the respondents in mentioning the various problems implied the need for mobilization and enlightenment of their neighbours who had these problems; this is what agricultural extension is meant to do.

b) *Number of months in a year the Respondents bought maize for their family consumption.* The study held that maize was the staple food and that its purchase for consumption in families represented a shortage at that level. In that view, therefore, respondents were asked to state the number of months in which they had purchased maize for consumption during the previous year. Their responses are summarized in Table 4.37 below.

Table 4.37 Distribution of the respondents according to the number of months in a year they purchase maize for consumption.

| No. of Months | Frequency | Percent |
|---------------|-----------|---------|
| None | 51 | 48.6 |
| 1 - 3 | 22 | 21.0 |
| 4 - 5 | 29 | 27.5 |
| > 6 | 3 | 2.9 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 48.6% of the respondents had sufficient maize and did not purchase any. Some 21.0% of them purchased maize for between 1 to 3 months, 27.5%

had bought maize for between 4 to 5 months and 2.9% had bought maize for a period of > 6 months in a year.

What emerges from the Table is that slightly over 50% of the respondents did not produce sufficient maize to last them a year. This finding contradicts the general assumption that there exists self-sufficiency in maize production at farm family level in agro-ecologically high potential areas.

Having established that maize deficits were rampant in the study areas, the study proceeded to inquire into the causes of the deficits. Those respondents who reported maize deficits in their families were asked to state the causes. Their responses appear in Table 4.38 below.

Table 4.38 Distribution of the respondents according to causes of maize deficits in their families.

| Cause(s) | Frequency | Percent |
|---|------------|--------------|
| Land shortages | 4 | 3.8 |
| Poor maize growing methods | 29 | 27.6 |
| Land shortage & poor maize growing methods | 14 | 13.3 |
| Land shortage and lack of finance for inputs | 2 | 1.9 |
| Land shortage, poor maize growing methods and lack of finance for inputs. | 5 | 4.8 |
| Not applicable | 51 | 48.6 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that maize deficits arose from land shortage (3.8%), poor maize growing methods (27.6%), land shortage and poor maize growing methods

(13.3%), land shortage and lack of finance for inputs (1.9%), land shortage, poor maize growing methods and lack of finance for inputs (4.8%), and 48.6% of the respondents did not experience maize deficits.

What seems to emerge from the Table is that as expected, land shortage was the common cause of maize deficits. However, poor maize growing method was an equally acknowledged cause of maize deficits in the study areas.

It appears from the findings, that a more effective extension service that can realize an improved and intensified agriculture, would be the surest way of alleviating maize deficits in particular and food deficits in general.

c) *The farmers' receipt of food relief.* This study recognized that some farmers could have been facing maize and other food deficits and yet had not bought maize. This being the case it was expected that some farmers facing food deficit could have received food relief from government, non-governmental organizations (NGOs) and/or from relatives and friends. This study expected that due to a strong extended family institution in the study areas relatives could have been the most important source of food relief. Respondents were first asked to state whether or not they had received food relief in the previous year. Their responses were as shown in Table 4.39 below.

Table 4.39 Distribution of the respondents according to whether or not they received food relief in 1992.

| Response | Frequency | Percent |
|----------|-----------|---------|
| Yes | 35 | 33.3 |
| No | 70 | 66.7 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 33.3% of the respondents received food relief, while 66.7% did not receive it. The implication here is that food relief was a substantial source of food for families in the study areas. When the respondents were asked to state the sources of the food relief they had received, their responses were as shown in Table 4.40 below.

Table 4.40 Distribution of the Respondents According to Sources from which they had received food relief.

| Source(s) | Frequency | Percent |
|----------------|-----------|---------|
| Relatives | 35 | 33.3 |
| Not applicable | 70 | 66.7 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 33.3% of the respondents received food relief from their relatives, while 66.7% did not receive any food relief. Thus as expected, relatives were

the greatest source of relief food for farm families in the study areas. This was probably as a result of the elaborate and strong extended family institution.

It was observed that farmers in the settlement scheme on the eastern parts of Nyamira district usually sent food to their relatives in the densely settled areas. The study found out that the farmers sampled had relatives not only in the settlement scheme within the district but also in other parts of the country including Molo, Nandi Hills, Kericho, Uasin Gishu and Trans-Nzoia. As a result, whenever there were food shortages the farmers went for food relief from their relatives in those areas. Perhaps it was this informal food relief system and the tea economy which enabled most farmers accessibility to food.

d) *Farmers' land proportion planted with food crops.* This study held that the proportion of land farmers devoted to food crops reflected the importance they attached to the food crops. Food crops were expected to compete with cash crops such as tea, pyrethrum and coffee. This being the case the study sought to determine whether food crops were accorded priority in the study areas. As a result when the respondents were asked to state what proportion of their land was devoted to food crops their responses were as shown in Table 4.41 below.

Table 4.41 Distribution of the Respondents According to the proportion of their land they planted to food crops.

| Proportion | Frequency | Percent |
|----------------------|-----------|---------|
| Quarter and less | 18 | 17.1 |
| About one half | 59 | 56.2 |
| About three quarters | 24 | 22.9 |
| > 3/4 | 4 | 3.8 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 17.1% of the respondents devoted less than a quarter, 56.2% used about half, 22.9% used about three quarters and 3.8% devoted more than three quarters of their land to food crops. The implication emerging from the Table is that majority of farmers in the sample used upto half of their land for food crops. This suggests that there was competition for land from other enterprises particularly cash crops and pasture. It is likely that the subsistence nature of food crop production undermined its prominence and reduced it in importance relative to the main cash crops; tea and coffee. It was clear that priority in land use was not with food crops.

This study maintained that agricultural extension service had a role to play in terms of improvement of crop husbandry in order to boost food production. It was expected that the service had taken steps to boost food production and that farmers had benefitted from its efforts. This being the case the respondents were asked to state whether or not agricultural extension service had helped them increase food production. The responses elicited were as shown in Table 4.42 below.

Table 4.42 Distribution of the Respondents According to whether Agricultural Extension service had helped them to increase their food production.

| Responses | Frequency | Percent |
|-----------|-----------|---------|
| Yes | 59 | 56.2 |
| No | 46 | 43.8 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that 56.2% of the respondents had benefitted from agricultural extension with regard to food production, while 43.8% of the sample had not. This result suggests that most farmers' food production efforts had benefitted from agricultural extension. Despite this, the extension efforts seemed to have neglected food production to some extent.

e) *Food crops given up due to new farming methods.* This study held that the farmers' adoption of new farming methods was likely to lead to the abandonment of various food crops. This was based on the fact that the improvement of yields of one food crop could negate the continued production of another related crop. Moreover, new methods of farming make the production of certain crops comparatively easier than that of others. It was therefore expected that with adoption of new methods of farming, certain food crops were to be given up by farmers. The respondents were asked to state which food crops they had given up since they adopted new methods of farming. Their responses are tabulated in Table 4.43 below.

Table 4.43 Distribution of the respondents according to the food crops they had given up.

| Crops given up. | Frequency | Percent |
|--------------------------------------|-----------|---------|
| None | 59 | 56.2 |
| Sugar cane | 6 | 5.7 |
| Sweet potatoes | 16 | 15.3 |
| Millet | 9 | 8.6 |
| Sugar cane & passion fruits | 5 | 4.7 |
| Sugar cane & sorghum | 1 | 1.0 |
| Sweet potatoes & millet | 4 | 3.8 |
| Sugar cane, passion Fruits & sorghum | 5 | 4.7 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that following the adoption of new farming method the crops that had been given up were sugarcane (5.7%), sweet potatoes (15.3%), millet (8.6%), sugarcane and passion fruits (4.7%), sugarcane and sorghum (1.0%), sweet potatoes and millet (3.8%), and sugarcane, passion fruits and sorghum (4.7%).

It is clear from the Table that millet, sorghum and sweet potatoes were the major food crops that modern agricultural methods tended to sideline. The data further suggests that adoption of modern methods of farming tended to lead to a kind of specialization in food crop production and this led to the laying off of certain food crops. It was observed that as land got scarce, farmers found food crops competing for land with other crops and had to prioritize. Maize and bananas seemed to rank high on the priority list.

f) *The number of meals per farm family per day.* This study considered that families with sufficient food, could have at least three meals a day. It was held that families with less than three meals were lacking in food supplies. The study therefore

undertook to inquire from the respondents, the number of meals their families had per day. Their responses were as shown in Table 4.44 below.

Table 4.44 Distribution of the respondents according to the number of meals their families ate per day.

| Number of meals | Frequency | Percent |
|-----------------|-----------|---------|
| One | 9 | 8.6 |
| Two | 6 | 5.7 |
| Three | 90 | 85.7 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that of the household heads interviewed 8.6% had a single meal, 5.7% reported two meals and 85.7% reported three meals per day. These data suggest that majority of families in the study areas enjoyed three meals per day. However, it is clear that some families had less meals with some doing with a single meal per day. This suggests that food scarcity at the farm family levels was present in the study areas.

Concerning meals made from the foodstuffs the study held that farmers could produce a variety of foods and that the meals averaged balanced diets with carbohydrates, proteins and vitamins at least. When the respondents were asked to state which foodstuffs regularly made up their meals, their responses were us shown in Table 4.45 below.

Table 4.45 Distribution of the respondents according to foodstuffs that regularly made up their meals.

| Regular foodstuffs | Frequency | Percent |
|--|-----------|---------|
| <i>Ugali</i> and vegetables | 36 | 34.3 |
| Porridge, <i>ugali</i> & vegetables | 21 | 20.0 |
| Milk, <i>ugali</i> & vegetables | 28 | 26.6 |
| Porridge, <i>ugali</i> , milk & vegetables | 13 | 12.4 |
| <i>Ugali</i> & milk | 7 | 6.7 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that the foodstuffs which made up the meals were *ugali* and vegetables (34.3%), porridge, *ugali* and vegetables (20%), milk, *ugali* and vegetables (26.7%), porridge, *ugali*, milk and vegetables (12.4%) and *ugali* and milk (6.7%). It was observed that vegetables included all edible leaves and legumes such as beans and peas.

It is clear from the Table that *ugali* and vegetables were the regular foodstuffs in the study areas and that the meals which were made up of a variety of foods may have amounted to balanced diet.

g) ***Farmers' ability to produce sufficient staples.*** The study went further to find out whether the respondents felt they were capable of producing staples for their households throughout the year. The responses were that 28.5% felt they were unable while 71.5% felt they were able to produce staples to feed their household throughout the year. These data implies that majority of the respondents were determined to feed their households through their own farms.

However it was felt that as land got scarce and as economic hardships set in, farmers could give up certain foodstuffs. This discontinuation of foodstuffs from family menus was supposed to indicate a declining accessibility to food in general. The respondents were asked to state which foodstuffs they had given up in the previous 2 to 3 years and their responses are shown in Table 4.46 below.

Table 4.46 Distribution of the respondents according to the foodstuffs given up 2-3 years prior to interview.

| Foodstuffs given up | Frequency | Percent |
|--|-----------|---------|
| None | 61 | 58.0 |
| Bread & rice | 15 | 14.3 |
| Meat | 3 | 2.9 |
| Sweet potatoes & carrots | 9 | 8.6 |
| Millet | 2 | 1.9 |
| Bananas | 4 | 3.8 |
| Sugar, rice, cooking fats & sweet potatoes | 8 | 7.6 |
| Milk | 3 | 2.9 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that 58.0% of the respondents had not given up any foodstuffs. Those that were given up were bread and rice (14.3%), meat (2.9%), sweet potatoes and carrots (8.6%), millet (1.9%), bananas (3.8%), sugar, rice, cooking fats and sweet potatoes (7.6%) and milk (2.9%).

