COMPARATIVE EFFECTIVENESS OF GROUP EXTENSION METHODS IN VILLAGE FARMING IN THE COASTAL ZONE OF TANZANIA

By

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THESIS

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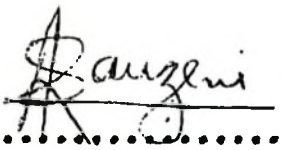

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ATHANAS STEPHEN KAUZENI

1st day of July, 1979, at Dar es Salaam.

A B S T R A C T

This dissertation compares the effectiveness of three group-based agricultural extension methods: (i) demonstrations together with formal scheduled group discussion meetings, (ii) formal scheduled group discussion meetings alone and (iii) informal unscheduled or general meetings or contacts that were applied in 24 villages of the coastal zone in Bagamoyo, Handeni, Korogwe, and Morogoro Districts, Tanzania. It examines social, economic, political, administrative, educational, and environmental factors that directly or indirectly affect the effectiveness of agricultural extension methods and the extension service in general.

The aim of the study is: first, to identify the best or most effective group-based agricultural extension methods which conform to the country's policy for villagization as related to the prevailing economic and social conditions. Secondly, to identify constraints to agricultural extension methods and the extension service in general that render agricultural extension workers ineffective and consequently inhibit increased agricultural production. Third, the study aims at making recommendations that will help agricultural extension workers in villages to increase their communication effectiveness which will hopefully lead to increased agricultural production.

Historically the agricultural extension service has been understaffed, and most seriously under-educated (in basic education), and under-trained (in extension and agriculture). Inadequate training, particularly in the extension approach or methods, is alleged to be one of the main causes for ineffectiveness of agricultural extension workers and the extension service in general. The training given lacks understanding and proper emphasis, therefore does not produce extension workers able to communicate effectively with farmers. Consequently extension workers have apparently had a minor impact in inducing changes in farming.

Five operational dependent variables used in measuring the effectiveness of the three group-based agricultural extension methods are: (i) Knowledge of recommended farming practices, (ii) Adoption rate of recommended farming practices, (iii) Development increase of the village, (iv) Income per ha and (v) Income per man-day.

Results of the study show that differences exist in effectiveness of the three group-based agricultural extension methods as stated in the hypotheses tested. Some of these differences are statistically significant, others are not. Of the three group-based agricultural extension methods studied, demonstrations together with formal scheduled group discussion meetings proved to be the most effective. Formal scheduled group discussion meetings were

second in effectiveness, and informal unscheduled general meetings or contacts were last in effectiveness. The analytical methods used in arriving at these results include simple and multiple regression and analysis of variance. There are also differences between Districts in relation to the effectiveness of extension methods in respect of the five operational variables. Some of these differences were statistically significant, other were not. Districts differ in levels of performance in respect to nature of activities (communal versus individual) but none of these differences between Districts are statistically significant. Finally, results show that there are, on average, statistically significant differences between communal and individual types of farming systems in respect of the two income variables under all three types of group-based extension methods.

Several obstacles affect agricultural information communication in the coastal zone villages: These include poor basic education and professional training of agricultural extension workers, high illiteracy percentage level among farmers, inadequate structural organization of the extension service, poor supervision of village level extension workers, and economic and social disparity between villagers and extension workers.

In order to improve effectiveness of the agricultural extension approach and the extension service as a whole, it is recommended that evaluation of the agricultural extension service, particularly extension methods, be made more often. Demonstrations and meetings should be the key educational tool of the extension workers in villages. The entire agricultural training programmes should be reviewed to insure that relevant subjects have their duo emphasis in the syllabi. The number of trainees should be increased and only form IV and above with high passes in relevant subjects should be recruited in so far as adequate numbers are available. Village-level agricultural extension workers should be employees of villages. Research recommendations for villages should be accompanied by their economic aspects to make them complete and should be written in layman's language for extension workers and farmers to understand. Farmers should be required to adopt complete packages of recommendations for a maximum increase in agricultural production to the extent that they are economically viable. There is an urgent need for a socialist credit system to be established to serve villages. Refresher or in-service courses for junior and senior agricultural extension workers should be arranged annually or after every two years. Finally, an intensive political education campaign should be launched for villagers,

particularly village council members, to enlighten them on the meaning, demands, and relevance of socialism in their own context.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

ANOVA	-	Analysis of Variance
AR	-	Aid Received
DADO	-	District Agricultural Development Officer
DSM	-	Dar es Salaam
E	-	Effective
ESP	-	Extension Saturation Projects
(H)	-	Handeni
Ha (ha)	-	Hectare
IN	-	Ineffective
LIDA	-	Livestock Development Authority
NAFCO	-	National Agricultural and Food Corporation

NRV - Non - Resident of the Village

R/DO - Regional Agricultural Development Officer

RE - Relatively Effective

RV - Resident of the Village

S - Stable

TANU - Tanganyika African National Union

TAT - Tea Authority of Tanzania

CATA - Cashewnut Authority of Tanzania

TCA - Tanzania Cotton Authority

T.Shs. - Tanzania Shillings

TTA - Tanzania Tobacco Authority

UDSM - University of Dar es Salaam

UFI - Ubungo Farm Implement

USAID - United States Agency for International Development

US - Unsuitable

VA - Village Assembly

VDC - Village Development Committee

VMT - Village Management Technician

CHAPTER I. INTRODUCTION: BACKGROUND AND PURPOSE OF THE STUDY

1.1. Evolution of Communal Farming in Tanzania

In Tanzania agriculture accounts for a substantial part of the gross national product as well as of total exports. More than 85% of the total population lives in rural areas and are dependent on agriculture for their subsistence and livelihood. These peasants, many of whom are conservative, have to rely on their own physical efforts, with little knowledge of science, to wrest a living from the land. Each family owned and operated its plot individually in isolated hamlets. The traditional agricultural methods that they used, together with their experience, have not contributed much to the evolution of more intensive output from the land.

Tanzania wants to achieve rapid social and economic development, with self reliance, and thereby build a democratic socialist state in which people live in freedom, equality and are free from exploitation of any kind. Tanzania has chosen to move from a nation of individual peasant producers who are gradually adopting the incentives and ethics of the capitalist system to a nation of organized villages as an ultimate goal. It is in these villages where people will live together, farm together or communally for increased agricultural production, market their produce together and take advantage of local services and small local requirements as a community.

Tanzania's choice to adopt a socialist strategy is the result of a century of oppression and exploitation by the imperialist social order as embodied in the colonial and semi-colonial system

whose modus operandi is to squander and rob human lives or living labour to the main benefit of the capitalist class. Tanzania's strategy to bring change through socialism and self reliance is elaborated in the Arusha Declaration.

The government adopted a dual approach to rural development in the first Five Year Plan, 1964-69, based on World Bank recommendations made in 1961. The "improvement approach" aimed at upgrading the existing peasant small holding through primarily effective agricultural extension service, credit programmes and improvements in marketing. On the other hand, the "transformation approach" aimed at modernizing agriculture through planned village settlement schemes which were heavily capitalized, with trained management personnel and modern technology which would make more productive use of land. Under the transformation approach, investment of capital and technical manpower would be concentrated on groups of farmers settled in more fertile parts of the country, and farming systems based on more intensive and permanent use of land would be used on planned farms of economic size. It was hoped this method would overcome the economic disadvantages of small scale agriculture and would overcome the economic disadvantages of farmers' education through an appropriate agricultural extension service. The method of grouping farmers together would also create a community of farmers, at least partly removed from their traditional environment, which would be expected to show less resistance to adoption of innovations than individual farmers on their existing holdings. With the creation of villages the government would be

better able to supply social services such as schools, dispensaries, and water supplies to farmers living in gathered villages. Moreover the creation of the first and essential step towards the development of a socialist state would be created by establishing cooperative or communal farming villages in which the members would work together on the basis of human equality.

Tanzania believed that the "improvement" and the "transformation" approaches should be the basis for a two-pronged attack on the underdevelopment in rural areas. However, during the mid-1960's the failure of the dual approach was apparent. The numbers of settlements established was lower than anticipated due to lack of planning staff and problems in obtaining external finance. Few of settlements showed promise and the majority were declared a disastrous waste of public resources. Initially, the "improvement approach" seemed more successful, but later it had major problems. The assumption that innovations would readily spread from "progressive farmers" to others proved ill founded as these early adopters controlled more resources than the average farmers with the result that the latter could not follow "progressive farmers'" examples. By building on the strong, agricultural extension contributed to increased rural class differentiation which was the opposite of government and Party Policy. Moreover, the "improvement approach" seemed unsuccessful in the medium and lower potential areas of the country. Due to disappointment with the rate of rural development, Tanzania's entire development strategy was reconsidered and the results were a restatement of development goals and strategies. A new Ministry of Regional Administration and Rural Development was

formed, which later changed into Prime Minister's Office, to which all other Ministries are affiliated. Tanzania's main objectives were defined as the development of an egalitarian society and the achievement of economic independence through self-reliance, cooperative and communal endeavors, and maximum use of local resources.

The Prime Minister's Office through the Ujamaa and Cooperative Development Department, and the Ministry of Agriculture has been charged with the responsibility of ensuring that the necessary advice and assistance on cooperative or communal and agricultural activities are provided to villages and Ujamaa Villages. The Ministry of Agriculture and the Cooperative Development Department have been ordered to have their staff representatives stationed in all villages with a variety of developed cooperative or communal activities including agricultural production.

1.2. Statement of the Problem

In spite of all government financial, material, and technical assistance, it is disappointing to note that agricultural production in most if not all villages is very low. There are, of course, a number of possible causes for this challenging state of affairs. Possible causes may be political, economic, social, environmental, administrative, or technical in nature. It may also be an ineffective agricultural extension service, or some combination of the above mentioned causes.

Previous research which has been done on several of these factors aimed mainly at finding means of increasing agricultural production. For instance, Feldman and David (1969) have

done research on social and economic factors of production, and Ellman (1969) on agricultural improvement through co-operative farming in Tanzania.

Considerable criticisms of the agricultural extension service in Tanzania, covering both practical and theoretical aspects, have been made (Cliffe, et al, 1968; Hulls, 1972; Yeamen et al, 1972). The overall impression of the extension service is that its effectiveness is well below the desired level although this is difficult to substantiate because of lack of empirical evaluation data. De Vries (1976) shows that situational factors of the farmer also contributes to his non-use of recommended agricultural practices. However, it is well known that low or poor agricultural production is often attributed by observers in Tanzania to the ineffective extension services.

The use of obsolete extension methods and poor agricultural production techniques in villages inevitably calls for changes in agricultural extension organization and methods of approach. It is imperative that appropriate communication strategies be developed to facilitate transmission of recommended and tested agricultural practices from agricultural experts to the farming communities and also to allow the full participation of the rural population in this process. Group-based communication strategies or group extension methods seem promising and appropriate since they are inherently more egalitarian than individualistic, capitalistic, "top-down" and "progressive farmer" approaches. With "top-down" and "progressive farmer" approaches, ideas and

information flow in one direction to the rich and advanced farmer. Group-based communication strategies are in line with the country's policy of socialism and self reliance within the framework of the country's prevailing economic and social conditions.

There is a serious need for better research on recommendations made by the extension service regarding various aspects of farming. Much of the ineffectiveness of the extension services is due to the fact that they have been trying to push ideas like single crops and use of fertilizers and insecticides that for many farmers are not economically sound. Improved recommendations may be at least as important as improved extension methods. Likewise, improved infrastructure (source of proper, timely inputs and necessary credit, proper transportation, and assured markets for products at remunerative prices) all are necessary if extension eventually is to succeed in modernizing agriculture. These factors are interwoven to such an extent that an improvement of only one or two factors may not have a measurable effect on the total situation in respect of agricultural improvement.

1.3. Literature Review

Factors limiting the effectiveness of extension service and inevitably extension methods can be grouped under three main headings. First, are factors derived from the nature of the clients or farmers. Secondly, are factors which are primarily concerned with the extension staff and their organization. Thirdly, there is a content of extension which is influenced by the staff but may often be outside their control. All three

groups of factors are important because they are inseparable if effectiveness of extension service is to be achieved.

A limited amount of research has been done in East Africa on evaluation of the effectiveness of extension services. Watts (1967) in his review of extension programmes for small projects based on an individual's or group's interest (in which he critically examined the effectiveness of the activities of rural extension agencies, nutrition extension, food crop extension, livestock extension, and general extension programmes) found that nutritional practices and knowledge were affected more by formal education than by intensity of contact with extension workers. He found that although the trend was towards a group approach, many staff have the old attitude of concentrating on a few individual farmers. As a result some were being visited almost monthly. However, the majority were not visited and did not seem to be aware that the services of extension workers were available to them. It was realized that the use of many methods becomes effective as the proportion of educated rural people increases. Moreover, Watts found that few farmers had ever attended an agricultural demonstration.

In Uganda starting from 1967 Vail et al (1970) conducted a study on "Extension Saturation Projects 11 (ESP)" for the Uganda Ministry of Agriculture and the United States Agency for International Development (USAID) Mission in Uganda. The objectives of ESP were: first to increase the efficiency of the majority of farmers in the community; secondly, to increase yields per acre of land used and the overall productivity of the farm for the majority of the people; thirdly, to align social pressure in support of

progressive farmers; fourthly, to involve the extension staff in the process of planning and executing an intensive, effective programme of work; and finally to evaluate the response to an intensive programme. In practice the basis of ESP was the allocation of an extension worker to an area of 12-80 km^2 having 300-500 farmers instead of a typical pattern of 1 man working in an area of 200-400 km^2 with 1,500-10,000 farmers. Vail et al found that although the question of whether overall benefits of ESP would cover the costs was extremely difficult to answer, a substantial number of farmers under the project gained financially, indicating that ESP increased the effectiveness of the extension service. As regards the improvement of extension methods, which is the major interest of the author, ESP was most successful. Demonstrations and clubs were introduced, both of which offered most valuable contributions towards improving the relevance of teaching and the coverage of the extension services. The author concluded that an overall benefit of the ESP programme was the increased practical content of extension teaching for it stressed the choice of appropriate methods for particular subjects which are to be taught.

Watts and Moris (1966) conducted a survey in Embu District of Kenya in order to evaluate the effectiveness of agricultural extension. Criteria used were: channels of communication of agricultural information, basic education of the majority of extension workers, transfers of extension workers, changes in policy and extension methods, and the approach in extension service. They found that ineffectiveness of extension was caused by a number of factors. It was discovered that the least qualified personnel had

the greatest contact with the farmers and a high proportion of the time of qualified personnel was spent on administrative and financial matters. There was a high risk of poor advice being given due to the complex channels of communication and group methods. Frequent changes of staff, policy, and extension methods, together with the generally negative approach in extension, were also observed as part of the causes for ineffective extension service.

Watts (1975) reports that during the period 1964-66 the USAID extension team in Kenya conducted a series of in-service training courses in what are called "Method Demonstrations". He is convinced that these courses contributed a great deal to improving the practical competence of an extension staff and consequently the extension service. He found that in-service training by group extension methods was one of the most important ways of improving the effectiveness of extension staff. Besides helping to develop technical and demonstration skills, in-service training can also be used for refresher courses and for teaching about newly developed techniques.

In Tanzania, a study of the impact of the farm situation on extension effectiveness was made by De Vries (1976). Maize-growing practices in Iringa Region were examined to determine the effectiveness of extension in promoting adoption of improved practices by agroclimatic zone and type of farmer. He made this selection on the basis that the extension system promotes maize-growing in the Region in a fairly uniform way, while maize is grown by many types of farmers and in a wide range of agro-climatic

zones. In this study De Vries questioned the allegation that extension has failed in its role of encouraging peasants to adopt new farming practices. He is convinced that this failure was due in large part to technical constraints such as lack of necessary inputs, lack of capital and markets, or to "wrong" recommendations. So, extension may not be to blame in many cases where farmers have failed to adopt newly-proposed farming practices. De Vries found that significant differences in adoption rates existed between zones, suggesting that the recommendations were more suited to the high-use zones. He also found that recommendations, particularly those involving high cash expenditure, were followed to a higher degree by rich farmers. In addition, he found that farmers with higher degrees of extension contact in all sub-groups are more likely to follow extension recommendations. De Vries' study emphasizes the fact that effectiveness of extension is a function of a multiplicity of factors and situational constraints. It should be remembered, however, that it is not only the factors affecting adoption or the situation in which extension operates that causes its ineffectiveness. Poor methods of extension approach and the strategies used also contribute to the failure of the extension service. The rich farmers might not have adopted the recommended practices if they were not aware of the existence of the recommendations conveyed to them by the extension service. It was for this and other reasons that extension contact was found to have an impact on the overall adoption of the recommended practices by both poor and rich farmers.

Other evaluations of the effectiveness of agricultural extension in Tanzania have been made by several individuals, and have mainly taken the form of research by academicians who were neither members of the agricultural service nor farmers. The results from these surveys have not been flattering to the extension service. For example Saylor (1970) in his study of "Variations in Sukumaland cotton yields and the extension service" found that in 12 out of 14 localities under study there was no correlation between farmers' contact with the extension worker and yield per hectare; and in the two localities where there was correlation, one of them was negative. In a 1971 study on coffee cultivation, Saylor found that most of the increased small-holder output was due to new planting and the use of new varieties but not new techniques and thus could not be credited to the extension service.

1.4. Limitations of Prior Studies

All these studies had serious limitations. First, they covered only a particular moment in time: a particular year when rains were distributed in a particular manner and inputs and crops had a particular price. What was rational or successful in that year in relation to the extension service might not be in the next. Secondly, these studies were largely empirical, i.e. based on a simple field survey. Researchers recorded what farmers said they did in comparison to recommended practices. However they rarely asked the farmers why they preferred to do things differently, what their problems actually were, what innovations farmers made themselves to overcome some of these problems, and what alternatives

actually existed but were not applied for one reason or another. This study has tried to avoid these shortcomings by use of a longitudinal approach. The study has been spread over four consecutive years and all measurements of the variables are averages of the four years. Most information was obtained through observation on the spot and participation by the author rather than mere recording what the farmer said.

Effectiveness of agricultural extension is influenced by the combination of agricultural inputs, and agricultural extension methods are a major factor affecting how inputs are used. It is unfortunate that none of these and other related studies conducted in Tanzania have attempted to make a comparative study of various extension methods under specific environmental conditions in order to determine which extension methods produced effective learning and the greatest adoption of those behaviours or practices likely to increase agricultural productivity.

Little is known about the kinds, intensity, and effectiveness of group agricultural extension methods used in villages, or about the characteristics of the extension personnel currently working in those villages. Basic information such as the extension worker's age, educational background, and professional training and experience, are not readily available in quantified form, and even less is known about his productivity. No objective measures of extension effectiveness have been established. Not much is known about the sociological and economic factors that influence the adoption or rejection of farming practices. Even more serious than the above-mentioned constraints is the fact that, until now,

traditional, colonial, and antiquated capitalistic extension methods are still being used or applied in a socialistic environment, a "top-down" approach is in most cases used, and extension workers still concentrate their efforts on individual "progressive" farmers or villages, a situation that has contributed to a differenciation in income among peasants and a dependency on the government and its agricultural experts for development rather than fostering rural transformation.

Increased agricultural production is not only a function of technological change, but also a function of the spread of new techniques and ideas among farmers. This means that it involves changing human consciousness and behaviour, an educational task which requires appropriate tools for its execution.

The present study therefore makes a detailed and critical comparison of the effectiveness of group-based communication methods and examines the constraints around them which inhibit increased agricultural production in randomly selected villages of the coastal zone in Tanzania. It also makes a comparison between an existing situation and a desired situation of political aims, organizational goals, and programme objectives. It takes into consideration economic, social, political, and administrative factors that affect the effectiveness of agricultural extension service in villages.

1.5. Objectives of the Study

This study looks into the effectiveness of group-based communication methods or media and also the characteristics of

village farmers and their agricultural extension workers in relation to the following objectives:-

(i) To appraise group agricultural extension methods in relation to the communication process of agricultural information in villages and indicate the best communication medium and method for use in villages.

At present the choice is a difficult one as there is insufficient research data to provide adequate guidelines for proper selection. Choosing the best medium for a particular message requires an understanding of media characteristics as they relate to various kinds of message content as well as an understanding of the audience.

(ii) To develop procedures that will help the extension workers in villages to increase their communication effectiveness. Agricultural communication in most villages is carried out in rather haphazard ways. Sometimes expensive posters are printed and displayed without concern for their ultimate effectiveness. Films are shown and, if enjoyed, it is assumed they are effective. Campaigns with specific objectives are carried out with little thought given to their relation to larger economic and social problems as well as the extension agents' know-how concerning the use of group agricultural extension communication media.

(iii) To be in a position to make recommendations to the government based on research findings on the use of extension methods that are congruent with the country's policy for village development.

Group agricultural extension methods may be appropriate because large group of families living and farming collectively

would be more easily and economically contacted by an agricultural extension agent than the same number of families living and working in isolation. The recommendation of proper extension methods to be used in villages is extremely important since technical and financial assistance could be based on how effective or ineffective different group extension methods are in these villages.

(iv) To identify bottlenecks, constraints and inadequacies in the use of group extension methods that might lead to an ineffective extension service and eventually to low agricultural production in villages. Further, to indicate research priorities in future extension research as a means for improving effectiveness of group extension methods.

(v) To identify training needs and ideal characteristics of agricultural extension personnel for villages and the equipment or facilities for efficient performance of their duties.

This is relevant because economic development makes increasing demands on training not only at a university level but also at other levels. In any organized agricultural programmes for rural development, the agricultural extension agents form the connecting link between the villagers and the institutions created to promote social and economic changes. The success of the programme will largely depend on the quality, philosophy, skills, and effectiveness of the extension agents. The type of personnel chosen for the work and the type of training received are therefore most important elements in the process of social and economic changes.

(vi) To identify the main characteristics of villagers which may influence agricultural production in the villages.

As an educational agency, extension is concerned with bringing about changes in the behaviour of individuals and is also concerned in promoting understanding of factors contributing to those changes. However there are teaching methods which extension agents use in imparting to the farmers new knowledge, skills, and attitudes required to bring about changes in agricultural practice and there are also sociological and economic problems in teaching and communicating ideas; so, for the extension worker to be effective in his work, he must have a fair understanding of all these characteristics of his clients.

(vii) To find out whether, after four years of extension work, the initial level of socio-economic development of the village, levels of contact with the extension worker, potentiality for development of the village, level of literacy of villagers, and aid received by the village from the government have some effect on agricultural productivity.

1.6. Hypotheses and Measurements

This study is primarily concerned with the comparative assessment of effectiveness of various group agricultural extension methods. In order to determine the degree of effectiveness of selected group extension methods in the communication process, four hypotheses were tested. These were:-

I: Demonstrations together with formal scheduled meetings (with group discussion) are more effective than scheduled meetings alone.

II: Formal, scheduled meetings alone are more effective than general meetings or contacts.

III: Informal, unscheduled general meetings or contacts are the least effective extension method of them all.

IV: Demonstrations together with formal, scheduled meetings (with group discussion) are more effective when applied within individual farming systems than within communal farming under present socio-economic and villagers' levels of understanding, acceptancy and commitment to communal activities, villagization and ujamaa policy in general.

Use of effective extension methods alone are not the only determining factors for the success of the agricultural extension service in villages but other factors are also involved. These other factors which were also investigated in relation to group extension methods include:-

(i) Initial village development level.

(ii) Level or degree of contact the extension worker has with the village concerned.

(iii) Amount of government aid received by the village.

(iv) Percent literacy of the villagers.

(v) Potentiality for village development.

Effectiveness of group extension methods was determined by using dependent variables such as:-

(i) Yield per unit of land (per ha) in cash terms

(ii) Yield per unit of labour (per man-day) in cash terms

(iii) Adoption of recommended farming practices.

(iv) Knowledge of recommended farming practices, such as:-

- Use of fertilizers
- Use of improved varieties of seeds

- Timeliness in carrying out various agricultural practices
- Use of insecticides
- Proper and early weeding
- Crop rotation
- Use of modern agricultural implements
- Soil conservation measures
- Vermine and wild animal control
- Farm record keeping
- Pure stand of crops

(v) Village development increase in terms of additional village amenities.

The causal reasoning underlying these hypotheses was developed in Chapter I in the literature review section.

CHAPTER II. HISTORICAL BACKGROUND OF THE AGRICULTURAL EXTENSION SERVICE AND THE TRAINING DIVISION OF THE MINISTRY OF AGRICULTURE

The agricultural extension service in Tanzania can be traced as far back as the German Colonial Administration. For the purpose of this study, the review of the extension service will commence in the early 1950's.