The general implication was that while a majority of the respondents had not given up any foodstuffs, a wide range of foodstuffs had been given up which included

bananas, millet and sweet potatoes. The implication was that farmers' accessibility to food had declined over the previous 2 to 3 years.

It was expected that there could be a variety of reasons that led the respondents to give up some foodstuffs. The respondents were asked to state why they had given up some of the foodstuffs and their responses were as shown in Table 4.47 below.

Table 4.47 Distribution of the respondents according to the reasons they provided for giving up some foodstuffs.

| Reasons | Frequency | Percent |
|--------------------------------|-----------|---------|
| Not applicable | 61 | 58.0 |
| Costliness | 28 | 26.7 |
| Declining land size | 12 | 11.4 |
| Foodstuff unavailability | 1 | 1.0 |
| Lack of labour | 1 | 1.0 |
| Land shortage & lack of labour | 2 | 1.9 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that several reasons accounted for the giving up of foodstuffs and these were costliness of foodstuffs (26.7%), declining land sizes (11.4%), foodstuff unavailability (1.0%), lack of labour (1.0%) and, land shortage and lack of labour (1.9%). It is clear that economic conditions in the form of costliness of foodstuffs turned out to be the most important reason why foodstuffs were given up by farm families. The second most important reason was meagre acreage and lack of labour to produce the foodstuffs.

h) *Farmers' own assessment of their families' nutritional status.* This study held that farmers understood the nutritional status of their families well and that they could be able to rate it accurately. This being the case the respondents were asked to rate the nutritional statuses of their families, and their ratings were as shown in Table 4.48 below.

Table 4.48 Distribution of the respondents according to their assessment of their families' nutritional status.

| Nutritional status | Frequency | Percent |
|--------------------|-----------|---------|
| Very high | 6 | 5.7 |
| High | 17 | 16.2 |
| Average | 62 | 59.1 |
| Poor | 20 | 19.0 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that the respondents' assessment was very high (5.7%), high (16.2%), average (59.1%) and poor (19.0%) nutritional status. What emerges from the data is that a majority of farm families in the sample rated their families' nutritional status as average. This tends to suggest that there were food shortages in the study areas. This finding is contrary to the study's expectation that Nyamira district being within a high potential agro-ecological zone could be in a position to be self-sufficient in food production. It was observed that food production was greatly hampered by land shortage and poor methods of farming.

Distribution of the Respondents According to levels of relative food self-sufficiency

Following the scoring of the indicators of the variable, self sufficiency in food production its three categories: low, average and high were created. The distribution of the respondents according to the variable is shown in Table 4.49 below.

Table 4.49: Distribution of Respondents According to their levels of food self-sufficiency.

| Level | Frequency | Percent |
|---------|-----------|---------|
| Low | 29 | 27.6 |
| Average | 47 | 44.8 |
| High | 29 | 27.6 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 27.6% of the respondents had achieved a low level, 44.8% had achieved average while 27.6% had achieved a high level of self-sufficiency in food production. It is clear from the data that majority of the farmers in the sample had achieved an average level of self-sufficiency in food production.

4.5 Levels of Living of farm families.

This study contended that farmers' adoption of improved farm practices led to improvements in their living standards. It was expected that farmers who made improved adoptions were also striving to increase their yields and hence income. That their incomes could rise leading to improved housing and diversification of economic

activities to cover non-agricultural activities or businesses. That the farmers would then afford to send their children to school as well as be able to acquire such resources like radios, television sets, vehicles, wheel barrows, bicycles, water tanks and wells. The data on these indicators restated below are presented in some of the following pages.

- . Farmer had permanent or semi-permanent house
- . Farmer's agricultural income was increasing during 1991-92
- . Farmer's total income in 1992 was US \$ 375 (Kshs 11,000) or more
- . Farmer operated other business other than farming
- . Farmer had all children duly enrolled in schools
- . Farmer's ownership of modern assets such as radio, TV, vehicle, wheelbarrow, bicycles, water tank and well/borehole
- . Farmer adopted modern agricultural practices mainly to increase yields and secure income for other business

Type of farmers' main houses. This study held that the type of main house a farmer had was an important indicator of the standard of living that his/her family led. It was expected that farmers who had made improved adoptions were likely to be able to improve their earnings and afford to improve their housing. Respondents were asked to state the type of their main houses and their responses were as shown in Table 4.50 below.

Table 4.50 Distribution of the Respondents According to the Types of their main houses.

| Type of main house | Frequency | Percent |
|--------------------|-----------|---------|
| Permanent | 19 | 18.1 |
| Semi-permanent | 58 | 55.2 |
| Traditional | 28 | 26.7 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that the main houses of 18.1% of the respondents were permanent, 55.2% were semi-permanent and 26.7% were traditional. The latter houses were those that had earth floors and earth walls supported with sticks and grass thatched roofs. The semi-permanent houses were those with corrugated iron sheet roofs but with either earth or paved floors and with walls which were either plastered with sand and cement or mudded.

The data suggest that a majority of the farmers sampled had improved their main housing units, because they had either permanent or semi-permanent houses. It was only a minority of the farmers who still lived in traditional houses.

b) *Farmers' agricultural income trend, 1991 - 1992.* The study considered the trend of agricultural income; that is, whether it was increasing, constant or decreasing. This was held to be an important measure of the farmers' economic welfare. It was expected that the largely meagre agricultural incomes in the district should have been increasing over-time, if they were to help raise or at least keep up standards of living of farm families.

The survey results of the agricultural income trend during the years 1991 up to 1992 were as shown in Table 4.51 below.

Table 4.51 Distribution of the Respondents According to Agricultural income Trends, 1991 - 92.

| Trend | Frequency | Percent |
|------------|-----------|---------|
| Decreasing | 16 | 15.2 |
| Constant | 5 | 4.8 |
| Increasing | 8 | 80.0 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that agricultural incomes for 15.2% of the respondents was decreasing, constant for 4.8% and increasing for 80% of them respectively. This implies that agricultural incomes were generally increasing in the survey areas during the period 1991 - 92.

It is also worth noting that the mean agricultural income in 1991 was KShs. 22,913.33 and in 1992 it was KShs 26,861.90. However, the minimum agricultural income was KShs 0 in 1991 and KShs 200 in 1992. The maximum agricultural income for 1991 and 1992 were KShs 110,000 and KShs 120,000 respectively.

These incomes showed ranges of KShs 110,000 and KShs 119,800 for 1991 and 1992 respectively. The implication was that the distribution of agricultural income in the study areas was extremely skewed, and the means were not reflective of the situation on the ground. Indeed, agricultural income was meagre for the overwhelming majority of

small scale farmers of the survey areas and much better for a few large scale farmers in the settlement areas of the district. It should be noted that the tilting of agricultural incomes to the higher side was due to the few large scale farms sampled from the settlement scheme.

Attention was also paid to non-agricultural income due to the expectation that diversification of economic activities among farmers to include non-agricultural ventures was an indicator of rising living standards. In this case farmers who enjoyed other income sources outside agriculture were considered to lead better lives than those with only agricultural incomes.

The study established that only 42.9% of the respondents had ventured into non-agricultural economic activities. Therefore 57.1% of the respondents were fully and exclusively in agriculture and depended only on agricultural income for livelihoods. This was in line with the study's expectations of an agricultural district such as the study area was. The non-agricultural income trends during the period 1991 - 1992, were as shown in Table 4.52 below.

Table 4.52 Distribution of the Respondents According to their Non-Agricultural income Trends, 1991 - 1992.

| Trend | Frequency | Total |
|------------|-----------|-------|
| Decreasing | 3 | 2.9 |
| Constant* | 60* | 57.1* |
| Increasing | 42 | 40.0 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

8

The Table shows that non-agricultural income was increasing for 40% of the respondents, constant for 57.1% of the respondents, and decreasing for 2.9% of the respondents. It is worth noting that the mean non-agricultural income was KShs 10,048.57 and KShs 11,281.90 for 1991 and 1992 respectively. However, the minimum non-agricultural income was zero both in 1991 and 1992. The maximum non-agricultural income was KShs 80,000 and KShs 96,000 for 1991 and 1992 respectively. The ranges were therefore KShs 80,000 and KShs 96,000 for 1991 and 1992 respectively. The implication was that non-agricultural income was extremely inequitably distributed among farmers in the survey areas. A further implication was that the economy of the survey area was basically agricultural with very limited diversification as shown by the high number of respondents with decreasing and without non-agricultural incomes respectively.

⁸ * Non-agricultural income was constant at zero, that is the affected respondents did not receive the said income during the two years under consideration.

c) **Farmer's total income.** As indicated earlier, this study held that income was a major measure of levels of living at the farm level. The total income (including both agricultural and non-agricultural for 1992) of farm families was looked at in relation to the world Bank 1990 poverty line which was US\$ 375 equivalent to about KShs 11,000 at mean 1992 rates.

When the respondents' income was looked at against the poverty line criterion, the results were as shown in Table 4.53 below.

Table 4.53 Distribution of the Respondents According to their 1992 Income situation and 1990 Poverty line criterion.

| Relation to poverty line \$375 | Frequency | Percent |
|--------------------------------|-----------|---------|
| Below poverty line | 45 | 42.9 |
| Above poverty line | 60 | 57.1 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table indicates that 42.9% of the respondents had incomes below the poverty line in 1992, while 57.1% had incomes above the line. The implication was that 42.9% of the respondents were poor and did not attain a minimum standard of living. The rest (57.1%) are considered to have attained a level of economic welfare that enabled them to afford a descent living.

d) **Farmers' Businesses outside the farm.** This study considered the diversification of economic activities to cover non-farm activities as an indicator of rising or high levels

of living. Indeed, it was expected that farmers who performed well on the farm could release both labour and savings to other non-farm economic activities.

The respondents were therefore asked to state which other businesses they operated outside their respective farms. Their responses were as shown in Table 4.54 below.

Table 4.54 Distribution Of the Respondents According to Non-farm Businesses Operated.

| Businesses | Frequency | Percent |
|----------------------------------|-----------|---------|
| None | 63 | 60.0 |
| Shops | 14 | 13.3 |
| Employment | 11 | 10.5 |
| Restaurant/Bar | 2 | 1.9 |
| Charcoal dealership | 1 | 1.0 |
| Rental houses | 5 | 4.8 |
| Employed and shop | 1 | 1.0 |
| Shop and restaurant/bar | 2 | 1.9 |
| Shop and rental houses | 5 | 4.8 |
| Restaurant/bar and rental houses | 1 | 1.0 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 60% of the respondents had no businesses other than farming. Those who had businesses reported them as shops (13.3%), employment (10.5%), restaurants/bars (1.9%), charcoal dealership (1.0%), rental houses (4.8%), employment and shops (1.0%), shops and restaurants/bars (1.9%), shops and rental houses (4.8%) and restaurants/bars and rental houses (1.0%). It is clear from these data that the majority of farmers in the sample had no businesses outside the farm. The area's

economy was therefore basically agricultural. Farmers had not diversified their economy probably because majority had meagre incomes which they readily exhausted in their attempts to meet their basic needs. They relied on farm incomes and this reflected itself in the rather low levels of living resulting from such unreliable and low farm incomes.

e) **Farmers and their Children's Education.** This study held that education of the farmers' children was a major indicator of the farm families' standard of living. The study sought to find out whether farmers afforded their children's education. This being the case, the study also sought to find out if there were any cases of illiterate children or above school age children in the sampled farm families who were unable to attend school. When these issues were posed to the respondents, their responses were as shown in Table 4.55 below.