2.1. Activities of the Agricultural Department in the Early 1950's

One of the numerous factors which contributed to the production increase in peasant-farming in the early 1950's was a gradual increase in personnel and funds of the Department of Agriculture as it was called at the time. The Agricultural Department was responsible for organizing local markets, providing aid in cases of famine and flood, improving production by supplying better seeds, introducing new crops, popularising better methods of land use, advising the local authorities, controlling agricultural credit, and carrying out agricultural research and education. In 1950 the actual agricultural extension work was carried out by 756 instructors who had hardly any training at all (Table 2.1).

2.1.1. Approach to Agricultural Improvement

The main problem of agricultural development was thought to be the uninterested attitude of the peasants towards economic development and rewards. Peasants were thought to have a rather high appreciation of leisure. They liked to have money and consumer

Table 2.1. Staff positions in the Agricultural Department, 1950-1960

Year	Agricultural Officers		Specialists		Field Officers		Field Assistants		Agricultural Instructors		Total
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.
1950	39	4	17	2	71	8	0	0	756	86	883
51	46	5	21	2	79	9	0	0	756	84	902
52	52	5	23	2	91	8	0	0	971	85	1137
53	48	3	24	1	101	6	0	0	1512	90	1685
54	47	2	21	1	91	5	414	21	1442	72	2015
55	50	3	20	1	97	5	527	27	1264	65	1958
56	49	3	20	1	103	7	322	23	920	65	1414
57	66	4	25	2	112	8	411	28	872	59	1486
58	70	3	28	1	114	6	608	29	1246	60	2066
59	69	3	30	1	138	6	700	32	1227	57	2164
60	74	3	33	1	125	6	815	36	1210	54	2257

Source: Ruthenberg (1964, p.49).

goods, but they shied away from the effort necessary to obtain them. Moreover peasants were regarded as thinking in static terms, meaning that they accepted the existing order of things as the natural one. The "old ones" who were also the "wise ones" were particularly critical of new ideas. The old considered themselves responsible for protecting customs which had been handed down to them. They opposed modernization. Thus in one instance the local chief demanded that the first tin roof in Sukumaland be torn down. The first master farmer in the Usambara was murdered (Ruthenberg, 1964). According to the local Agricultural Officer in Moshi, the first cotton seeds introduced in the Pare Mountains were cooked before being planted in order to prove that such a crop could not be grown in that area.

During the British Colonial Administration, agricultural officers tried to counter resistance to agricultural progress through administrative ordinances, on the assumption that the African would have to be complelled to help himself. The Agricultural Department tried to bring agricultural change through the use of rules and regulations issued by local authorities. Case for non-bservance were reported and those concerned were punished. The cultivation of specific hectareage of cassava was already effective during the German Colonial Administration. Cassava was to serve as a protection against famine. The regulation was revived in the late 1940's within the coastal zone of Tanganyika. A farmer who did not plant cassava was fined. However, agricultural extension workers had to be accompanied by armed policemen when carrying out their duty (Ruthenberg, 1964).

Administrative ordinances were also used to improve coffee production in Kilimanjaro. The Chagga Council ordered that only planting materials which had been certified by the Agricultural Department could be used; that coffee could be planted only after the field had been examined and approved by the agricultural officer or his representative; and that approval would be granted only after proper preparation of the land and the provision of sufficient shade. Persons who ignored these regulations would be punished by having their coffee up-rooted, and would have to bear the cost of the measures taken.

The failure of erosion control in the Uluguru Mountains of Morogoro, one of the Districts under study, is worth mentioning

here. The tributaries of the Ruvu river flow from the Uluguru Mountains near Morogoro. Superficial studies of the tributaries showed that water supply was endangered by soil and forest destroying practices of mountain peasants. A scheme was begun in 1949 with the following aims: to improve the land, to preserve and expand forests, and to stabilize the flow of water. Five agricultural officers and sixty instructors were employed for this purpose. For six months the scheme was explained to the peasants and the advantages pointed out. However, obligatory measures were required. Farmers had to terrace their fields, and were forbidden to burn in their fields without permission. Work was supervised by agricultural instructors. Farmers were required to make 300 yards of terrace per year per household.

As time passed, farmers developed growing resistance. They were convinced that terracing reduced yields - a contention not totally unjustified from a short-term point of view. Consequently, they terraced first the most infertile slopes. Peasants complained that the instructors treated them as schoolboys. They could not understand why they were to work intensively 2-3 days per week for something which reduced their incomes. At first peasants tried to bribe the agricultural instructors, so that they might escape work and avoid reduced yields.

With the spread of rumours that forced resettlement of peasants from mountains to flat land was being planned, the discontent of the farmers led to riots. The cry was raised "we want the custom of the old." Politicians organized discontented farmers by stating that an African government would restore "the case of the old life."

The Luguru began to tell the agricultural officers that they were fed up with compulsory terracing. Agricultural instructors were attacked physically by discontented peasants. In Morogoro, protest demonstrations were held and the threatening behaviour of the crowd forced the administration to resort to arms (Young and Fosbrooke, 1960). When probing on this incident from one old peasant, the author was told that one death resulted out of that confusion. Peasants refused to continue with terracing. Terraces which had already been completed were willfully destroyed. Throughout the land, bush fires were started as a symbol of protest

In so far as terracing was concerned, the hoe proved to be an unsuitable tool. Spades would have been better, but since peasants had no shoes, they would have had to use their bare soles to operate normal spades. Special spades for bare-footers were not available.

Burning of crop refuse was one of the peasants' old customs. Under this project, crop refuse had to be used for trashbunding. Farmers resisted, again not without cause, since maize borers breed in maize straw and damage the next crop.

It is worth noting here that, while terracing could be enforced, it proved virtually impossible to enforce burning controls since fires can be started by any one and identification of the culprit could not be made with certainty. Since often the wrong person was accused, resentment and bribery of officials increased. The low salaries paid to junior staff was also a temptation.

The damages of the Uluguru Project were not limited to the loss of money and labour. The agricultural officers and the instructors were degraded to "policemen." In the following years agricultural extension workers faced a situation of mistrust. The above incidences and many others that took place in different parts of the country might be among the causes for negative attitudes toward agricultural extension workers, especially during the early years of independence. Some elements of this nature still persist today. One example of misinterpretation and resistance to innovation is reported by Omari (1976) in relation to the "Mafyeko Complex." The "Mafyeko Complex" was a "forced male migration" process during the colonial administration under which male adults from a given village were forced to cut down trees in the bush land and were told that the practice was a way of destroying the tsetse fly habitat. Since the poll-tax was collected at the same time and those who were unable to pay their dues were arrested, people regarded the "Mafyeko Complex" as a check point for those who had not paid taxes. The movement into villages (Operation Vijiji) was associated with the "Mafyeko Complex" during which people were separated from their families, made to pay tax, and were arrested if they did not pay. Enforcement or compusion as contrasted to educational and persuasive processes create misunderstanding, mistrust, hatred and resistance to an innovation and also to the source of that innovation.

Agricultural extension workers at that time tried to combine the advisory and executive or persecutive roles which are psychologically incompatible, especially if one takes into account what is discussed in subsequent chapters on communication methods.

In a situation where well-trained personnel are not available, ordinances and compulsion were taken to be the only alternatives. The unfortunate situation is that the bad experience gained by peasants from agricultural extension work based on ordinances and compulsion has not been forgotten because old farmers are still alive and this experience has been passed over to the young farmers. So, the mistrust and in some cases hatred still exists on the part of the peasants towards the present agricultural extension workers.

The Government Daily News confirms this statement by saying:

> "The use of force is absurd, and in Tanzania out of question. Coercion dehumanizes man and has the effect of alienating the people from the revolution, instead of identifying the revolution with the people."[1]

2.2. Agricultural Extension Service in the Late 1950's

A strategy for agricultural development that was adopted was the improvement of existing peasant farms via the persistant persuasion of an expanding agricultural extension service. The improvement approach did not really get off the ground in Tanzania

[1] Daily News, 22nd August, 1972, p.4, Dar es Salaam.

as it did in Kenya during 1964-1968. The two main problems in Tanzania were: (i) the staffing densities in the Districts were rather low, (ii) the middle cadre of staff was weak in training. However there was a definite change in the approach of agricultural extension workers to the farmer from compusion or coercion to persistant persuasion. Administrative ordinances as a development tool were replaced by voluntary cooperation with the agricultural extension workers. Nevertheless, no basic changes were made in the top-down, bureaucratically-controlled extension service. It was up to the farmer to decide whether he or she wanted agricultural extension advice or not. When cross-examining the old farmers during the survey, the author was told that just before independence (the late 1950's) agricultural extension workers became a bit more friendly to farmers and that the change was brought about by the struggle for independence. Since compulsion was associated with the colonial administration which was approaching an end, extension workers wanted to identify themselves with the party, the Tanganyika African National Union (TANU), that was struggling for independence. Persistant persuasion by agricultural extension, though re-enforced by the struggle for independence, aimed at overcoming the barriers or problems mentioned above. It was clearly known that the farmer desired more cash and a gain in social status. Through agricultural extension these desires should have been used to obtain more production and thus economic development.

It was realized that the major instrument to implement the development policy mentioned above was trained personnel in agriculture. The employment of great numbers of untrained instructors can be a rational measure if they are closely supervised. However, the new development policy needed extension personnel who could make rational decisions on their own. Realizing this situation, the expansion of the staff of the Ministry of Agriculture, and especially of the extension division, received priority in the distribution of government funds. Primary school teachers were sent to the Natural Resources Training School at Tengeru to study agriculture. The goal that was set by the Ministry of Agriculture at that time was to have one officer at the disposal of every 1,000 farmers.

Several strong assumptions were made about persistent persuasion in relation to information dissemination. It was assumed that information on agricultural activities reached the people who needed it because most upper primary schools had teachers for agriculture and school farms; local festivals were held in conjunction with small agricultural shows and contests; pamphlets and placards on important cash crops were distributed; and a monthly agricultural newspaper "Ukulima wa Kisasa" was published and sold with almost the highest circulation (about 20,000) in the country at that time.

Another assumption was that this information was supplemented by demonstrations through experiments, experimental farms, and especially through the example of more progressive farmers. Moreover, assistant field officers and instructors who lived in the

villages were supposed to put into practice the theory which they taught by cultivating their own small fields according to the rule of good husbandry. The "baraza" (court) where the agricultural officer used to proclaim the ordinances was then replaced by organized extension work based on group meetings with progressive farmers.

The main principle of extension work was the concentration of effort (Ruthenberg, 1964). It was believed that concentrated efforts would achieve cumulative development in a given area, overcome "barriers," and eliminate prejudices and mistrust through persistent repetition. Efforts must go forward from "bridgeheads" of agricultural progress, because holding-on, keeping-up, and overcoming unexpected difficulties is usually even more difficult than introducing a given innovation. So, it was decided that in the persistent persuasion approach, personnel and money in extension work would be concentrated on: (a) densely populated areas where soil and climatic conditions are favourable and markets are assured, (b) receptive farmers, villages or tribes; and (c) specific projects, for example cash crops such as cotton or tea. In Tanga, Freyhold (1970) observed a high concentration of agricultural extension workers on the Usambara Mountains where perennial cash crops such as tea, coffee and cardamom are grown.

It was believed that the concentration of agricultural development work was a necessary consequence of the conditions of increased production in Tanganyika. A staff which was widely scattered throughout the land, largely inexperienced, and in need

of constant encouragement, could hardly be supervised and instructed. High transport costs and time lost in travelling long distances must be avoided. The policy was adopted in the late 1950's with the understanding that agricultural development efforts could not help all farmers in the same manner, and that aid measures would be effective if carried out in the more developed areas. Moreover, the policy was that help would be given to the person who helped himself, and such a person would generally be already in a relatively good position.

In the late 1950's the goverment seemed to have been making a step forward in reforming agricultural administration and extension but it overlooked the attributes of the recipients (farmers). When persistant persuasion was adopted instead of compulsion, it was believed that farmers would be more receptive to innovation than before because to agricultural extension workers persistant persuasion in relation to innovation adoption meant "take it or leave it". This situation implied that farmers were to be exposed to the innovations and then it was up to them to either adopt or reject these. This was an over-simplification of the adoption process. Prior stages which the adopter needs to pass through were ignored; these require definite information and media exposure before the adoption takes place. A "Take it or leave it" approach portrays a feeling of despair and disapointment after abandoning the military (compulsion) type of extension service which was apparently preferred by some agricultural extension workers because at times they were bribed by farmers. It is worth remembering that the change from compulsion to persistant

persuasion merely created a favourable atmosphere for the introduction of an innovation. That this change by itself was not enough was proved later.

Considering the demand for the fiscal profitableness of agricultural extension on the one hand and the inability to effect innovations through the use of administrative compulsion on the other, the government thought the most suitable method undoubtedly was in concentrating extension on innovations and improvements which are willingly taken up by the farmer. In an attempt to systematize actual experience, Ruthenberg (1964) reports that the government went as far as setting up three groups of innovations (i) Innovations that are easy to introduce, these being those that do not require far-reaching changes in living patterns. These offer a favourable input-output relationship, are technically simple, and can be realized within a short period of time. (ii) Innovations that are difficult to introduce. The success of these depends upon their being used in specified combinations. These innovations frequently lead to increased yields per ha. (iii) New systems of farming, such as the integration of crop farming and animal husbandry. A transition to new systems of farming is even more difficult. The decision to concentrate on innovations which are easy to introduce, hoping that success was to be achieved, again overlooked the situational factor leading to the acceptance or rejection of the innovation by the farmer.

The need for trained personnel was realized and funds were allocated for greater emphasis in the training programme on biological sciences such as crop and animal husbandry. The author,

having been an agricultural student in the early 1960's using a syllabus developed 5-8 years earlier, recalls its contents. Agricultural extension was not a subject in the syllabus. It was assumed that any person trained in agriculture would automatically be in a position to extend or disseminate information effectively to the farmers. This was a serious ommission in the training programme. Agricultural extension work resembles the teaching of adults. In as much as adult education requires that teachers receive training in teaching methods for effective performance, so also does agricultural extension work require knowledge of methods of teaching and disseminating agricultural information. The main issue here is not an increased number of personnel per se but an increased number of personnel equipped with the necessary training in biological sciences as well as sociological, anthropological and psychological fields with an adequate emphasis on extension communication.

It was assumed that by having upper primary schools in the country teaching agriculture, annual agricultural shows, pamphlets and placards on important crops, an agricultural magazine (Ukulima wa Kisasa), and agricultural broadcasting sessions twice a week the peasant would get the information intended for him. The situation is not as simple as that. Having tools or media is one thing, and applying those tools or media effectively to accomplish the goal is another thing altogether. Limitations in respect of the use of these tools are covered in Chapter VI on the communication process. It was also assumed that information through the

media mentioned above was supplemented by demonstrations through "experiments," "experimental farms" and especially through the example of more progressive farmers. There was a complete lack of understanding of the difference between demonstrations and experiments. The difference between the two and the consequence of the failure to differentiate them are also covered in chapter VI.

It was believed that the native courts which were used to enforce ordinances could then be used for discussion meetings. Again, this was wishful thinking. Contrary to expected uses of the courts, most of them were used for exhortation meetings. Moreover, when meetings were held, villagers were not all involved in the discussions of matters affecting them.

The implicit assumption of the "progressive farmer" approach was that the advanced farmers would set an example to their poorer colleagues, who were expected to imitate them. In this way, the innovation which the extension service introduced would spread like oil-stains from the progressive farmer to others, particularly the poorer farmers, in the society. According to Ruthenberg (1964), the category of the advanced farmers tends to overlap to a considerable extent with that of the richer farmers, and data gathered by sociologists suggests that government services accorded preferential treatment to richer farmers. The question arises as to how an approach favouring the rich can be reconciled with a socialist development policy even if it were effective.

During the colonial administration, the "progressive farmer" approach tended to strengthen the relationship between the agricultural extension workers, the staff elite, and the richer farmers. Mutually profitable exchange relations developed between the two groups. The "better-off" farmers supplied their staff contacts with food (vegetables, maize, goats, beer) and gave them plots on loan. In their turn the extension worker would make certain resources available to their friends among the farmers. The extension worker had direct or indirect access to resources such as seeds, equipment, insecticides, fertilizers, transport and veterinary facilities.

Not only was the concentration of agricultural extension service on "progressive farmers" unfair because these people had already made some steps forward economically, it was the poor farmers who needed this concentrated attention more than anybody else. This approach was also unjust because both "progressive" and poor farmers paid taxes to support the extension service. Here there was a valid case for mistrust, jealousy and antagonism between "progressive" farmers and ordinary or poor farmers. This approach assisted in widening the gap between the "haves and the have nots", a situation which would not be tolerated in a country that is striving for socialism and self-reliance. That is the reason why in the subsequent chapters the "progressive farmers" approach is referred to as a capitalistic approach.

2.3. Agricultural Administration and Extension After Independence

Agricultural administration and extension remained basically unchanged after independence except that by the end of 1962 almost all higher agricultural positions at district and regional levels were held by Africans. By this time most European agricultural officers who knew the language and country at regional and district levels had left. These were the people who had supervised the agricultural extension workers in the rural areas. Qualified African agricultural extension workers were so few in number that even with the best intentions they were unable to fill the gap. Originally it was assumed that the African government could work with a largely British agricultural administration which would gradually be Africanized. This assumption did not come true. As a rule the African filled a vacancy which had been created because the British predecessor was no longer satisfied with his working conditions and had left. Approximately two-thirds of the European agricultural officers employed in 1961 left their positions in 1962, or were thinking of doing so. The exodus included some who would have remained and performed valuable services under different circumstances. Financial incentives to remain were said to have been provided. Work was accumulating for those few who remained because they had to take over what others had left in addition to their own tasks. This was the time the government was inducing activities at every level, which resulted in a situation in which District Agricultural Officer were flooded with paper work and

administrative duties and had to take up responsibilities with which they had no experience. There was little time left for actual extension work, which included the supervision of junior staff in the field, a situation which prevails even today. Yeaman et al (1972, p. 98) report that the extension field cadre are involved (as are staff at all levels) with duties other than extension.

Shortage of manpower in the agricultural extension service has been a chronic disease since the inception or beginning of the service. The obstacle to agricultural development immediately after independence was not only the lack of money, technical know-how, or interest by the peasants but also the lack of agricultural extension workers.

In order to make use of the willingness of the people inorder to increase agricultural production required clear guidance from top functionaries, careful and judicious local leadership, and a coordination of different offices. This was not easy to attain. There was a danger that the willingness of the people would be wasted because the institutions and their personnel or agridultural extension workers would not master the situation in time. This situation led Ruthenberg (1964) to report that there were few countries in the world where the vastness and the lack of communications, education and discipline provided as many handicaps to the desired situation as in Tanganyika. The present situation, insofar as the shortage of manpower and inadequacy in extension training is concerned, is not much different from that a few years after independence (compare table 2.1 and 2.2).

Table 2.2. Staff positions in the Agriculture Division, 1974, 1975

Civil service title	Number		Percent	
	1974	1975	1974	1975
Agricultural Officers and Specialists	266	360	5	8
Field Officers	588	502	11	11
Assistant Field Officers	2,437	2,178	44	48
Field Assistants	2,204	1,527	40	33
Total	5,495	4,567	100	100

Source: Ministry of Agriculture, Dar es Salaam, 1978.

Under the decentralization policy implemented in Tanzania since 1972, the agricultural extension service is administratively located in the Regional Director's office under the Regional Agricultural Officer who maintains administrative contacts with the Ministry of Agriculture headquarters in Dar es Salaam mainly in connection with national agricultural policy matters, research and training activities. The Ministry's headquarters has little to do with the organization and supervision of agricultural activities. The impression the author got after talking to the agricultural authorities at the Region, District and village levels was that the concepts, organization, philosophy, programming, functions and methods of extension are generally not understood by the entire extension organization or, if they are understood, then they are not implemented. Yeamen et al (1972) reported that the three basic reasons for the failure of the extension service are lack of adequate planning and corresponding lack of adequate supervision and evaluation at all levels, combined with non-use of

the most important extension methods. They remarked that meaningful extension programming is not documented if done at all at national, Regional and District levels and that planning of a generally haphazard nature permeates the entire system. The only exceptions which they saw were campaigns for a few cash crops which show good planning, although these also showed a lack of complete understanding of extension.

Objectives and goals are not set in terms that are meaningful to the average extension worker. Goals set must be understandable, realistic, and obtainable.

The hierarchical structure of the extension service from the Regional to the village level has not changed much since the late 1950's. Table 2.3 shows the present structural organization.

In each of the regional administrative headquarters, the Ministry of Agriculture maintains the following divisions:- agriculture and veterinary. The same structure is replicated at the District, division, ward and village levels. The present discussion is concentrated on the agricultural and not the livestock aspect of the Ministry's programme. The livestock extension advisory service has an equivalent hierarchy for those areas where livestock is important.

The Regional Agricultural Development Officer now under the Regional Development Director was and is administratively responsible for the organization and coordination of the agricultural extension apparatus in the Region, and so is the District Agricultural Development Officer under the District Development Director for

Table 2.3. Structural organization of the extension service from the regional to the village level

Place of work	Title		Qualification	Basic education
	In the late 1950's	Now		
Region	Agricultural Officer	Regional Agricultural Development Officer	Graduate	Form 4 or 6
District	Assistant Agricultural Officer	District Agricultural Development Officer	Graduate or Diploma holder	Form 4 or 6
Division	Field Assistant	Assistant Field Officer	2-year Certificate in agriculture or 6-month crash programme	Form 4 or Standard X
Ward and village	Agricultural Instructors	Field Assistants	Field experience plus seminars and short courses lasting less than 6 months	Below standard X, mainly Primary school leavers

Source: Director of Manpower Planning, Ministry of Agriculture, Dar es Salaam.

the District. The Village Management Technicians (VMT) are concerned only with ujamaa and cooperative activities, teaching villagers proper book-keeping or accounting activities in general. Village Managers are coordinators of various activities of the developmental ministries. It is still the responsibility of KILIMO staff to offer agricultural technical advice to the villagers and not the responsibility of either the Village Management Technician or the Village Manager.

The divisional, ward and village level agricultural extension workers used to and still do meet their superior, the District

Agricultural Development Officer (DADO), during short monthly meetings at the District headquarters. During the 1950's and 1960's all agricultural extension workers travelled every month to the District headquarters to draw their salaries and allowances. Approximately 2-7 days per month were lost that way, half a day or a full day for payment and instructions, the others for travelling, which was often done in many Districts entirely on foot.

A considerable administrative burden is placed upon the District Agricultural Development Officer. He is on about 10 local committees and is supposed to attend meetings of the political party and to sit on ad hoc committees. The divisional agricultural head within the District also has many administrative duties. The question arises whether, because of the staff's preoccupation with travelling, administrative and other such duties, the actual extension message reaches the farmer at all, and whether there is adequate supervision of the subordinate staff.

A gradual change in agricultural extension policy has occurred since the early 1970's. The "progressive farmer" strategy as described above does not fit into the present policy of socialism and self-reliance which forms the basis of the villagization programme. The policy has been for the agricultural extension workers to concentrate on groups of farmers for several reasons: because commercially ambitious and progressive individual farmers become rich at the expense of poor farmers; they keep their knowledge to themselves; they are not interested in their neighbours' progress; they shy away and discourage competing

communal activities; and they employ poor peasants paying them poorly and reducing their labour contribution in the communal enterprises.

2.4. Characteristics of Contact Staff in the Study Area

Personal characteristics are important determinants of the efficiency of agricultural extension workers because these characteristics influence their perception of their duties. We now turn to a brief review of the characteristics of the contact staff in the study villages.

2.4.1. Sex

Although recruitment of female agricultural extension workers started in 1967 when the first graduates went into the field, not a single female extension worker was found in the villages studied. The number of female agricultural extension workers is still small and they are concentrated at Regional and District headquarters. However, among many tribes in Tanzania, including those in the coastal region, most agricultural activities are performed by women. It is alleged that the coastal male Swahili people are jealous of the female members of the community, and so feel uncomfortable if male agricultural extension workers advise their wives or daughters. In trying to find out the truth of the allegation, the author approached some elders of Mkata village in Handeni District who agreed that the allegation was true and that the behaviour was introduced by Arabs during the time of the slave trade. Four of the extension workers in Bagamoyo and Handeni

District said the situation was correct but did not want to elaborate on the issue. It appears that this is another constraint to agricultural extension service in the coastal zone, a partial solution of which is to post more female village-level agricultural extension workers in the zone if an effective agricultural extension service is to be achieved.