Table 4.55 Distribution Of the Respondents According to their Children's Educational Status.

| Farmers with | Frequency | Percent |
|--|-----------|---------|
| Illiterate children | 1 | 1.0 |
| School dropouts due to fees problems | 5 | 4.8 |
| Children duly enrolled in schools or fully exhausted their academic capacity | 99 | 94.2 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 1% of the respondents had children above school age who were illiterate, 4.8% of them had children who were school drop-outs due to school fees

problems and 94.2% had all their children of school going age duly enrolled in schools or those who had completed their schooling.

The Table implies that a majority of the farmers sampled afforded education for their children to the extent that the children sought it. In terms of education, therefore, levels of living were fairly high. It was reported that some of the farmers had educated their children up to the university and a large number of them had children in gainful employment outside the farm.

f) *Farmers' Ownership of Modern assets.* This study held that there were such items as radios, television sets, vehicles, wheel barrows, bicycles, water tanks and wells, the possession of which improved the standard of living of farm families. The study expected that farmers who possessed the items enjoyed standards of living higher than those who lacked them. This assumption was based on the fact that those with these possessions enjoyed means of communication and transportation and ample supplies of clean water which were basic to improved livelihoods. The study therefore sought to find out which of the respondents possessed the items and the data related thereto is shown in Table 4.56 below.

Table 4.56 Distribution of the Respondents According to Ownership of Modern Life

Improving Items.

| Items | Frequency | Percent |
|---------------------------------------|-----------|---------|
| Radio | 43 | 40.9 |
| Wheel barrow | 2 | 1.9 |
| Radio & television | 2 | 1.9 |
| Radio & wheel barrow | 10 | 9.5 |
| Radio & bicycle | 13 | 12.3 |
| Radio and water tank | 2 | 1.9 |
| Radio & well | 4 | 3.8 |
| Wheel barrow & bicycle | 1 | 1.0 |
| Radio, T.V & wheel barrow | 5 | 4.8 |
| Radio, wheel barrow and bicycle | 6 | 5.7 |
| Radio, wheel barrow and well | 3 | 2.9 |
| T.V wheel barrow and bicycle | 1 | 1.0 |
| Radio, T.V water tank and well | 3 | 2.9 |
| Radio, wheel barrow, bicycle and well | 6 | 5.7 |
| Radio, wheel barrow, bicycle & w/tank | 4 | 3.8 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that of the seven listed items, the radio was the most widely owned (40.9%); only 3.9% of the respondents did not own radios. The Table further indicates that water tanks and wells were not very common in survey areas, much as television sets and vehicles were not. Overall, the Table shows that all the respondents owned some of the seven items listed.

g) *Farmers' Reasons for Adopting improved farm Practices.* This study held that farmers whose living standards benefitted from agricultural activities ought to have known that they adopted improved farm practices to increase yields and incomes subsequently. This way it was expected their levels of living would rise. The study

sought to know from the respondents why they adopted improved farm practices if they did. Their responses were as shown in Table 4.57 below.

Table 4.57 Distribution of the Respondents According to their Reasons for Adopting improved farm practices.

| Reason(s) | Frequency | Percent |
|--|-----------|---------|
| To be like other farmers | 8 | 7.6 |
| To please the extensionist | 1 | 1.0 |
| To increase yields & income for other businesses | 96 | 91.4 |
| Total | 105 | 100.0 |

Source: 1993 Survey Data.

The Table shows that 7.6% of the respondents adopted improved farm practices in order simply to be like other farmers. One percent of the respondents adopted improved farm practices to please agricultural extensionists. Finally 91.4% of the respondents adopted improved farm practices in order to increase yields and secure income for other businesses.

What emerges from these data is that majority of the farmers in the study sample understood, and undertook improved farm practices for their own betterment, i.e., they sought better or higher living standards by way of improved farming practices.

Distribution of the respondents according to their levels of living

The attributes of the variable, living standards at farm family level were scored, and that variable was conceived at three levels - low, average and high. The data related to those categories were as shown in Table 4.58 below.

Table 4.58 Distribution of the Respondents according to levels or standards of living.

| Levels of living | Frequency | Percent |
|------------------|-----------|---------|
| Low | 39 | 37.1 |
| Average | 37 | 35.1 |
| High | 29 | 27.7 |
| Total | 105 | 100.0 |

Source: 1993 Survey 1993.

The Table indicates that 37.1% of the respondents led low, 35.2% had average living and 27.7% enjoyed high standards of living. It is clear from these data that a majority of farmers sampled lived in average or lower standards.

CHAPTER V

DATA ANALYSIS

In this chapter the data presented in the previous chapter is examined in detail with a view to illuminate on the relationships between the various major variables of the study. Specific attempts are made to test the various hypotheses which this study advanced in chapter two.

5.1 Relationship between farmers' participation in the Agricultural extension process and their adoption of improved farm practices.

This study hypothesized that farmers' participation in the process of agricultural extension positively affected their adoption of modern or improved farm practices. The assumption was that farmers who participated in such activities as women's group meetings, farm demonstrations and field days, shows, educational trips and films and public barazas would tend to be more receptive of improved techniques of farming. Involvement in the aforesaid was equally expected to bring the reality of an improved agriculture to bear on the participants and hence open them up to adopting similar practices.

This study further held that farmers who were aware of the problems their agricultural activities faced discussed the problems with neighbours and friends or with the agricultural extension agents, or raised them at cooperative societies meetings. It was also felt that such farmers took initiative to consult agricultural extension agents and were able to inform the agents of how they needed to be assisted. Such farmers were

considered to be highly participative and better placed to make a wide range of adoptions of farm innovations.

Participative farmers were also expected to have been keen enough to note beneficial ideas and/or practices and share them with neighbours and friends as well as with agricultural extension agents especially for refinement. This kind of innovativeness was considered a prerequisite to adoptive dispositions on the part of the farmers. With these assumptions, participation as a variable was cross tabulated with adoption and the results were as shown in Table 5.1 below.

Table 5.1 Respondents' levels of adoption according to their levels of participation in agricultural extension.

| Levels of participation | levels of adoption | | | Total |
|-------------------------|--------------------|---------|------|-------|
| | Low | Average | High | |
| Low | 6 | 7 | 0 | 13 |
| Average | 8 | 56 | 10 | 74 |
| High | 0 | 11 | 7 | 18 |
| Total | 14 | 74 | 17 | 105 |

Source: 1993 Survey Data.

$X^2 = 22.43403$ $df = 4$ Significant at 0.05 (95%) confidence level.

$r = 0.4169$.

The Table shows that 5.7% of the respondents had low participation levels and equally low levels of adoption. The Table further shows that 6.7% of the respondents who had low levels of participation had attained average levels of adoption while finally

none of the respondents had low levels of participation and at the same time attained high levels of adoptions. It was therefore plausible to tentatively conclude that low levels of farmers' participation in the agricultural extension process resulted in the farmers' general low levels of adoption of improved farm practices.

Equally, it is deducible from Table 5.1 that a majority of the respondents who demonstrated an average level of participation had attained average and high levels of adoption. That was illustrated by the fact that while only 7.6% of the respondents demonstrating average levels of participation had attained low levels of adoption, 53.3% with average participation had attained average levels of adoption, and 9.5% of the respondents with average participation attained high levels of adoption.

Table 5.1 further shows that none of the respondents with high level of participation attained low levels of adoption, but that 10.5% of the respondents with high participation had demonstrated average adoption of improved farm practices. It is further shown that 6.7% of the respondents who had high levels of participation equally demonstrated high levels of adoption. Finally, 80% of the respondents generally demonstrated average and high levels both in participation in the agricultural extension process and in adoption of improved farm practices. These results led us to the conclusion that there existed a positive relationship between participation in the extension process and adoption of improved farm practices.

The cross-tabulation shows a chi-square value of 22.43403 at $df = 4$ and which is significant at 0.05 (95%) level of confidence. These represent a strong relationship between participation in agricultural extension and adoption of improved farm practices.

This result supports Harrison's (1987:passim) finding of the Zimbabwe farmers he studied. He found those who were highly participative mainly in farmers' groups to have adopted improved maize seeds.

Hypotheses Testing: Hypothesis one

In this section, the study proceeds to apply the statistical parameters derived from Table 5.1, with a view to testing the first hypothesis of the study. As indicated in chapter three, in testing the first hypothesis this study utilized the chi-square test and the pearson's co-efficient of correlation. It is to be noted that while the chi-square test brings out the strength of the relationship between the independent and dependent variables, the pearson's co-efficient of correlation shows the strength and whether that relationship is positive or negative.

Hypothesis number one sought to test whether farmers' participation in the agricultural extension process positively affected their adoption of improved farm practices. The null form (H_0) of the hypothesis is that there is no relationship between farmers' participation in the process of agricultural extension and their adoption of improved farm practices. The alternative form (H_1) is that farmers' participation in the process of agricultural extension positively affects their adoption of improved farm practices.

The independent variable is participation and the dependent variable is adoption. A chi-square test revealed a strong relationship ($X^2 = 22.43403$ significant at 0.05 confidence level), between farmers' participation in the agricultural extension process and

their adoption of improved farm practices (Table 5.1). The coefficient of correlation (r) of 0.4169 represents a substantial positive relationship between the two variables.

On the basis of that result, the null hypothesis stating that there is no relationship between farmers' participation in the process of agricultural extension and their adoption of improved farm practices was rejected. A significant positive relationship exists between the two variables. As the study had contended there was a tendency for farmers who participated in the agricultural extension process to easily and readily adopt a wide range of improved farm practices. Despite the positive association between farmers' participation and their adoption of improved farm practices, the study did not find agricultural shows, field days and demonstrations as important fora for agricultural extension as were other informal fora such as barazas, farm cooperatives, self-help and women's group meetings. Agricultural extensionists' movement toward the use of some of these informal fora is therefore a step in the right direction. Utilization of these fora is likely to boost farmers' participation in the extension process and elicit more widespread adoption of improved farm practices.

5.2 Relationship between extension methods and farmers' adoption of improved farm practices.

This study postulated that the Agricultural extension methodology employed influences farmers' adoption of improved farm practices. The primary assumption underlying the postulate was that various agricultural extension methods and the messages conveyed by them had varying capacities for eliciting farmers' responses.

The study found out that there were three basic approaches to agricultural extension in the study areas. First, the group approach in its many dimensions; second, the individual approach in the form of the usual farm visits including extension agent-contact farmer interactions in the Training and Visit (T&V) programme; and third, the Indirect extension approach in the form of follow-up farmers learning from contact farmers, and their learning from neighbours and friends, and reading materials.

The group approach to extension method entailed farmers learning improved farm practices at public barazas, co-operative societies and welfare group meetings (including women's group and other social gatherings). The social gatherings included informal work group meetings and community development activity sessions such as school, tea buying centre and village project work days. Some schools had tree nurseries and demonstration plots where the agricultural extension agents taught farmers who were parents in the schools on a regular basis. These sorts of farm demonstrations were an important part of the group approach to agricultural extension in the study areas.