2.4.2. Age

Out of 14 agricultural extension workers involved in this study, 6 were between 45 and 55 years old, the rest were between 35 and 44 years old. The former group tended to be a bit slower than the latter in responding to various requests made by the author during the study, which might also imply slow responses to farmers' requests. On the whole all 14 were in good health and capable of making long trips on foot visiting villages.

2.4.3. Basic Education and Training

One out of 14 had completed Form Four education and had a 2-year certificate professional training. He was stationed in Msata village, Bagamoyo District. The remaining 13 workers had completed either 4 or 8 years of primary school education with 3-9 months of professional training plus seminars of varying lengths. When talking to them individually they said they believed that additional training through refresher courses of a slightly different type than they had had in the past would permit them to be more effective in carrying out their work. Cliffe et al (1968, p.15) note that because of poor training field workers had little to offer farmers. They pointed out that there were some indications

that the field worker often does not have any significant new advice to offer and that the advice/instructions offered are merely simple reminders to farmers that they should weed or pick their crop at the proper time. It seldom could be described as new or specialised knowledge available only to a trained agricultural worker.

2.4.4. Original Home

Out of 14 agricultural extension workers involved in the study, 11 came from their respective home Districts of the coastal zone. The other 3 came from other Regions and were socially regarded as foreigners and also encountered some communication problems because they did not understand the local dialects.

2.5. Organization of Field Activities at the Village Level

2.5.1. Distribution of Staff

Agricultural extension workers are scattered over the coastal zone. Due to their small numbers, each one is assigned 15-20 villages. Distances between villages vary from 5-40 km. Out of 24 villages studied, half had agricultural extension workers stationed in them (see Chapter V, table 5.10). Dispersion of villages makes it difficult for the extension worker who has no means of transport to visit his villages.

Out of 14 extension staff, only 6 had bicycles. The remaining 8 walk or use public transport when visiting villages and hence maintain only a low rate of extension contact with villagers. All 14 extension staff complained that one of the

major problems in carrying out their assigned tasks was transportation to areas of work. They stated that they spent more time walking than talking to villagers or farmers. Saylor (1970, p.12) reports the same situation in his opinion-survey of Bwana Shambas (agricultural extension workers) in Tanzania.

2.5.2. Transfers of Staff

Out of 14 respondents, 8 complained that they were transferred too frequently. Of the 8 complaining respondents, 6 said that within the last three years, i.e. before 1971, they had been transferred twice. District agricultural officials reported that transfers have been more frequent since decentralization in 1972. All 14 workers indicated that frequent staff transfer reduce the effectiveness of their work. All thought that the Ministry of Agriculture did not consider the welfare of workers when making staff transfers. Some even thought that frequent transfers were a kind of indirect punishment. Frequent transfers reduce the efficiency of the extension worker because he finds himself in a new environment and it takes some time to learn what goes on in the new area before he can work effectively. A serious effort needs to be made to slow down the present rate of transfers and to ensure that all extension workers spend at least three (and preferably more) years in one station.

2.5.3. Supervision

Over half of the extension workers said that they were not visited regularly by their senior officers from the District headquarters. Moreover when senior officers visit them, no

advice or guidance was given concerning the performance of their work. They felt that they receive less attention from the District headquarters as compared to workers from other ministries. Officers at the District headquarters told the author that they were unable to visit their field staff as often as they would like because of lack of transport and, where transport is available, there is an upper limit of mileage to be covered per month. This upper limit fluctuates from one financial year to another but does not exceed 800 km per month. The other main reason given for not visiting field staff frequently is the extent of other, especially office, duties. District Agricultural Field Officers said that in addition to dealing with reports and looking after wages, salaries and other accounting matters--tasks for which they were not especially trained--they have to attend many meetings; moreover they are loaded with administrative matters which require their personal attention and thus take up much of their time.

2.5.4. Decision on Programme of Work

Work programming was highly inadequate. Apart from carrying out the instructions given to them periodically from the District headquarters, for the most part the field workers are left to decide by themselves which crops to emphasize, what operations and improvements to stress, and how to organize their time. It is not surprising that the less industrious work a limited amount or that even the enthusiasm of keen staff might flag. On top of that most extension staff admitted that they did not understand what a work programme meant. All 14 extension workers complained that they

did not have enough supplies or equipment such as fertilizers, insecticides, spray pumps, or improved varieties of seed to use in order to demonstrate improved techniques to the villagers.

2.6. Agricultural Extension Programmes Undertaken in Villages at the Time of the Study

At the time of this study the Ministry of Agriculture had launched a campaign on the use of fertilizers and insecticides on cotton and maize. These were programmes being emphasized in all villages and had been going on during the two preceding crop seasons. Due to a shortage of supplies and equipment and inadequate training of extension workers, the programmes were less successful in some villages. Emphasis was placed only on use of fertilizers and insecticides, ignoring other equally-important recommendations which were later also emphasized as part of this study. At that point, a complete package of recommended farming practices was then supplied to the villagers.

Previous programmes imply that there may have been some "residual" carry-over effect from earlier extension programmes which might have influenced the results of this study, especially during the first two years and in certain villages which might have had extreme experience (good or bad) of previous efforts. This situation provides an additional reason for longitudinal design of the study.

It should be pointed out that it was the observed weakness in the initial extension situation which led to or justified the

intervention within the system with a complete package of recommended innovations, but working within broad constraints set by existing staff, supplies, and equipment. The planned programme adopted in the study removed the constraint of bad organization, wrong emphasis or an incomplete package of innovations and shortage of facilities which otherwise would complicate measuring the impact of extension methods.

2.7. Agricultural Extension Training

2.7.1. Output and Utilization of Agricultural Extension Workers

During the British colonial administration only two agricultural schools operated in the country, Tengeru in Arusha and Ukiriguru in Mwanza. These schools ran short courses lasting for six months and seminars lasting for a few days or weeks. Later on, the duration of courses was extended to two years. The British administration used few African agricultural teachers. In the course of Africanizing the agricultural administration after independence, some of the best African teachers were transferred to administrative positions, so agricultural training relied on European agricultural teachers almost exclusively.

In 1962 the schools at Tengeru and Ukiriguru, which enrolled students with 10-12 years of basic school education and who had worked for some time at the District offices of the Ministry of Agriculture, could not operate at full capacity because of insufficient applicants with the necessary qualifications. Agriculture had to compete with other professions, especially the

urban ones which seemed more attractive. This situation explains the reason why some unsuitable candidates were recruited in the Ministry of Agriculture at that time. Secondary school leavers realized that they were in great demand and exploited the situation accordingly. The output from Tengeru and Ukiriguru remained small until the late 1960's, when more agricultural training institutions were established and the KILIMO technician-training output increased (Table 2.4). The expansion from 2 to 13 training institutes resulted in training programmes that were poorly staffed, only partially equipped and unable to provide high qualified graduates (Yeaman et al, 1972, p.2).

Agricultural extension is not taken as a specialized subject at any level in the training system. Yet, the intended utilization of Certificate and Diploma finalists (at least for 1977) shows that more than half of these finalists are absorbed by Regions in the extension division (Table 2.5). These are the people who have had little training in extension methods.

Currently, even when in-service courses are arranged for various subjects, agricultural extension is usually not considered (Table 2.6). An urgent need exists for establishing in-service Certificate and Diploma courses in agricultural extension for Certificate and Diploma holders in the courses listed in table 2.4.

Table 2.4. KILIMO technician training output by institutes and field of speciality, 1966-70 average, 1971-1977

Level of training, name and location of institute, and field of specialty	1966-70 average*	1971	1972	1973	1974	1975	1976	1977	1966-77 total
Tanzania:									
Certificate level (pre-service), MATI system:									
Ukiriguru - Agriculture	70	108	81	142	71	102	88	98	760
Uyegezi - Agriculture	30	72	88	91	80	121	59	72	613
- Land Planning	0	0	0	0	0	27	21	35	83
Morogoro - Veterinary	34	76	87	89	74	67	76	0	503
- Poultry	0	0	0	11	12	14	14	0	51
Mpwapwa - Veterinary	0	0	0	0	0	0	0	74	74
Tengeru - Agriculture	31	0	0	0	0	0	0	0	31
- Veterinary	4	0	0	0	0	0	0	0	4
- Dairy	0	0	0	19	28	44	37	40	168
Maruku - Agriculture	0	10	40	45	18	53	35	42	243
Tumbi - Agriculture	0	0	28	38	24	48	50	50	238
Ilonga - Nutrition	0	0	0	39	38	38	18	0	133
CVL Temeke - Lab. Technician	0	3	4	5	9	0	13	1	35
Mtwara - Agriculture	0	0	0	0	0	0	0	60	60
Mbeya/Uyole - Agriculture	0	0	0	0	0	0	0	79	79
Kenya:									
Kenya Polytechnic (Nairobi):									
Institutional Mangt.	0	2	3	2	3	2	2	0	14
Athiti-Kabete Range Mangt.	[illegible]	10	13	10	9	4	4	1	55
Sub-total	173	281	344	491	366	520	417	552	3,144

Table 2.4. (Cont.)

Level of training, name and location of institute, and field of specialty	1966-70 average*	1971	1972	1973	1974	1975	1976	1977	1966-77 total
Tanzania:									
Diploma level (pre-service),									
MATI system:									
Lyamungu - Horticulture	0	0	0	0	0	0	22	24	46
Mlingano - Agro-Mechanics	0	0	0	0	0	0	0	29	29
- Farm Management	0	0	0	0	0	0	79	0	79
Mpwapwa - Animal Health	0	0	0	0	0	36	34	0	70
Mkata/Morogoro - Ranch Management	0	0	0	0	0	0	30	0	30
Ukiriguru - Crop Production	0	0	0	0	0	0	0	43	43
Mbeya/Uyole - Animal Production	0	0	0	0	0	0	0	29	29
- Crop Production	0	0	0	0	0	0	0	31	31
- Agric. Home Economic	0	0	0	0	0	0	12	0	12
Ilonga - Nutrition	0	0	0	0	0	0	0	15	15
CVL Temeke - Lab. Technician	0	0	0	0	0	0	14	13	27
Kenya:									
Egerton College - Agric. Engineering	8	11	11	5	0	6	6	6	53
- Animal Husbandry	6	12	9	8	0	5	6	11	57
- Range Management	5	10	7	5	0	5	4	7	43
- Dairy Technology	2	2	2	1	0	2	1	0	10
- Agric. Educ./Ext.	0	0	6	4	0	6	6	1	23
- Home Economics	0	0	0	5	0	6	4	1	16
- Farm Management	0	0	0	0	0	0	2	9	11
- Horticulture	0	0	0	0	0	0	1	0	1
Sub-total	21	35	35	28	0	66	221	219	625
Grand total	194	316	379	519	366	586	638	771	3,769

Source: Maxwell (1977, p.165).

* A dash indicates an average of less than 0.5.

Table 2.5. Intended utilization of certificate and diploma finalists, 1977

Certificate holders			Diploma holders		
Nature of post		No.	Nature of post		No.
Regions:	Crops	293	Regions:	Crops	91
	Livestock	121		Livestock	31
Total		414	Total		122
Parastatals:	TAT	53	KILIMO:	MATI's	27
	TACA	49		Research	25
	NAFCO	3		Mbeya/Uyole	5
	LIDA	2	Total		57
Total		107	Parastatals:	TCA	16
KILIMO:	Research	30		TAT	3
	Headquarters	18		LIDA	1
	Irrigation	11		TTA	1
	Mbeya/Uyole	10		UFI	1
Total		69	Total		22
Prisons		24	Other:	Prisons	4
Grand total		614		UDSM	3
				Others	10
			Total		17
			Grand total		219

Source: Maxwell (1977, p. 166).

2.7.2. Syllabi for Certificate and Diploma Courses in Agriculture

Until the mid-1960's, the syllabus leading to a Certificate in general agriculture both at Tengeru and Ukiriguru did not include agricultural extension as one of the subjects. When the Agricultural College at Morogoro was established in the mid-1960's, agricultural extension as a subject formed part of the syllabus for the 2-year Diploma course in agriculture. Yeaman et al (1972) report that while the total hours of instruction seemed adequate for the subject, it was apparent that emphasis was not placed on the most important extension methods such as result and

Table 2.6. Training schedule for pre-service and in-service courses

Qualifications and type of course	Course of study	Institute
Certificate, pre-service	Agro-Veterinary	Ilonga
		Marulu
		Mpwapwa
		Mtwara
		Tengeru
		Tumbi
	Land Planning	Ukiriguru
		Nyegezi
	Lab. Technology	Temeke
Diploma:		
Pre-service	Crop Production	Ukiriguru
	Agric./Home Economics	Uyole
In-service	Agric./Nutrition	Ilonga
	Agric./Mechanics	Mlingano & Nyegezi
	Animal Health	Mpwapwa
	Farm and Land Planning	Uyole
	Farm Management	Mlingano
	Horticulture	Tengeru
	Irrigation	Nyegezi
	Ranch Management	Morogoro
	Crop Production	Uyole
	Animal Production	Uyole

Source: Maxwell (1977, p. 167).

method demonstrations. They advised that more training must be devoted to ensure complete understanding and competence in this area if extension work is to succeed. Since the introduction of agricultural extension in the syllabi, the subject has not attained a significant status in either Certificate or Diploma courses. A close examination of both Certificate and Diploma courses of the Ministry of Agricultural Training Institutes shows that agricultural extension is one of the subjects with the lowest allocation in both lecture and practical hours per year or per entire course (Table 2.7).

Table 2.7. Total allocation in hours per course and time allocated for "Agricultural Extension" as a subject

Year and institute	Level and title of course	Time allocation	
		For course	For Agricultural Extension as a subject
		Hours	Hours
1970:			
Nyegezi	Certificate in Agriculture	900	60
Ukiriguru	Certificate in Agriculture	900	60
1972:			
Mbeya/Uyole	Diploma in Agriculture (crops)	1,650	200
Tengeru	Certificate in Dairy Husbandry	1,024	84
Mpwapwa	Diploma in Animal Health	1,580	80
1975:			
Ukiriguru	Diploma in Agriculture	1,768	80
1976:			
Mbeya/Uyole	Diploma in Agriculture (animals)	2,346	50
Ukiriguru	Diploma in Agriculture (inservice)	1,640	0
1977:			
*Mbeya/Uyole	Diploma in Agriculture (crops)	2,507	199
*Ukiriguru	Diploma in Agriculture (crops)	2,507	199
*Mpwapwa	Diploma in Animal Health	2,380	133
Mpwapwa	Certificate in Agriculture	2,538	65

Source: Ministry of Agriculture, Dar es Salaam (1978).
*Syllabi developed through joint effort of teaching staff at the Ministry of Agricultural Training Institutes at Ukiriguru and Mbeya/Uyole and personnel from KILIMO Headquarters.

Only recently was an option in agricultural extension education introduced at the degree level at the Faculty of Agriculture, Forestry and Veterinary Science, Morogoro. A full-fledged department now caters for the subject. It is hoped that this will not mark an end in the effort to promote this important subject.

The foregoing sections demonstrate clearly that extension is neglected within the training of field staff. The training does not seem to take into account the nature of work students are expected to do in the field after graduation. The extension field worker as observed in the survey villages is of generally low technical competence, does not use effective extension methods mainly because he does not know them, hence cannot communicate effectively with farmers or villagers, is the victim of inadequate programming and planning because he never received training in these vital processes or aspects of extension work, and deals with incomplete technological packages of innovations to extend to farmers. Inadequate training of the extension field cadre as documented in this chapter is a major cause of the general weakness in the junior agricultural staff in the field as documented later. In order to test the impact of methods which otherwise would be obscured by the deficiencies of the larger extension system, a comprehensive study of the extension programme was made as outlined in subsequent chapters. In this programme, selected village-level extension workers received short intensive training in making extension programmes and plans and in extension methodology and motivation. They were also introduced to the package approach whereby a complete and correct package of technological innovation together with extension advice are presented to the farmers as a single unit. The results justify re-thinking the current curriculum and the overall training programme for prospective agricultural extension workers.

names of household heads of selected villages, the same procedure was used and 40 names were selected. This procedure, as for any proper random sampling technique, gave to each population element in the total population of villages and household heads an equal chance to be included in the sample.

An agreement was made between the author and KILIMO staff (village-level agricultural extension workers) that in the first set of two villages in each District demonstrations together with formal, scheduled group discussion meetings were to be used in teaching farmers recommended farming practices. In the second set, formal scheduled group discussion meetings only were to be used, and in the third set informal unscheduled meetings or general contacts only were to be used in teaching farmers. This exercise was to continue for the 4-year study period. Table 3.1 shows the Districts, villages and extension methods used. In all three sets of villages, Ilonga composite maize was used as an example for teaching villagers recommended farming practices. Good cooperation was secured from KILIMO in applying the three sets of group extension methods in the different villages. This cooperation was possible because most villages would gain through this study.

At the beginning of the research, the focus was on comparing effectiveness of the three sets of group agricultural extension methods. It was presumed that such comparisons would allow generalizations to be made about factors that affect effectiveness of group extension methods and hence the effectiveness of the agricultural extension worker himself. The initial design of the

Table 3.1. Villages in the sample and types of group extension programmes applied for each

Method	Village
Bagamoyo District	
Demonstrations together with group discussion meetings	Lunga and Msata
Formal scheduled group discussion meetings only	Bwilingu and Moga
Informal or general meetings only	Malivundo and Mlaula
Handeni District	
Demonstrations together with group discussion meetings	Mkata (H) and Segera
Formal scheduled group discussion meetings only	Komkonga and Manga
Informal or general meetings only	Kitumbi and Mazingara
Korogwe District	
Demonstrations together with group discussion meetings	Kiloza and Kwamsisi
Formal scheduled group discussion meetings only	Chekelei and Kuluwani
Informal or general meetings only	Magamba and Mlembule
Morogoro District	
Demonstrations together with group discussion meetings	Kauzeni and Kizinga
Formal scheduled group discussion meetings only	Kikundi and Sinya Ulime
Informal or general meetings only	Lukobe and Mkata

Source: Research results.

questionnaire was based on certain expectations relating to the effectiveness of group extension methods. The approach made use of several dependent variables: income per ha and per man-day, adoption rate and level of knowledge of recommended farming practices, and village development increase. In the process of pre-testing the questionnaire and talking to the village government officials, several issues came up. The most important one was whether as originally planned, this research should concentrate

only on communal production, ignoring completely private and individual production, or whether it should cover both communal and individual production. It became apparent that the last proposal would yield more useful information not only on the effectiveness and suitability of group extension methods under present policies but also on the understanding and acceptability of and commitment to villagization and Ujamaa policy in general. This approach would lead to a fuller understanding of the intricacies and causes of problems related to low production on communal fields vis-a-vis individual production regardless of the effectiveness of the extension methods applied.

The inclusion of individual production in this study necessitated conceptualization of alternative hypotheses and therefore a fourth hypothesis was formulated. Also the questionnaire had to be expanded to accommodate data on individual production.

Before the initiation of this study adequate preparations were made concerning enumerators and the subjects to be taught to the villagers. All 14 agricultural extension workers in charge of villages under study were briefed about the study and also received intensive coaching on the use of group extension methods and work programming and planning, principles of production of Ilonga composite maize and cotton, the application of these tools, and the collection of data.

Meetings were held under trees, or in village godowns where they existed, or in any other convenient and comfortable places. Topics for discussion during these meetings were the 11 advocated agricultural practices, namely:- (i) use of fertilizers;

(ii) timeliness in carrying out various operational agricultural practices; (iii) use of improved varieties of seeds; (iv) use of insecticides; (v) proper and early weeding; (vi) use of modern agricultural implements; (vii) crop rotation; (viii) soil conservation, (ix) vermin and wild animal control; (x) farm record keeping and (xi) pure stand versus mixed/interplanting of crops.

These topics were discussed in separate meetings. Before the commencement of these meetings, leaders or important members of the villages were contacted and detailed discussions of the programme was held. Moreover, before each meeting these leaders were contacted and briefed in advance, so that they would be well informed of the subject that was to be discussed. Leaders referred to here include the chairmen and secretaries of the villages together with village council committee members.

Discussions were conducted in a formal manner in the first two sets of group methods and every member was encouraged to participate, giving illustrations and examples from his own experiences. The duration of meetings depended on the interest and response of audiences. Where applicable, audiovisual aids were used for effective transmission of information and knowledge about the subject under discussion. In villages where formal, scheduled group discussion meetings together with demonstrations were used, these meetings prepared the ground for setting up demonstrations on the subject discussed.

Demonstrations were conducted on village farms using village labour, but inputs such as fertilizers, insecticides and seeds were provided by the author who also did the supervisory work with

the assistance of village-level agricultural extension workers. In order to insure the effectiveness of demonstrations, both methods and result demonstrations were performed by the author and his assistants and then trainees or villagers were asked to repeat the practice. Demonstrations were presented step-by-step stressing key points in simple, non-technical language.

In villages where demonstrations together with formal, scheduled group discussion meetings were conducted and in those villages in which formal, scheduled group discussion meetings alone were used, handouts or notes were distributed after the meetings to villagers who were able to read and write to serve as reference material for future use.

Where informal or unscheduled meetings were held, they were conducted on an ad-hoc basis. There was no specific subject preparation and consequently no particular subject for discussion. Handouts or notes were not distributed to villagers after ad-hoc meetings.

3.2. Types and Sources of Data

Data presented in this study are those which relate villagers' agricultural productivity to variables which are to a certain extent under the control of the extension worker. Other types of data collected include background information on agricultural extension methods, attributes of extension workers, percentage of villagers who are literate, village development potential, initial level of village development, final village development,

village development increases, aid received by villages, villagers' knowledge of recommended farming practices, and rate of adoption of recommended farming practices.

In the present study several variables have been omitted these include agricultural inputs of an economic nature and some social, administrative, and organizational aspects. However, it was difficult to make use of the variability due to the weather and therefore dummy variables by Districts were used.

3.2.1. Sources

Two major sources of data were used:

Primary sources - Data were collected principally through personal interviews with household heads and agricultural authorities at National, Regional, District and village levels. The author, assisted by village-level agricultural extension workers, carried out the interviews with each subject using a written Swahili questionnaire on which all replies were recorded. Household heads were interviewed separately or in isolation from other household heads and from their family members.

Interviews were arranged in a manner such that only one person, the household head, was interviewed per household. As much as possible, the same individuals or persons were interviewed each year for four consecutive years using the same questionnaires. In case one of the respondents died or left the village, his/her replacement was selected from the same household. If the whole family left the village, another household head in the list was

randomly picked in the following year. Interviews were also extended to village, District and Regional-level agricultural extension workers.

Information was also gathered by the author through living for several days in each village in order to observe and participate in various village activities.

Secondary Sources - Secondary sources of data used included research materials pertinent to the topic and geographical area under study, as shown in the bibliography.

3.3. Measurement of Variables

Thirteen operational variables for each village were investigated in this study. Below are computer code names for these variables:

PCLIT - Percent literacy

INDEV - Initial level of development

FIDEN - Final level of development

DEVIN - Development increase

CONTA - Total number of extension contacts for the four years

PODEV - Potential for development

AID - Total aid given to the village by outside parties for the four years

KNOW - Knowledge of the recommended farm practices

ADOPT - Number of recommended practices adopted

INCHA - Income per ha in T. shs.

INCMD - Income per man-day in T.shs.

DEME - 0-1 variable (1-Demonstrations and meetings)

MONLY - 0-1 variable (1-Meetings only)

The above operational variables were measured in the following ways:-

Percent literacy was obtained by taking the total number of all adults and school-age children in the village who could read and write and dividing by all adults and school-age children, then multiplying by one hundred.

Initial development of a village was measured by according a score of one point for each of the amenities which are indicative of development. These include schools, health centres, community centres, piped-in water, mosques, churches, shops, and grain mills. The scores at the beginning of the study were taken as the measurement for initial development of the village. Similarly, the scores for the same amenities at the end of study were the measurement of final development of the village. Development increase was the difference between these two scores.

Number of extension contacts was determined by assigning one point to each visit paid to the village per month when the worker was actually on duty. Five additional points were assigned to a village if there was an agricultural extension worker stationed in that village.