This study expected the individual approach to agricultural extension to be strenuous on the extension agents owing to the high density population of the study areas. For that reason, extension agents relying on the approach were, for convenience, expected to concentrate on farmers whose homesteads were along major roads to the exclusion of those in interior areas. Despite the fact that the approach was expected to reach only a few farmers, it was expected to achieve farmers' adoption of improved farm practices owing to the face-to-face interaction it entails. The indirect approach owing to the predominance of the extended family institution in the study areas was expected to

expedite the diffusion of improved farm practices from farmer to farmer. A cross-tabulation of extension methodologies and farm adoptions was performed to determine the relationship between the two variables. The results of the cross-tabulation are shown in Table 5.2 below.

Table 5.2 Respondents' levels of adoption according to extension methodologies.

| Methodologies | Levels of adoption | | | Total |
|---------------|--------------------|---------|------|-------|
| | Low | Average | High | |
| Group | 10 | 53 | 9 | 72 |
| Individual | 0 | 8 | 8 | 16 |
| Indirect | 4 | 13 | 0 | 17 |
| Total | 13 | 74 | 17 | 105 |

Source: 1993 Survey Data.

$X^2 = 19.2689$ $df = 4$ Significant at 0.05 (95%) Confidence level.

The Table shows that 9.5% of the respondents who received agricultural information by the group approach had attained a low, 50.5% had average and 8.6% had attained high adoption levels. The Table further shows that while none of the respondents who received agricultural information by individual approach attained low level, 7.6% attained average and 7.6% attained high levels of adoption. Also 3.8% and 12.4% received information through the indirect approach, and had attained low and average adoption levels respectively. None of the respondents receiving information through the indirect approach attained a high level of adoption.

It is conclusive from the Table that a majority of the farmers sampled who received agricultural information by way of group approach attained at least an average level of adoption. Equally, that most of the farmers who received information through the individual (one-to-one) approach attained at least an average level of adoption. And that most of the farmers who received information through the indirect approach attained a low adoption level.

The group approach seemed to have given the farmers a lot of freedom to choose without pressure from the extension agents. This enabled them to sift and select from the information provided to the groups, that which was relevant to their situations.

The study had held that the individual approach was more demanding and able to reach only a few farmers but with good results in terms of adoption. However, it was only a minority 15.2% of the respondents who received agricultural information by that approach. That minority, attained average and high levels of adoption. The implication is that the individual approach to agricultural extension was highly productive in terms of instant responses, but weak in terms of the numbers of farmers it covered.

As regards the indirect approach the study had held that the approach was likely to elicit a high level of adoptions due to strong extended family institutions. Contrary to these expectations, the study found out that only a mere 16.2% of the respondents received agricultural information through indirect channels and all of them attained average and low levels of adoption. This low level of adoption was presumably due to the transmutation of information in the course of its diffusion from farmer to farmer. Similarly the low adoptions may have been the result of prevalence of witchcraft with its

concomitants such as jealousy and suspicion, and deliberate dissemination of defective or false information.

The chi-square value of 19.2689 significant at 0.05 confidence level revealed a strong relationship between agricultural extension methodology and farmers' adoption of improved farm practices. The implication was that as assumed by this study, various agricultural extension methodologies had varying capacities to elicit farmers' positive responses to the recommendations and ideas of the extension agents. These findings are in agreement with Ban and Hawkins' (1988:181) assertion that each extension method has its own advantages and disadvantages; and that each purpose or function to be fulfilled has its best method.

Hypotheses Testing: hypothesis two.

In this sub-section the second hypothesis of this study is tested. The chi-square test was used. This hypothesis was meant to establish whether the agricultural extension methodology employed influenced farmers' adoption of improved farm practices. The hypothesis as stated in chapter three and the corresponding null hypothesis were:

H_0 (null), There is no relationship between the agricultural extension methodology employed and farmers' adoption of improved farm practices.

H_2 (alternative), The agricultural extension methodology employed influences farmers' adoption of improved farm practices. The independent variable was methodology and the dependent variable was adoption.

Data on the two variables was cross tabulated as shown in Table 5.2 and the chi-square test was applied. The test indicated a strong relationship between the independent and the dependent variable with a chi-square value of 19.269, significant at 0.05 confidence level. The significance enabled the study to reject the null hypothesis that there is no relationship between agricultural extension methodology employed and farmers' adoption of improved farm practices.

Having rejected the null hypothesis, this study accepted the research hypothesis, that, agricultural extension methodology employed influences farmers' adoption of improved farm practices. As the study had expected therefore, the influence of agricultural extension methodology on farmers' adoption of improved farm practices was two-fold by manifesting itself in terms of: one, certain approaches by which a majority of the farmers received agricultural information, and two, adoption of improved farm practices on the part of the farmers.

In the first perspective, the group approach emerged as the popular fora by which farmers in the sample received agricultural information. The approach entailed some freedom of choice and corresponding participation on the part of farmers. Additionally, on the part of extension agents, the approach enabled them to reach more farmers in a tension free environment (farm visits by extensionists cause tension as most farmers realize they have not adopted this or that recommendation). A further point on group approach was that the high turn out of farmers in such sessions as public barazas motivated extension agents to use them more.

The fact that the approach was found wanting in terms of feedback and follow-ups, showed that it was weak from the point of view of extension agents, but had a strength on the part of farmers because they had ample time to select whatever information they were provided and adopted it at their own pace.

The individual approach on the other hand enabled extensionists to understand specific farm situations and address them effectively. Its limited coverage and the tension it sometimes caused at the farm level notwithstanding, the approach appeared to work well with farmers predisposed for change or improvement. It should, however, be noted that the approach by covering very few farmers on the basis of extensionists' discretion may have led to its concentration on elitist or above average farmers that are well predisposed for adoption of improved farm practices. Hence the approach was not strong for farm-to-farm campaigns requiring adoption of various recommendations.

The indirect approach to agricultural extension was rarely used by farmers to receive agricultural information. The approach also did not elicit positive responses from farmers in the form of adoption of improved farm practices. This result has a serious negative implication for the "contact farmer approach" to extension which relies on this indirect approach. The implications include: first, the possibility that the diffusion of information from the contact to the follow-up farmers was either very slow and negligible or the technical messages were transmuted in the course of diffusion and led to no effect in the end. Second, contrary to the study's assertion that the strong extended family institution in the study areas could facilitate diffusion, the institution turned out

to be the basis of witchcraft and its accompanying jealousy and suspicions; these were a deterrent to the diffusion of useful messages.

5.3 Relationship Between Farmers' adoption of improved farm practices and their self-sufficiency in food production.

This study posited that farmers' adoption of improved farm practices influenced food production at farm family level. It was assumed that adoption of improved farm practices led to refinement of food production methods and hence to higher yields. It was further assumed that farmers who adopted improved farm practices had also diversified their food production. In sum it was expected that farmers who adopted improved farm practices enjoyed self-sufficiency in food production. The two variables: farm adoption and food self-sufficiency were cross-tabulated as shown in Table 5.3 below.

Table 5.3 Relationship between varying levels of adoption of improved farm practices and relative food self-sufficiency.

| Levels of adoption | Food self-sufficiency levels | | | Total |
|--------------------|------------------------------|---------|------|-------|
| | Low | Average | High | |
| Low | 5 | 7 | 2 | 14 |
| Average | 21 | 34 | 19 | 74 |
| High | 3 | 6 | 8 | 17 |
| Total | 29 | 47 | 29 | 105 |

Source: 1993 Survey Data.

$\chi^2 = 4.73754$ $df = 4$ Insignificant at 0.05 (95%) confidence level. $r = 0.1889$.

The Table shows that of the respondents who had attained a low level of adoption 4.8%, 6.7% and 1.9% attained low, average and high levels of self sufficiency in food production respectively. On the other hand, of the respondents who had an average level of adoption, 20%, 32.4% and 18.1% had attained low, average and high level self-sufficiency in food production respectively. Finally, of the respondents who had a high adoption level 2.9%, 5.7% and 7.6% had attained low, average and high levels of self sufficiency in food production respectively.

The data led to the conclusion that there existed a relationship between farmers' adoption of improved farm practices and their self-sufficiency in food production. This is because levels of self-sufficiency in food production generally tended to rise with levels of adoption of improved farm practices. Particularly a majority of farmers who attained a low level of adoption attained corresponding average and low levels of self sufficiency in food production. On the other hand, a majority of those farmers who attained average level of adoption, achieved average and high levels of self sufficiency in food production. Also a majority of the farmers who had achieved a high level of adoption, reached average and high levels of self-sufficiency in food production. This trend suggested that as the level of adoption increased, self-sufficiency in food production tended to improve.

However, a chi-square value of 4.73754, was calculated and indicated there was no relationship between farmers' adoption of improved farm practices and their self-sufficiency in food production.

Hypotheses testing: hypothesis three

In this section, the data presented in Table 5.3 is re-examined with the intention of testing the third hypothesis of the study.

This hypothesis was meant to test whether farmers' adoption of improved farm practices positively correlated with their self-sufficiency in food production at farm family level.

The hypothesis and the accompanying null hypothesis were as shown below.

H_0 (null) There is no relationship between farmers' adoption of improved farm practices and their self-sufficiency in food production.

H_3 Farmers adoption of improved farm practices positively correlates with their self-sufficiency in food production.

The independent variable was adoption and the dependent variable was self-sufficiency in food production. The two variables were cross-tabulated as shown in Table 5.3 and the chi-square value of 4.738, insignificant at 0.05 level of confidence and $r = 0.1889$ indicated an insignificant relationship between the independent and dependent variables. This insignificance of the relationship enabled the study to accept the null hypothesis that there is no relationship between farmers' adoption of improved farm practices and their self-sufficiency in food production. The study thus failed to accept the research hypothesis that farmers' adoption of improved farm practices positively correlates with their self-sufficiency in food production.

Therefore, contrary to the study's expectations, only to a limited extent did farmers who had adopted improved farm practices also tend to attain relative

self-sufficiency in food production. It was found out that the agricultural extension service emphasized cash crops and soil conservation, so that modern farm inputs and practices such as hybrid maize seeds, fertilizers, pesticides, planting maize in rows and agroforestry were widely accepted, but they had not been effectively utilized to secure relative self-sufficiency in food production at farm family level.

For instance, farmers used fertilizers mainly on cash crops such as tea because the fertilizers were provided on credit by the Kenya Tea Development Authority. In many cases the farmers used fertilizers meant for top dressing tea for planting maize and millet with not so good results. This lack of use of improved farm inputs and practices was so because the agricultural extension service had sidelined food crops. Table 4.14, for example shows that when farmers were asked to state which crops they gave priority to, tea and coffee were mentioned by 54.3% compared to maize mentioned by less than 10% of the respondents. Farmers had been led to believe and act as if agricultural extension service was exclusively for cash crops. The findings suggest that farmers' adoption of improved farm practices could not necessarily lead to relative self-sufficiency in food production at farm family level. The kind of adoptions sought by the agricultural extension agents need to be selectively tilted and geared toward food production. For example, besides the extension agents telling farmers to plant hybrid maize seeds, they should show them how to prepare farms and how to space the crops and which fertilizers to use and in what quantities. Deliberate efforts need to be made by the extension agents to promote a variety of food crops and teach farmers about effective methods of their production.