Potential for development of a village was measured by observing the infrastructures of the area in which the village is located and arable land available per household. One point was given to a village which was accessible all year-round by road

from either the major road, a market centre, or a main town which was either a Regional or District headquarters. Nearness of the village to main towns or marketing centres was another aspect considered. A village that was 0-10 km away from the town or marketing centre was given 5 points; 11-20 km, 4 points; 21-30 km, 3 points; 31-40 km, 2 points and beyond 40 km, 1 point. A similar grouping of villages on the basis of the availability of good agricultural land was adopted. A village that had 120 ha and below was given 1 point; 120-240 ha, 2 points; 241-360 ha, 3 points; 361-480 ha, 4 points and more than 480 ha, 5 points. The grouping was based on the recommendations of most Districts in the coastal zone that each household should have a minimum of 3 ha of arable land. Since the minimum number of households per village was 40, the minimum land requirement was 120 ha (40 x 3).

Aid given to the villages by government or other donors in monetary terms was determined by adding up the amounts donated for the four years for each village.

KILIMO recommends use of several so-called advanced agricultural practices. Knowledge of the recommended practices was measured by asking the respondent to name or list those practices that he knew. For each correct recommended practice named, he was given one point. The assessment of villagers' knowledge was made in each of the four years and the average per year was calculated.

Knowing recommended agricultural practices alone is not a solution to increased production; the adoption of the recommended practice is also necessary. In determining the number of practices

adopted, respondents were asked each year which of the recommended agricultural practices they had completely adopted. One point was given to each practice that was said to have been adopted. This was then summed over all four years and divided by four to get the average rate of adoption per year.

Income per ha was obtained by adding all ha under different crops for each year. The amount of each crop produced was given by the respondent and these were converted to a cash value by using the then-current market price for each year. The total amount of cash that would have been realized if the entire crop had been sold was divided by the total hectarcage to get income per ha.

Income per man-day was determined by dividing total income that would have been realized if all crops were sold by the total number of man-days spent in producing the crop.

With studies of this type, which to a large extent are based on responses to a questionnaire, certain possible weaknesses are inherent in the measurement of some variables. Information on labour input, total yield, and size of individual or private fields all were gathered using respondents' responses. Time did not permit checking the accuracy of the figures given by physically measuring the items. The same situation applies to number of contacts each extension worker made during the year. Nobody could ascertain the credibility of answers given by either extension workers or villagers. Moreover, the number of contacts an extension worker makes may not be a good measure of his effectiveness since visiting clients or farmers does not necessarily mean

performance of effective extension work. Insofar as the percent literacy measure is concerned, knowing how to read and write does not guarantee the ability to acquire and to comprehend agricultural materials such as the agricultural magazine (Ukulima wa Kisasa), bulletins, booklets, and brochures. With aid given to villages, there are also possibilities of misuse of both financial/material and technical assistance given for development purposes.

3.4. Procedure of Analysis

Two main analytical approaches were applied in this study: (i) analysis of variance and (ii) regression and correlation analyses.

3.4.1. Analysis of Variance (ANOVA)

The three different group-based agricultural extension programmes were imposed or applied in different villages, Districts, and under different types of farming systems. Therefore, the sources of variation in the effectiveness of the extension programmes were: first extension programmes applied, second the Districts, and third the nature of activities (communal and individual farming systems). ANOVA results for these treatments are shown in Appendice A-8.

3.4.2. Regression and Correlation Analyses

Both regression and correlation analyses were used in this study. Dummy or 0-1 variables were used in order to permit a shift up or down in the regression for individual Districts to allow for factors not included in the study of which weather

(timely rains) likely were of major importance. An analysis of residuals for individual villages highlights infrastructural and socio-economic factors not included specifically as variables.

Simple correlations between all possible pairs of individual variables were calculated by the computer programme and all except those for the dummy variables by Districts are shown in appendices for individual and communal fields respectively. The degree of statistical significance is indicated by a single* to indicate significance at P = 0.05 and a double** to indicate significant at P = 0.01.

In the final multiple regression equations, five variables, namely income per ha, income per man-day, adoption rate, level of knowledge and village development increase were considered as dependent variables, respectively. Any causal variables that had a (computed) negative partial effect was dropped on the assumption that this is contrary to basic logic. In such cases, the only rational assumption is that the true partial correlation is zero or so close to zero that its true positive effect was missed by data in the sample. Negative signs can indicate many things such as poor data or poor choice of measurements or the analytical method used. Alternative explanations for these negative correlations are given in the discussion section.

In all cases equations were run with and without the District 0-1 variables. For income per ha and income per man-day, separate equations were run based on these income variables for (a) communal plots and (b) individual plots.

Numbers in parentheses below the regression coefficients are the standard errors of these coefficients. Statistical significance is indicated in the same way as for the simple correlations. Since the sign is presumed to be known, a 1-tailed test was used.

For dependent variables only, the simple r^2's are examined in relation to the R^2 to see how much effect is added by use of the multiple relation over the single factor.

3.5. Limitations of Procedures

In relation to this study, a number of factors might limit the reliability of the analytical results. Unexplained variability is partly due to variable factors which are beyond the control of man but have great influence on the measurements and parameters used in arriving at various conclusions and, of course, is expected in any study of this type.

3.5.1. Uncontrolled Factors

Level of production - Agriculture is an extension of the natural process of plant growth on the earth's surface. Man modifies the physical and biological environment to facilitate the growth of the plants needed by him. The extent to which man can successfully modify the physical and biological environment depends on various factors, in particular the skills and tools that are at the command of the society concerned. Peasants or villagers in the coastal zone, limited in the technology at their disposal, face serious problems from certain aspects of the physical and biological environment. During this study variations in levels of crop production from one year to another were caused

by mostly unreliable rainfall, vermine attacks on crops, and outbreaks of crop diseases and insect pests. The period 1972/73 and 1973/74 was particularly bad insofar as rainfall was concerned. This was the period during which a large part of this zone faced serious drought and food shortages. There were frequent crop damages by monkeys, wild pigs, rats and porcupines. These, together with other unpredictable occurrences, influenced survey results concerning crop production. In order to minimize the effects of variation in the levels of crop production, the study period was spread over four years. It was considered that a 4-year study period was long enough to average out differences in the level of annual crop production. Moreover 0-1 variables were used to permit a shift up or down in the regressions for individual Districts to allow for factors not included in the study, of which weather (timely rains), diseases, insect pests, and vermine might have been of major importance. Low or negative correlations between number of extension contacts, number of adoptions, level of knowledge of recommended farming practices and demonstrations together with formal scheduled group discussion meetings as correlated to income per ha and per man-day might have been caused by fluctuations in the levels of crop yields due to these uncontrolled factors.

Respondents' replies - Quantitative information in this study was admittedly difficult to obtain on individual household fields for items such as family labour inputs and yields (which may be both for family consumption and for sale) partly because of lack

of record-keeping and partly because villagers were frequently not very communicative or were reluctant to volunteer information. Rural people, because of their past colonial experience of taxation, suspect and distrust strangers and usually try to avoid talking about prices, incomes, and their possessions. An opposite situation was encountered when collecting data from communal fields or activities partly because, in most villages, records were kept by secretaries and partly because nobody feared to reveal them since they indicated communal property which even if taxed or confiscated by government would not cause individuals to suffer much. In some cases respondents likely gave answers which they thought the enumerator wanted instead of those that reflected the true situation. Receipts of crop sales were often used as a check against what the farmer said he actually produced and what he said he consumed or sold.

Location of villages - All villages studied are either on the Morogoro-Chalinze-Korogwe-Moshi road, or up to 10 km away from the main road. Some villages, such as Kauzeni and Sinya Ulime in Morogoro District, Mlembule in Korogwe District and Segera in Handeni District, were close to urban or semi-urban centres and were also surrounded by sisal estates. The differences in the distance from the main road among villages studied and their geographical location in relation to urban, semi-urban or sisal estates might have some influence on the survey results. To minimize such effects, some household heads who had part-time employment outside their respective villages were excluded from the study. However, such control was not fully effective. Later

it was discovered that some of the household heads included had part-time employment for short periods outside their villages. Having many village members with part-time employment means a reduction in labour force and consequently a reduction in the area cultivated and yields from it in relation to the total number of village members.

Enumeration - Data collection was done by the author assisted by village-level agricultural extension workers. Although the author provided continuous field supervision of enumerators and also had developed this research project in conjuction with the personnel who were eventually to be field enumerators, there were still possible problems of cheating and unreliability due to negligence of enumerators. Cheating in research surveys of this nature is a common characteristic (Moris, 1970). Some enumerators might have asked questions carelessly, neglecting difficult questions and recording stereotype answers provoked by their own suggestions. To counteract such situations, constant field supervision is required. Several enumerators did their work well, producing reliable questionnaire data as well as extremely important notes consisting of personal reflections in the course of the research. They went to great lengths where appropriate to elicit true replies of respondents and to probe the real situation on, for example, family labour inputs or production per ha.

3.5.2. Factors Under Control

Several factors which could be expected to have influenced the results but which were not included in the calculations were

controlled for in other ways, either as "dummy" variables (coded 0-1, to permit a shift up or down in the regressions for individual Districts) or by other means. These factors are discussed in the paragraphs that follow:

Crops grown - Due to similarities in climate, ecology, soils and the socio-economy of the zone, all four Districts raise similar types of cash and food crops. These include sorghum, cassava, simsim, rice, maize, beans, cowpeas, cotton, sunflowers, cashew-nuts, and a variety of fruits. The major source of income is derived from crop sales. So differences due to type of crops grown were not expected to be important.

Markets and crop prices - With the registration of villages as cooperative societies in 1972, all villagers sold their crops within villages or within walking distances. The policy of the government during the period of this study was that all crops had to be sold through cooperative societies to the appropriate Crop Authority or Board. Crop Authorities or Boards offered uniform official prices for the same crops everywhere in the country. However, it is likely that some crops were sold outside official channels at higher prices but this was not believed to significantly affect the between-village comparisons.

Education and professional training of village-level agricultural extension workers - With the exception of one agricultural extension worker who had completed his secondary school education and two years of professional training in agriculture, the remaining 13 had completed only their primary school education

with at least six to nine months of professional training in agriculture. Based on the author's four years of observation of these extension workers, it is believed that their levels of performance did not differ significantly. This point was confirmed by the District Agricultural Officers in the four Districts when they were consulted on the issue. Hence, it will be assumed that differences in effectiveness of village-level agricultural extension workers did not influence the results of the survey significantly.

Transfers of agricultural extension workers - An agreement was made with the authorities in KILIFI that all village-level agricultural extension workers involved in this study should not be transferred to other areas during the study period. Therefore the survey results were not influenced by changes in extension workers.

3.5.3. Questionnaire Design

The questionnaires were written in Swahili. Any language problem among the illiterate elder members of the communities was overcome by the enumerators translating Swahili into vernacular or local dialect. When preparing the questionnaires, a balance was kept between "open-ended" and "fixed alternative" questions. The distinguishing characteristics of open-ended questions is that they merely raise an issue but do not suggest any structure for the respondent's reply so that the respondent is given the opportunity to answer within his own frame of reference. Because of lack of fixed alternatives, the enumerator is expected to

interpret the meaning of replies and paraphrase them in the process of recording, and therefore possible errors may be incorporated while recording. It is also difficult to comprehend the meaning of long-winded and vague responses. Open-ended questions are conceptually difficult to answer especially for the illiterate respondents. Nevertheless, because of the nature of information that was required pertaining to villagers' attitude, open-ended questions had to be included. Fixed alternatives types of questions do not give a chance for the respondent to think and he is tempted to pick one of the listed alternatives unless the enumerator probes the respondent further. Fixed alternatives questions are used when precise answers are wanted. Selltiz (1964) recommends the use of both "fixed alternative" and "open-ended" questions in preparing a questionnaire in order to balance the disadvantages and advantages of both.

CHAPTER IV. THE AREA AND VILLAGES UNDER STUDY

4.1. Geographical Location

Geographically all four Districts in the study lie roughly between latitude 4° and 8° south of the equator and between longitude 36° and 40° north-east on the Tanzania mainland. Altitude ranges from sea level to 3000 m above sea level. The mountain areas of Usambara and Uluguru constitute an uplifted portion of this zone. These mountain areas rise to above 2500 m and include important forest and agricultural areas. This study did not cover the upland areas but was confined to villages in the lowland part of the zone. Figure 4.1 shows the geographical location of the zone which was studied, while Figure 4.2 shows the Districts' main roads, towns and study villages.

The eastward flowing rivers, fed either by high precipitation on the distant Kilimanjaro massif or on the above montane areas, form well-defined drainage systems. The most important are the Ruvu, Wami, Mlizaji, Msagasi, and Pangani Rivers.