5.4 Relationship between Farmers' adoption of improved agricultural practices and living standards at farm family levels.

This study held that farmers' adoption of improved farm practices positively influenced the living standards of farm families. It was assumed that adoption of improved farm practices resulted in higher yields and subsequently higher incomes. The higher incomes were expected to be translated into better housing, education for children, the acquisition of life improving items and diversification of economic activities. Overall, this study expected that farmers who adopted improved farm practices would end up leading better lives or attaining higher standards of living. In order to study the relationship between farmers' adoption of improved farm practices and their living standards, the data on levels of adoption was cross-tabulated with the data on levels of living. The result of the cross-tabulation is shown in Table 5.4 below.

Table 5.4 Distribution of the respondents according to levels of adoption and levels of living at farm family level.

| Levels of adoption | Levels of living | | | Total |
|--------------------|------------------|---------|------|-------|
| | Low | Average | High | |
| Low | 10 | 4 | 0 | 14 |
| Average | 27 | 25 | 22 | 74 |
| High | 2 | 8 | 7 | 17 |
| Total | 39 | 37 | 29 | 105 |

Source: 1993 Survey Data.

$\chi^2 = 13.39959$ $df = 4$ Significant at 0.05 (95%) confidence level. $r = 0.3357$.

The Table shows that 9.5% of the respondents with low level adoption attained low, 3.8% average and none of them attained high level of living standards. The Table also shows that 25.7% of the respondents with average level of adoption attained low, 23.8% average and 21% attained high levels of living standards.

The Table further suggests that 1.9% who achieved high levels of adoption attained low, while 7.6% and 6.7% of them attained average and high levels of living standards respectively. Overall those respondents who had attained low level adoptions tended to enjoy average or lower living standards. On the same score majority of those respondents who attained high level adoptions tended to enjoy average and higher levels of living. This scenario suggests a relationship between farmers' adoption of improved farm practices and their living standards at farm family level.

The Table revealed a chi-square value of 13.39959 and $r = 0.3357$ representing a substantial relationship between farmers' adoption of improved farm practices and their levels of living standards at farm family level.

Hypotheses testing: hypothesis four

In this section the data in Table 5.4 was looked at from the perspective of testing hypothesis four, of the study. As indicated in chapter three the study made use of the chi-square and the coefficient of correlation (r) to test hypothesis four.

The fourth hypothesis sought to test whether farmers' adoption of improved farm practices positively influenced the living standards of farm families. The null form of the hypothesis was that there is no relationship between farmers' adoption of improved

farm practices and their living standards at farm family level. The alternative form was that farmers' adoption of improved farm practices positively influences their living standards at farm family level.

The independent variable was adoption and the dependent variable was living standards. Cross-tabulation of data on the two variables was done as shown in Table 5.4 followed by application of the chi-square and Pearson's co-efficient of correlation. The chi-square value was 13.39959 significant at 0.05 confidence level and $r = 0.3357$ which represented a significant relationship between the independent and dependent variables. With this significant relationship, the study rejected the null hypothesis that there is no relationship between farmers adoption of improved farm practices and their living standards at farm family level.

Overall, this study rejected the null hypothesis that there is no relationship between farmers' adoption of improved farm practices and their living standards at farm family levels. The study thus maintained the alternative hypothesis that farmers' adoption of improved farm practices positively influences their living standards at farm family levels.

As shown by the test results the positive relationship was substantial but not all embracing. Farmers adoption of improved farm practices did not always uniformly result in higher standards of living at farm family level. It was noted that in some cases even if farmers had attained higher levels of adoptions including cash crops, record keeping, use of fertilizers, soil conservation, agroforestry and hybrid maize seeds, the higher incomes realized were consumed through school fees. This translated into the

neglect of other life improving expenditures such as housing, radios and water tanks. In some cases higher incomes resulting from the practice of improved methods of farming may have been squandered in leisure activities such as beer or concubines and did not therefore lead to higher levels of living as expected. Generally speaking, however, as contended by this study, farmers who made various adoptions of improved farm practices tended to improve their families' living standards.

Farmers who had more reasons for income than leisure knew that adoption of improved farm practices would lead to higher yields and incomes to invest. Farmers who did not seek to improve their living standards thought that they made adoptions either to please extensionists or to be like other farmers. Such farmers did not make serious efforts at adopting improved farm practices and their yields remained low, translating into low incomes and low standards of living.

Finally, farmers' adoption of improved farm practices was a necessary factor in improving their living standards but it was not the only factor. Farmers in the survey areas needed to learn the need for other life improving things like clean water sources on the farm, improved housing, radios and others. This study found out therefore, that agricultural extension service needs to focus beyond the mere adoption of agricultural practices and the mass media ought to also sensitize people to better living standards and all that go with them.

5.5 Conclusion.

This chapter set out to provide an understanding of the relationship, between farmers' participation in the extension process, agricultural extension methodology and farmers' adoption of improved farm practices. It was established that farmers' participation in the extension programme could no doubt lead to more widespread adoption of improved farm practices. It was shown that different extension approaches had varying capacities to elicit positive responses that led to farmers' adoption of improved farm practices. Agricultural extension methodologies employed were therefore found to influence farmers' adoption of improved farm practices.

This chapter also set out to analyze the relationship between farmers adoption of improved farm practices and their self-sufficiency in food production at farm family level in the first instance. In the second, the chapter sought to show the relationship between farmers adoption of improved farm practices and their living standards.

The study found out that farmers' adoption of improved farm practices influenced their self-sufficiency in food production, but only to a limited extent. The study showed that while adoption was a precondition for farmers' self-sufficiency in food production, it did not always result in that self-sufficiency. This study found out that most adoption as encouraged by the extension service was tilted in favour to non-food crops, i.e, cash crops or to agricultural activities such as agroforestry, which had no direct bearing on food production.

The study confirmed that farmers' adoption of improved farm practices positively influenced their living standards. It was, however, noted that this relationship was not

all embracing. In some cases farmers' adoptions did not result in higher standards of living. Otherwise the study established that by and large, farmers who made a wide range of adoptions of improved farm practices tended to enjoy high standards of living. It was such farmers who afforded to intensify and extend their agricultural activities and hence secure higher incomes and better living conditions.

CHAPTER VI

CONCLUSIONS AND IMPLICATIONS FOR POLICY AND RESEARCH

The aim of this chapter is to summarize the major findings of this study, draw conclusions and show some of their implications to agricultural extension services and to future research.

6.1 Recapitulation and discussion.

The study found out that farmers' participation in the agricultural extension process positively affect their adoption of improved farm practices. As the study had contended, there was a propensity for farmers who participated in the agricultural extension process to more readily adopt a wide range of improved farm practices.

This was probably because participative farmers discussed their farm problems in different fora (formal and informal), clarified them and evolved sound solutions. Participative farmers were discussive and ready to learn as opposed to the less participative ones who were presumably relatively withdrawn, and may not have had occasion to clarify their farm problems.

Thus agricultural extension, should not be seen as just an effort to get specific messages to specific farmers or groups of them. It needs to be broad based, emerging both at the farmers' field day and village baraza, at the local church and at the village school general meeting, at the Tea Buying Centres and at welfare group meetings. In a nutshell, the service needs to creatively infiltrate the farming communities with a view

to involving members of the various groups (formal and informal, large and small, prestigious and non-prestigious) therein.

The study also found out that the agricultural extension methodologies employed influenced farmers' adoption of improved farm practices.

The group approach emerged as the popular forum by which the sampled farmers received agricultural information. The approach occasioned freedom of choice and corresponding participation on the part of farmers. On the part of extensionists, it enabled them to reach more farmers.

The individual approach had limited coverage of farmers, but enabled extensionists to address specific farmers' problems effectively. The indirect approach to agricultural extension was rarely used in the study areas. The approach elicited limited positive responses from farmers in the form of adoption of improved farm practices. This was probably because of the prevalence of witchcraft and jealousy in the survey areas, which may have made some farmers withhold or pass on false messages.

It was found out that there is no relationship between farmers' adoption of improved farm practices and their relative self-sufficiency in food production. Only to a limited extent did farmers who had adopted improved farm practices also tend to attain relative self-sufficiency in food production. The agricultural extension service seemed to emphasize cash crops rather than food production.

Finally, the study found out that farmers' adoption of improved farm practices positively influenced their levels of living. It was, however, noted that this relationship was not all embracing. In some cases farmers' adoption of improved farm practices did

not result in higher levels of living. This was probably because the income may have been used for paying school fees or for leisure activities such as drinking and second or subsequent marriages.

This study concluded that a participatory-oriented agricultural extension service that used approaches that involved farmers in the extension process was likely to lead to a more widespread adoption of improved farm practices. The agricultural extension service needs to pay more attention to food crops if relative food self-sufficiency is to be attained. Finally, it is concluded that farmers' adoption of improved farm practices is a pre-requisite to their attainment of higher levels of living.

These conclusions imply that from the participatory perspective, the modernization theory which emphasizes 'transferring-in' technology is deceptive and does not capture the whole concept and practice of development. It seems to exclude the participatory component which is critical to development. These conclusions further show that the communication theory which emphasizes both forward and backward linkages encourages the participation of the client and hence forms a suitable framework for understanding and furthering the participatory approach to development.

6.2 Some Implications for Policy and Research

The various research findings discussed above and the conclusions drawn have several implications both for policy and for future research.

As regards policy, first, the observation that farmers' participation in the agricultural extension process influences their adoption of improved farm practices calls

for the strengthening of efforts aimed at making the extension process participatory-oriented. For instance, initiatives need to be taken to encourage farmers to consult extension agents as frequently as possible. Similarly, farmers need to be encouraged to make their own priorities for advice. Self-help and women's groups are useful forums for extension work and agents need to strengthen and aid them to undertake agricultural activities. Public barazas (meetings) also need to be emphasized as a forum for agricultural extension. It would also be desirable to distribute agricultural reading materials to farmers and advise them to share their knowledge of better farming among themselves and with extension agents for clarification.

Second, it was shown that the agricultural extension methodology employed influences farmers' adoption of improved farm practices and this suggests that extensionists have to decide on appropriate approaches more diligently. For example it was observed that the group approach was considered convenient by extensionists because it enabled them to reach a large number of farmers. However, extension methodology needs to be decided not on the basis of convenience alone, but also on the basis of suitability depending on the clientele and the specific situations. Farmers need to be involved in the selection of contact farmers in order to ensure their accessibility. Moreover, the T & V approach needs to be discontinued altogether, because contact farmers are chosen on the basis of considerations other than suitability to help other farmers adopt improved farm practices. That some contact farmers did not consider themselves suitable for the positions calls the T & V approach into question all the more. In a nutshell the T & V approach is out of tune with its objectives. Modalities also need

to be in place to involve extension agents more continuously in mobilizing farmers for various agricultural activities to avoid abdicating this role to the local administrative bureaucracy, as is the case now with regard to soil conservation activities. Overall, the agricultural extension service needs to utilize the mass media such as radio (which is common in rural areas) and billboards to reach more farmers.

Third, the notion that agricultural extension pays little attention for food crop production needs to be revisited. Farmers' adoption of improved farm practices did not seem to result in their relative self-sufficiency in food production. The emphasis of the extension service on cash crops and other non-food-related activities needs to be redressed so that they deliberately spread out efforts to cover food crops. Extension agents would perform better in the food sector if they are, as a matter of policy required to deal exclusively in food crops during appropriate peak periods such as land clearing, planting, weeding and harvesting. More intensive methods of food crop production are necessary to cope with land shortages in the study areas.

Finally, it would be beneficial to recognize that farmers' adoption of improved farm practices leads to their attainment of higher levels of living. Thus, agricultural extension needs to be viewed as a vehicle of improvement of living conditions of farm families. This then, calls for a more ambitious extension service to cover more farmers and hence spread socio-economic welfare more rapidly in rural areas. However, in general the extension service also needs to sensitize farmers to better living conditions to help direct their aspirations toward goals that are in line with development.

As regards farm adoption research there are a number of research questions emerging from the present study which need attention in the future. First, in this thesis it has been established that farmers' participation in the extension process influences their adoption of improved farm practices. It will be necessary in the future to study the factors that affect extension agents' ability to facilitate farmers' participation. Second, it is also necessary to study the personal characteristics of farmers who prefer respective agricultural extension approaches; i.e., group, individual and indirect approaches, in order to move closer to accurately predicting appropriate approaches for farmers once their characteristics are known. Finally, research is required to determine the relationship between cash crop production and relative food self-sufficiency. A further inquiry into the effect of informal food relief (within extended families and clans) on the recipients' future relative self-sufficiency in food production is also required.

BIBLIOGRAPHY

- Ascroft, J. et al (1973) Extension and the forgotten farmer: First Report of A Field Experiment. IDS, University of Nairobi, Nairobi.
- Alila, O.P. (1978) The Role of Public Bureaucracy in Agricultural Development in Kisumu District, Western Kenya. Unpublished Ph.D. Thesis. Indiana University, U.S.A.
- Amin, S (1990) Maldevelopment: Anatomy of a Global failure. United Nations University Press, Tokyo.
- Ban, A.W.V.D and Hawkins, H.S. (1988) Agricultural Extension. John Wiley and Sons, Inv and Longman Scientific and Technical, New york.
- Bahemuka, J. M. (1982) Our Religious Heritage. Thomas Nelson and Sons Ltd, Nairobi.
- Bahemuka, J.M. (1987) Socio-Cultural Practices Related to Grain Storage in Western Kenya. A report for Ministry of Agriculture, Nairobi.
- Benor, D., Harrison, J.Q. and Baxter, M. (1984) Agricultural Extension: The Training and visit system. World Bank, Washington, D.C.
- Benor, D. and Harrison, J.Q. (1977) Agriculture Extension: The training and visit system World Bank, Washington D.C.
- Benor, D. and Baxter, M. (1984) The Training and Visit Extension. World Bank, Washington D.C.
- Biggs, S. and Farrington, J. (1991) Agricultural Research and the Rural Poor: A Review of Social Science

- Analysis. International Development Research Centre, Ottawa.
- Brown, L.H. (1968) Agricultural change in Kenya; 1945-1960. Stanford University press, Stanford.
- Chambers, R. (1983) Rural Development: Putting the Last First Longman Group, Essex.
- Chattopadhyay, P. (1972) 'Modernization of Economic life in Developing Societies'. In: Desai, A.R. (ed), Essays on Modernization of Underdeveloped Societies. Humanities Press, New Jersey.
- Chitere P.O. (1980) Decentralization of decision making processes: Its implications for the implementation of the crops improvement programme in Kakamega District Kenya. Unpublished PhD Thesis university of Nairobi, Nairobi.
- Chitere, P.O. (1991) "Reflections on Action Research and Rural Development Approaches". In: Chitere, P.O. and Mutiso, R.M. (eds.), Working with Rural Communities: A Participatory Action Research in Kenya. Nairobi University Press, Nairobi.
- Chitere, P.A. (1975) Introduction of grade dairy animals in Kakamega District: Effectiveness of Agricultural Extensions. Unpublished MSc. Thesis, University of Nairobi.
- Chitere, P. O. and Kiros, F.G. (1994) Farmers' participation in the adaptation of IPM Technologies in ICIPE's ISERIP Project in the Coast Province, Kenya. Paper presented at the ICIPE's Annual Research Conference, Nairobi, May 9-12th.

- Chitere, P.A. (ed), (1994) Community Development: Its conceptions and practice with Emphasis on Africa. Gideon S. Were Press, Nairobi.
- Cohen, D.W and Atieno Odhiambo, E.S. (1989) Siaya: The Historical Anthropology of An African Landscape. Heinemann Kenya, Nairobi.
- De wilde et al (1967) Experiences with Agricultural Development in Tropical Africa.Vol.1. The John Hopkins Press, Baltimore.
- FAO (1972) Agricultural Extension: A Reference Manual. FAO, Rome.
- FAO (1978) Small Farmers Development Manual Vol. I, Field Action for small farmers, small fishermen and peasants. FAO Bangkok.
- FAO (1983) Delivery Systems of Agricultural services to small farmers in Africa: Case studies from Ethiopia, Kenya and Nigeria. FAO, Rome.
- Freire, P. (1972) Pedagogy of the oppressed. Penguin Book Ltd. England.
- Garst, R.D. (1972) The Spatial Diffusion of Agricultural innovations in Kisii District, Kenya. Unpublished PhD. Thesis Dept. of Geography, Michigan state University.
- Geertz, C. (1963) Agricultural Involution: The Process of Ecological Change in Indonesia. University of California Press, London.
- Ghai,D. Et al (1979) Planning for Basic Needs in Kenya: Performances, Policies, and

- Prospects. ILO Publications, Geneva.
- Godfrey, A.I. (1977) Quantitative Methods. Edward Arnold (Publishers) Ltd, London.
- Hall, A.D. (1936) The improvement of Native Agriculture in relation to population and Public Health. Oxford University Press, London.
- Harrison, P. (1987) The Greening of Africa: Breaking Through in the Battle for Land and Food. Paladin Grafton Books, London.
- Heyer, J. et al (1969) Rural Development in Kenya. A Survey of Fourteen Districts with Recommendations for Intensified Development. IDS, University of Nairobi, Nairobi.
- Hill, F.F and Hardin, L.S. (1971) 'Crop production successes and Emerging problems in Developing countries'. In: Turk, K.L. (ed), Some Issues Emerging from Recent Breakthroughs in food production. New York State College of Agriculture, New York.
- Hunter, G. (1978) Agricultural Development and the Rural Poor. Overseas Development Institute, London.
- Hunter, G. (1978) Modernizing Peasant Societies: A Comparative study of Asia and Africa. Oxford University Press, New York.
- Inkeles, A. and Smith, D.H. (1974) Becoming Modern: Individual Change in Six Developing Countries. Heinemann Educational Books, London.

- Jaetzold, R. and Schmidt, H. (1982) Farm Management Handbook of Kenya vol.2a, West Kenya (Nyanza and Western provinces). Typo-druck, Rossdorf.
- Kanogo, T. (1989) 'Kenya and the Depression 1929 - 1939' In Ochieng', W.R. (ed), A modern History of Kenya 1895 - 1980 in Honour of B. A. Ogot. Evans Brothers Limited, Nairobi.
- Kenya, Republic of (1983) District Focus For Rural Development. Government printer, Nairobi.
- Kenya, Republic of (1994) Nyamira District Development Plan 1994-96. Government printer, Nairobi.
- Kenya, Republic of (1992) Evaluation Report: National Soil and Water Conservation Project Ministry of Agriculture and SIDA, Nairobi.
- Kenya, Republic of (1986) Economic Management for Renewed Growth. Government printer, Nairobi.
- Kenya, Republic of (1994) Recovery and sustainable Development to the year 2010. Government printer, Nairobi.
- Kenya, Republic of (1984) Kisii District Development Plan 1984-88. Government Printer, Nairobi.
- Kenya, Republic of (1989) Kisii District Development Plan 1989-93. Government Printer, Nairobi.
- Kenya, Republic of (1981) National Food Policy. Government Printer, Nairobi.
- Kenya, Republic of (1984) District Socio-Cultural Profiles: Kisii District. Nyamwaya, D. ed.

- Ministry of Planning and National Development, Nairobi.
- La-anyane, S. (1985) Economics of Agricultural Development in Tropical Africa. John Wiley and Sons, New York.
- Lele, (1975) Design of Rural Development. Lessons from Africa. The John Hopkins University Press, Washington, D.C.
- Lerner, D. (1958) The Passing of the Traditional Society: Modernizing the Middle East. The Free Press, Glencoe Illinois.
- Lerner, D. and Schramm, W.eds. (1967) Communication and Change in Developing Countries. East-West Press, Honolulu.
- Leonard, K.D. (1977) Reaching the Peasant Farmer: Organisation, Theory and Practice in Kenya. The University of Chicago Press, Chicago.
- Leys, C. (1977) "Political Implications of the Development of Peasants Society in Kenya." In: Gutkind, P.C.W. and Waterman P. eds. African Social Studies: A radical Reader. Nairobi: Heinemann.
- Marco Surveys Ltd (1965) A Baseline Survey of Factors Affecting Agricultural Development in Three Areas of Kenya. Ministry of Labour and Social Services, Nairobi.
- Maxon, R. (1989) 'The years of Revolutionary Advance 1920-1929' In Ochieng', W.R. (ed), A Modern History of Kenya 1895-1929 in Honour of B.A. Ogot. Evans Brothers Limited, Nairobi.

- Mbithi, P.M. (1974) Rural Sociology and Rural Development: Its Application in Kenya. Kenya Literature Bureau, Nairobi.
- Mosher, A.T. (1966) Getting Agriculture Moving: Essentials for Development and Modernization. Praeger Press, New York.
- Mulwa, F.W. (1987) Participation of the Poor in Rural Transformation: A Kenya Case. Gaba Publications, Eldoret.
- Muia, D.M. (1991) 'A Conceptual Examination of the Phenomenon of participation in Rural Development' In: Chitere, P.O. and Mutiso, R.M. (eds) Working with Rural communities: A Participatory Action Research in Kenya. Nairobi University Press, Nairobi.
- Myrdal, G. (1970) The Challenge of World Poverty: A world Anti-poverty programme outline. Penguin Books Ltd, Middlesex, England.
- Ogada, F. (1971) 'Maize in Kenya'. In : Turk, K.L. (ed) Some issues emerging from Recent Breakthroughs in Food Production. New York State College of Agriculture, New York.
- Omoka, W.K. (1991) 'Effect of community power on local development projects in Kakamega District' In: Chitere, P.O. and Mutiso (eds), Working with Rural Communities: A Participatory Action Research in Kenya. Nairobi University Press, Nairobi.
- Ontita, E.G (1991) "The Role of village Headman in Rural Development". In: Chitere,

- O.P. and Mutiso, R.M. (eds), working with Rural communities: A Participatory Action Research in Kenya. Nairobi University Press, Nairobi.
- Ontita, E.G. and Chitere, P.O. (1991) 'Village Communities in Kenya with Emphasis on Kabras Area' In: Chitere, O.P. and Mutiso, R.M. (eds), Working with Rural Communities: A Participatory Action Research in Kenya. Nairobi University Press, Nairobi.
- Pickering, D.C. (1983) 'Agricultural Extension: A Tool for Rural Development' In: Cernea, M.M. et. al. (eds), Agricultural Extension by Training and Visit: The Asian Experience. World Bank, Washington, D.C.
- Reddy, A.A. (1971) Extension Education. Sree Press, Bapata.
- Rostow, W.W. (1960) The Process of Economic Growth. Oxford University Press, London.
- Rostow, W.W. (1960) The Stages of Economic Growth. Oxford University Press, London.
- Russell, J.F.A (1983) 'Farmer participation and the village extension worker: A comment'. In: Cernea M.M. et. al. (eds), Agricultural Extension by Training and Visit. The Asian Experience. World Bank, Washington, D.C.
- Ruthenberg, H. (1966) African Agricultural Production Development policy in Kenya 1952 - 1965. Springer - Verlag, Berlin.
- Rogers, E. M. (1969) Modernization Among Peasants: The Impact of Communication. Holt, Rinehart and Winston, Inc, New York.

- Savile, A.H. (1965) Extension in Rural Communities. Oxford University Press, London.
- Seidman, A. (1977) 'The Economics of Eliminating Rural Poverty'. In: Palmer R. and Parsons N. (eds), The Roots of Rural Poverty in Central and Southern Africa. Heinemann Educational Books, Nairobi.
- Singleton, R. et. al (1993) Approaches to Social Research. Oxford University, New York.
- Sprague, E.W, Osler, R.D. and Filay, K.W. 1971 'New Horizons in Food Production'. In: Turk, K.L. (ed), Some Issues emerging from Recent Breakthroughs in Food Production. New York State College of Agriculture, New York.
- Sukaayo, G. D. (1983) 'Farmer participation in the training and visit system and the role of village extension workers: Experience in Indonesia' In: Cernea, M.M. et. al. (eds), Agricultural Extension by Training and Visit: The Asian experience. World Bank, Washington, D.C.
- Swynnerton, R.J.M. (1955) A plan to intensify the development of African Agriculture in Kenya. Government Printer, Nairobi.
- Timberlake, L. (1985) Africa in Crisis: The Causes, the Cares of Environmental Bankruptcy. Earthscan Publications, London.
- Uchendu, C.C. and Anthony, K.R.M. (1975) Agricultural change in Kisii District, Kenya. East Africa Literature Bureau, Nairobi.
- Uphoff, N.T. and Esman, M.J. (1974) Local Organisation for Rural Development: Analysis of Asian Experience. Rural Development Committee, Center for International

- Studies, Cornell University, Ithaca, New York.
- Vajas, E. (1972) 'Problems connected with Modernization of Underdeveloped Societies. In: Desai, A.R. (ed), Essays on Modernization of Underdeveloped Societies. Humanities Press, New Jersey.
- Wandera, G. and Omoto, W.S. (1991) 'Non-Governmental Organisations: Their Role in Rural Development in Kenya'. In: Chitere, P.O. and Mutiso, R.M. (eds), Working with Rural Communities: A Participatory Action Research in Kenya. Nairobi University Press, Nairobi.
- World Bank. (1990) World Development Report 1990: Poverty. Oxford University Press, New York.
- Zezeza, T. (1989) 'Kenya and the 2nd World War 1939-1950'. In: Ochieng', W.R. (ed), A Modern History of Kenya 1895-1980 in Honour of B.A. Ogot. Evans Brothers Limited, Nairobi.
- Zezeza, T. (1989) 'The establishment of Colonial Rule, 1905-1920'. In: Ochieng', W.R. (ed), A Modern History of Kenya 1895-1980 in Honour of B.A. Ogot. Evans Brothers Limited, Nairobi.
- Zwanenberg, V.R. (1992) The Agricultural History of Kenya to 1939. East Africa Publishing House, Nairobi.

Appendix A: PHOTOGRAPHS



A1: Sweet-potatoes crop on the fore and middle ground. In the mid-background is a maize crop.



A2: A case of agroforestry: Maize intercropped with trees used as fuel-wood (middle ground)



A3. Straw-berry tree on the left fore-ground, sukuma wiki on the right fore-ground, millet in the middle ground and maize crop in the right mid-background.



A4. Pasture on the foreground and maize intercropped with bananas and some trees on the background

APPENDIX B: INTERVIEW SCHEDULE FOR HEADS OF HOUSEHOLDS.

**DEPARTMENT OF SOCIOLOGY,
UNIVERSITY OF NAIROBI.**

INTERVIEW SCHEDULE FOR HEAD OF HOUSE-HOLDS.

INTERVIEW SCHEDULE NO.-----.

NAME OF RESPONDENT:-----.

SUB-LOCATION:-----.

DATE:-----.

INVENTORY.

- Q.1. Sex of respondent. (1) Male (1) Female.
- Q.2. Age of respondent.
- Q.3. Education level.
- Q.4. Farm acreage:-----hectares.
- Q.5. Occupation (1) Farmer (2) Teacher (3) Civil Servant
(4) Businessman (5) Professional (6) Others.

PARTICIPATION IN AGRICULTURE EXTENSION.

- Q.6. Which problems do you face in your farming activities?
(1) Lack of advice from extensionists. (2) Lack of finance.

(3) Marketing problems. (4) Meagre acreage. (5) Poor soils.

(6) Drought. (7) Insufficient family labour.

Q.7. How do you proceed to solve the farm problems?

(1) Go out for advice or help from a neighbour or friend.

(2) Go out for advice from an agriculture extensionist.

(3) Wait until the extensionist comes to my farm to advise.

(4) Takes no step. (5) Seek help from a traditional co-operative group.

Q.8. How frequently have you approached agriculture extensionist for advice in the last year?

(1) Weekly (2) Monthly (3) Quarterly (4) Others. Specify.

Q.9. What did you mention as your priorities?

(1) Tea (2) Coffee (3) Pyrethrum (4) Maize (5) Millet

(6) Beans (7) Vegetables (8) Others.

Q.10. In advising you does the extensionist:

(1) Give you alternatives from which to choose?

(2) Persuade you to adopt some practice?

(3) Direct you to adopt some practice?

(4) Threaten you into adopting some practice?

(5) Others? Specify:

Q.11. Are you a member of any self-help or women's group?

(1) Yes (2) No.

Q.12. If the group has ever invited advice from an agriculture extensionist how did that benefit your farming activities?

- (1) Has not benefitted me.
- (2) Received information on better farming methods.
- (3) Received information on sources of farm inputs.
- (4) Received information on farm product market out-lets.
- (5) Others.

Q.13. Which of the following functions have you attended in the last year.

- (1) Agricultural field-days/ demonstrations.
- (2) Agricultural shows (3) Educational films.
- (4) Public barazas. (5) Self-help group meetings.
- (6) Educational trips (7) Women's group meeting.

Q.14. For those that you attended how have they helped improve your farming?

- (1)
- (2)
- (3)
- (4)

Q.15. How frequently do you read Newspapers/Agricultural magazines?

- (1) Does not read at all. (2) Monthly (3) Quarterly
- (4) Others.

Q.16. Have you ever, in the course of your usual farming activities come across any idea (s) or practice (s) which you thought would improve farming in this area?

(1) Yes (2) No.

Q.17. If yes, which? (1) (2)

(3) (4) (5)

Q.18. What did you do with the idea(s) or practice (s)?

(1) Perfected it and I am benefiting.

(2) shared it with neighbours and friends.

(3) Told the extensionist about it.

(4) Others.

ADOPTIONS.

Q.19. Have you adopted hybrid maize seeds? (1) Yes (2) No.

Q.20. If yes, how frequently do you use them?

(1) Every planting season (2) Occasionally (3) Others.

Q.21. Do you use chemical fertilizers? (1) Yes (2) No.

Q.22. If yes, how frequently do you use them?

(1) Every planting season (2) Yearly for perennial crops

(3) Occasionally (4) Others. Specify:

Q.23. Have you ever received agricultural credit? (1) Yes (2) No.

Q.24. If yes, how did you spend the loan?

(1)

(2)

(3)

Q.25. If you received a loan, on the basis of what security did you get it?

(1) (2)

(3) (4)

Q.26 Were you able to repay the loan fully and on time?

(1) Yes (2) No

Q.27. Do you in your farming activities use pesticides?

(1) Yes (2) No

Q.28. If yes, for what uses?

(1) (2)

Q.29. Do you plant maize in rows? (1) Yes (2) No.

Q.30. If yes what spacing? _____

Q.31. Which soil and water conservation measures have you taken in your farm?

(1)

(2)

Q.32. Do you practice afforestation on your farm? (1) Yes (2) No.

Q.33. If yes, for what reason? (1)

(2)

(3)

Q.34. Do you keep farm records? (1) Yes (2) No.

Q.35. If yes, which records? (1) Inventories (2) Financial records. (3) Farm operations records (4) Others.

Q.36. Which cash crops do you grow on your farm? (1) Tea (2) Coffee (3) Pyrethrum (4) Passion fruits (5) None (6) Others.

AGRICULTURE EXTENSION METHODOLOGY

- Q.37. Are you a contact farmer for agriculture extension purposes in this area? (1) Yes
(2) No.
- Q.38. If yes, how many visits by other farmers do you host per month? _____
- Q.39. Which problems do you encounter as a contact farmer?
- (1) Other farmers waste my time visiting my farm.
 - (2) Other farmers feel jealous of the demonstration materials I use.
 - (3) Majority of them do not visit my farm.
 - (4) I face no problem.
 - (5) Others.
- Q.40. If you are a contact farmer do you like being identified as one?
- (1) Yes
 - (2) No.
- Q.41. Do you think you deserved the position of contact farmer?
- (1) Yes
 - (2) No.
- Q.42. If yes, why? (1) My farm was well kept
- (2) My income was the highest in this area.
 - (3) Agriculture extensionist was a friend.
 - (4) I hold leadership positions in various institutions here.
 - (5) My farm is next to a road.
 - (6) People in this area fear me.

Q.43. In case you are not a contact farmer, how would you describe a contact here, in terms of accessibility to others for advice?

- (1) Too rich and arrogant.
- (2) Too christian and intolerant.
- (3) Hospitable and willing to assist.
- (4) A witch, inaccessible
- (5) Too poor to be an example.
- (6) Others specify _____

Q.44. Have you ever participated in a group soil conservation exercise?

- (1) Yes
- (2) No.

Q.45. If yes, who invited you to work?

- (1) Ass. Chief or Chief
- (2) Agriculture extensionist
- (3) Village Headman
- (4) Others specify _____

Q.46. What is your assessment of this method of soil conservation?

- (1) Very appropriate
- (2) Appropriate
- (3) inappropriate
- (4) Very inappropriate.

Q.47. What is your assessment of group meetings (baraza, Welfare/women's group meetings) as fora for agriculture extension?

- (1) Very appropriate
- (2) Appropriate
- (3) inappropriate
- (4) Very inappropriate.

Q.48. If you are a member of a group which receives agricultural information, how has the introduction of such messages affected your group?

- (1) Strengthened the group.
- (2) Side-lined the original objectives.
- (3) Completely disrupted the group.
- (4) Other specify _____

Q.49. From what source do you MOSTLY receive agricultural information?

- (1) Agriculture extensionists directly.
- (2) Near-by contact farmer.
- (3) At public baraza.
- (4) At welfare group meetings/social gatherings.
- (5) From neighbours and friends.
- (6) Other specify _____

FOOD PRODUCTION

Q.50. Which food crops do you grow on your farm?

- (1) Maize (2) Beans (3) Millet (4) Vegetable (5) Others.

Q.51. Specify acreage for each food-crop.

- (1) Maize and beans _____ acres.
- (2) Millet _____ acres
- (3) Vegetable _____ acres.
- (4) Others _____ acres.

Q.52. Why do you think people fail to produce enough food?

- (1) Are lazy (2) Are poor (3) Are drunkards.
- (4) Are ignorant (5) Are landless

(6) Are rich enough to afford food purchases.

Q.53. For how many months did you purchase maize for consumption, last year?

- (1) None (2) Less than 3 months
(3) 3 - 6 months (4) Others specify _____

Q.54. What was the cause of the maize deficit?

- (1) Meagre acreage
(2) Poor maize growing methods/poor yields
(3) Lack of finance to buy inputs.
(4) Lack of labour
(5) Others specify _____

Q.55. Have you ever received any food relief in the last year?

- (1) Yes (2) No.

Q.56. If yes, from which sources?

- (1) Relatives (2) NGOs
(3) Government (4) Others.

Q.57. What proportion of your land is planted with food crops?

- (1) One quarter and less (2) One half
(3) Three quarters (4) Other specify _____

Q.58. Has agriculture extension service in any way helped you, increase your food yields over the last two years?

- (1) Yes (2) No.

Q.59. Which food-crops have you given up since you adopted new farming practices?

(1) (2)

(3) (4)

Q.60. How many meals does your family normally have per day?

(1) One (2) Two (3) Three (4) Others Specify _____

Q.61. Kindly tell us which foodstuffs regularly make up meals and the estimated quantities in which they are taken per person per day.

Q.62. Which foodstuffs have you given up in the last 2 to 3 years?

(1) (2) (3) (4)

Q.63. If you have given up any foodstuffs, what were the reasons for the actions?

(1) (2) (3) (4)

Q.64. How would you assess the nutritional status of this household?

(1) Very high (2) High

(3) Average (4) Poor (5) Very poor

FARMERS' STANDARDS OF LIVING

Q.65. What type is your main house?

(1) Permanent (2) Semi-permanent (3) Traditional.

Q.66. How much was your agricultural income in:

1991 Kshs _____ 1992 Kshs _____

Q.67. How much income (Kshs) did you receive from other sources in

1991 Kshs _____ 1992 Kshs _____

Q.68. Which other businesses do you have outside this farm?

- (1) (2) (3)

Q.69. Kindly distribute your OUT-OF SCHOOL children by educational attainment.

- (1) No formal education at all
(2) Sub-primary education
(3) Std. 7 or 8 No. _____
(4) 'O' Level No. _____
(5) 'A' Level No. _____
(6) College Cert. No. _____
(7) College Dip. No. _____
(8) University degree(s) No. _____

Q.70. How many of your children are currently in:

- (1) Nursery and primary schools. No. _____
(2) Secondary schools. No. _____
(3) Middle level Training institutions. No. _____
(4) Universities No. _____
(5) Paid or self-employment No. _____
(6) Unemployed and staying at home. No. _____

Q.71. Which of the following do you own?

- (1) Radio(s) (2) Television set(s) (3) Vehicle (s)

(4) Wheel-barrow (5) Bicycle(s) (6) Water tank (7) Water hole (well)

Q.72. If you have adopted any modern agricultural practices, for what reasons did you do so?

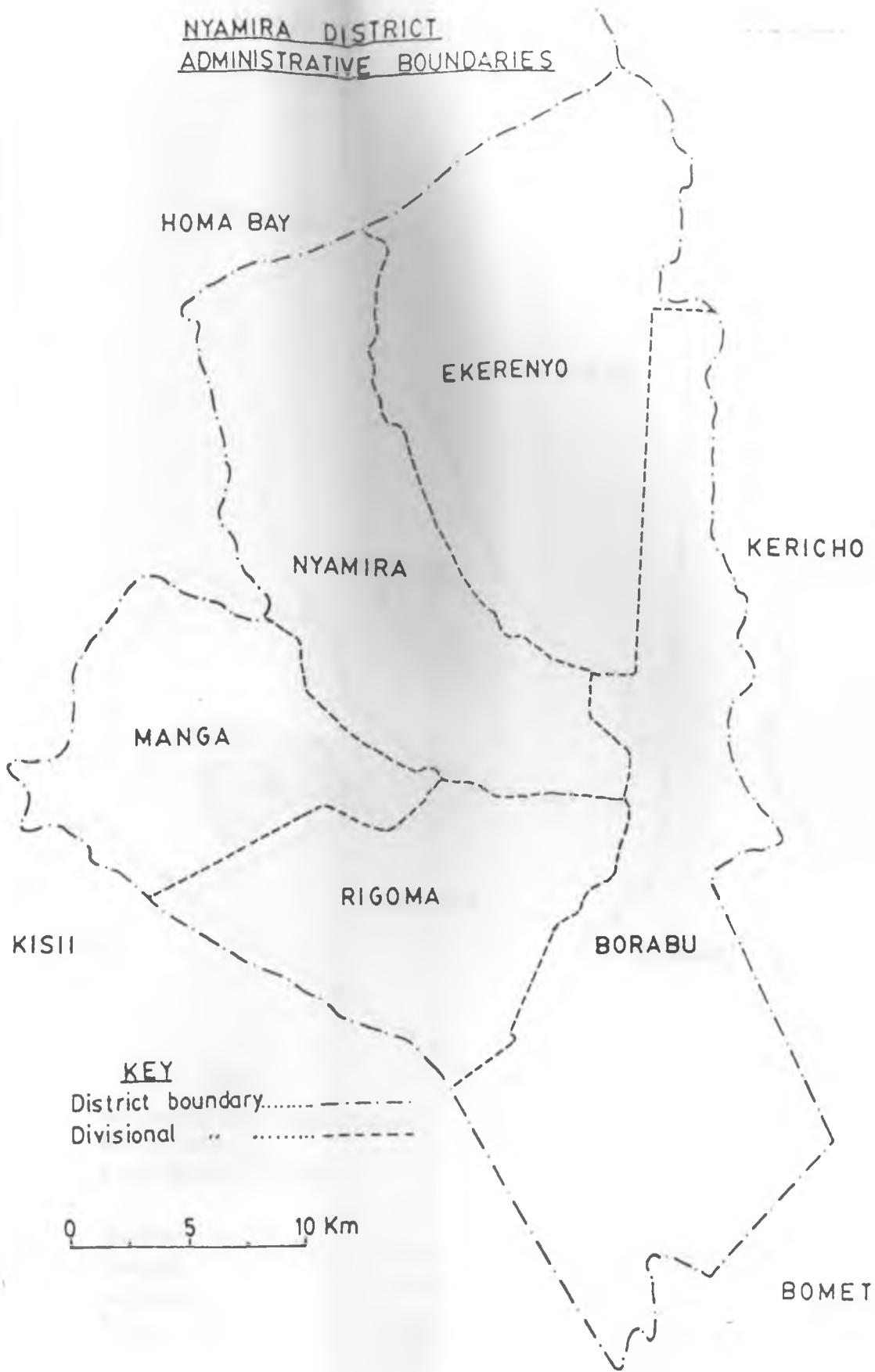
(1) To be like other farmers

(2) To please the extensionist

(3) To increase yields and secure income for other businesses.

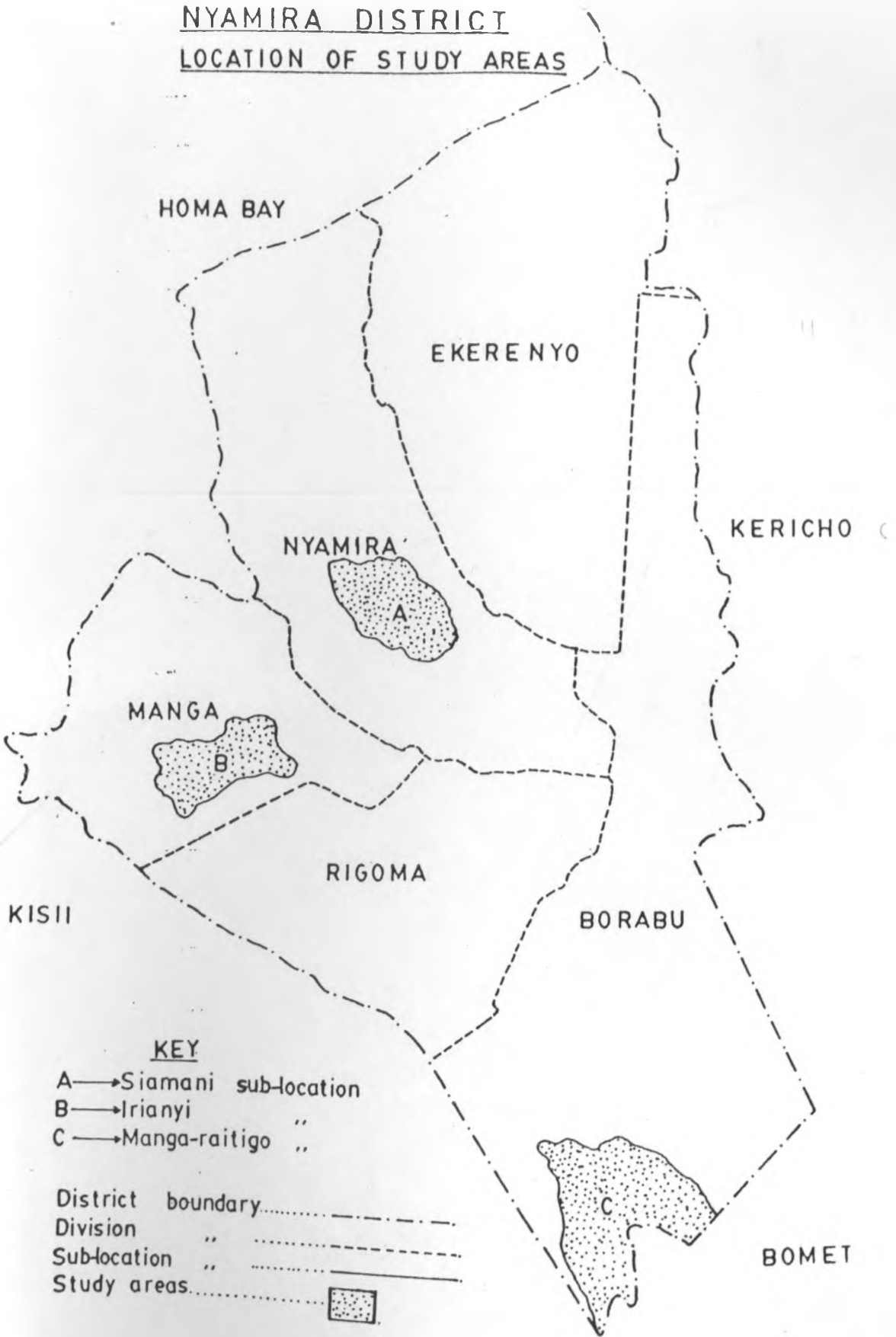
(4) Other; specify _____

NYAMIRA DISTRICT
ADMINISTRATIVE BOUNDARIES



Abel N.

NYAMIRA DISTRICT
LOCATION OF STUDY AREAS



KEY

- A → Siamani sub-location
- B → Irianyi "
- C → Manga-raitigo "

- District boundary.....
- Division
- Sublocation
- Study areas.....

Abel N.

Note: The study areas are NOT to scale. [Source: Researcher's sketch]