The soil throughout the area has low to medium fertility and is of moderate agricultural potential (Table 4.1). These soils are classified as either ferruginous tropical soils or ferrosols of subhumid regions. They are easily erodible because of their tendency to form a surface cap. Nevertheless, they are suitable for growing a variety of crops including: sisal, groundnuts, sorghum, maize, soybeans, caster, cashewnuts, cassava, beans, cotton, tobacco, simsim and sunflower. Rice can be grown in the swampy areas.

FIGURE 4.1: GEOGRAPHICAL LOCATION OF THE AREA UNDER STUDY.

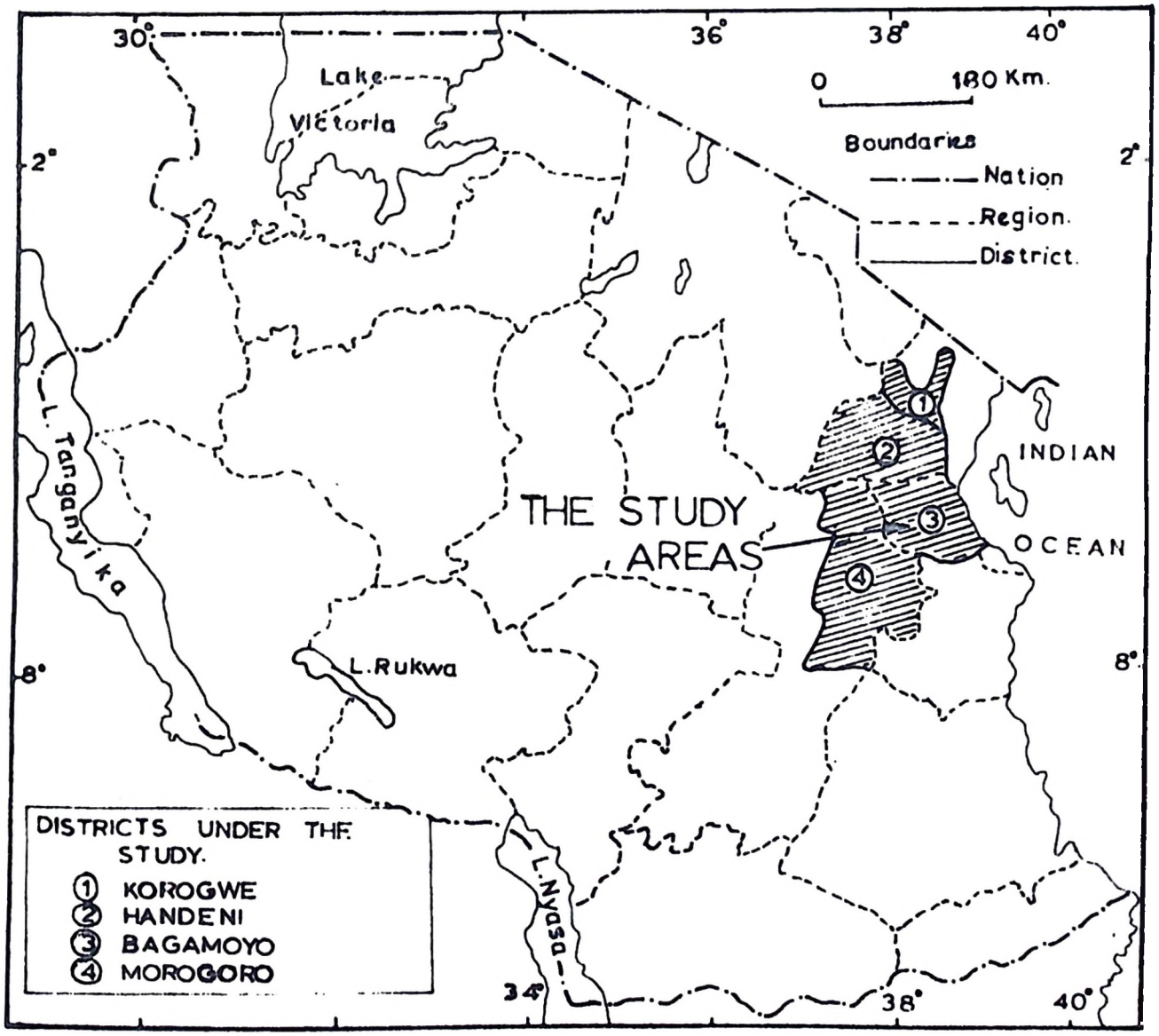

Table 4.1. Site soil fertility of the village

Good	Moderate		Poor
Kikundi	Bwilingu	Manga	Chekelei
Kizinga	Kauzeni	Mboga	Lukobe
Kwansisi	Kitumbi	Mdaula	Kiloza
Mlembule	Komkonga	Mkata (H)	Kiluwani
	Lunga	Mkata	
	Magamba	Msala	
	Malivundo	Segera	
	Mazingara	Sinya Uline	

Source: Sample survey.

Because of their poor quality, these soils cannot support continuous cropping without the addition of nutrients. In the last few years fertilizers have been distributed to most villages in the zone, but so far their use has not been very successful. Sumra (1975) gives the following two reason for lack of success in Handeni District and these were found also by the present author in the four Districts under study. (i) No attempts have been made to determine the kind and amount of fertilizers required in specific areas or geological zones. The quantity of fertilizer to be applied to the crop depends upon the levels of nutrients in the soil, their availability, and the ability of the crop to take up the nutrients and use them to increase yields. The practicability of the use also depends on the cash value of the increased crop in comparison with the cost of the fertilizer applied. (ii) Farmers are not taught how the fertilizers should be applied, how they work, and the need for their use. This emphasizes the need for demonstrations as a teaching method. Another reason not mentioned by Sumra is that, although the cost of fertilizer is subsidized

by the government to about half of the total cost, yet most farmers and villages could not afford it. A further problem is that fertilizers, even though economic when combined with recommended agronomic practices, may not be so under crop production methods used by most farmers and villages. Singh, Uriyo and Poote (1978) found that N fertilizer application for maize in the near-by Morogoro and Wami-Kilosa areas under 1976 prices was profitable only on soils with low soil-N content.

4.2. Rainfall and Its Effects on Economic Activities

4.2.1. Direct Effects

This zone has two rainy seasons which are, however, not of equivalent reliability and which are separated by a variable short dry spell normally from late January to late February. The first rainy season (commonly called the 'Short Rains') starts around November and ends in December or early January. The longer rainy season runs from March to May or June. This seasonal pattern limits the production of most annual crops to that part of the year receiving the longest rains. The distribution of rainfall within individual months and intensities over short periods are of considerable importance. The effect on crops of a few heavy storms are different from a more evenly distributed, moderate rainfall. Much of the rainfall in this zone occurs in storms of high intensity during which a large part of the precipitation runs off the soil surface and is thus lost to crops. Rainfall over most of the area is unreliable, varying greatly in total amounts

from year to year in its distribution between months within the rainy season, particularly in relation to comparatively small areas. Although an assessment of the annual rainfall pattern is of some value, it is the conditions during individual seasons and small areas which to a large extent determine agricultural practices in general in Tanzania. The mean annual rainfall in the zone under study varies from 800-1200 mm (Jackson, 1970a, p.174). The mean number of rainfall days varies from 75 to 120 (Ministry of Land, Settlement and Water, 1967). Rainfall reliability is a problem particularly in the lowland areas. Only a small area of the Uluguru and Nguru Mountains have a high probability of receiving at least 1200 mm in a year (Jackson, 1970b, p.7). In Tanga Region, for example, droughts occurred in 1971 and 1973 causing crop failure, especially maize. The effects of such droughts on single-season extension evaluation has been noted. The major source of water in this area is natural rainfall. Its variation is the most important climatic element in the zone and indeed in Tanzania as a whole (CIMMYT, 1977, pp. 21-27).

The uncertainty as to the start of the main rains and the distribution of it within the season causes peasants to find it difficult to time their farming operations. To overcome this problem, peasants in most parts of the zone carry out three plantings of maize spread over a period of two months. In this way they hope to make sure that at least one planting will give good yields.

The temperature regime is typical of equatorial altitudes. Variation between the hotest and coldest months of the year is

small and the annual range for mean highs or lows is smaller than the daily range. The mean annual temperature ranges between 23° and 28°C. At no time does temperature impose a total restriction on agricultural and pastoral pursuits, except indirectly by its contribution to evapotranspiration.

Most coastal zone villages experienced severe droughts during the 1972/73 and 1973/74 crop seasons covering half of the study period. In these two crop seasons, crop yields were drastically reduced. This reduction affected calculations for income per ha and per man-day.

In respect to rainfall, the survey villages can be divided into two groups. Villages along the Morogoro-Chalinze-Tanga main road form one group with some common characteristics. This group includes Sinya Uliine in Morogoro District; Mdaula, Bwilingu, Malivundo, Mboga, Lunga and Msata in Bagamoyo District; and Mkata (H), Manga, Kitumbi, Segera, Mazingara and Komkonga in Handeni District. These villages experience a triennual rainfall pattern which at times goes below 700 mm and seldom goes above 1000mm. West of the line of the Ruvu River, water is chronically short. Water supplies in most of these villages are almost entirely from natural water pools, most of which dry up during severe dry conditions. Generally water is insufficient for human, livestock, and agricultural activities.

The second group of villages comprises Kauzeni, Kizinga, Kikundi, Mkata and Lukobe in Morogoro District; and Kwamsisi, Kiloza, Kiluwani, Mlembule, Magamba and Chekelei in Korogowe

District. The average annual rainfall for these villages is 1400-1800 mm so that water is not so much of a problem. These villages are located on higher altitudes than those in the first group. With the exception of Kauzeni in Morogoro District and Mlembule in Korogwe District, which are on the main roads, the villages are far away from the main road and less people are engaged in commercial or trading activities. Due to differences in rainfall between the two groups of villages, the second group does slightly better in crop production than the first group. Major cash crops and marketing facilities for the two groups are the same.

4.2.2. Indirect Effects

Indirect effects of rainfall on the overall survey results was caused by serious scarcity of water in the zone resulting from inadequate amount of rainfall. Water scarcity compelled villagers to walk sometimes over six km in search of water. In so doing they wasted time and energy, both of which could have been otherwise used in productive work such as farming. Water scarcity in the coastal zone is one of the most serious problems faced by villagers and indirectly retards both the social and economic development of the zone.

Three types of costs are incurred by villagers in the process of hauling water: Energy cost, opportunity cost, and limiting cost. The unit cash price that an urban dweller pays for his water can be determined. It is harder to give a cash price to the energy his rural cousin may use in carrying water home. However, the method adopted by researchers on this subject is to estimate

the amount of energy used and then determine the amount of staple food required to supply this energy and the price of that amount of food (White, 1972, pp. 93-97). The same approach could be repeated to calculate the cost of energy expended by villagers fetching water in the coastal zone villages.

When calories are converted into cash, as in the above-mentioned calculations, the question of the opportunity cost of the time and energy arises. In carrying water, the woman sacrifices the opportunity of do something else, perhaps something which would produce a greater return for her labour. In a situation where the carrier could find no productive alternative employment of her time and energy, the opportunity cost for her carrying water becomes zero, from society's point of view. In this zone, as in many parts of Tanzania, the women do much of agricultural work which occupies the largest share of the time of a majority of married women. Table 4.2 shows water sources to the villages. As can be seen, most villages get water from natural water pools. Villagers using these pools have to travel long distances because natural water pools are not permanent water sources near which villages can be established.

Extreme distances to water sources often limit human settlement in particular areas only. There are several areas in Handeni and Bagamoyo Districts with high potentials for agricultural and other types of development. Resources in these areas have not been fully exploited mainly because of water or rainfall shortages.

Table 4.2 Sources of water to the village

Piped water	Constructed modern well	Natural water pool		River
Kauzeni	Kizinga	Bwilingu	Lunga	Kiloza
Kikundi	Kwamsisi	Chekelei	Manga	Mlembule
Magamba	Segera	Kiluwani	Malivundo	Sinya Ulime
Mlembule		Kitumbi	Mazingara	
Mkata (H)		Kimkonga	Mdaula	
Mkata		Lukobe		
Msata				
Segera				

Source: Sample survey.

4.3 Ecology

The general vegetative cover of the area is classified as woodland. This is land with an open cover of trees, their crowns not forming a thickly interlaced canopy, and as a rule leafless for some period during the year. The most common types of trees are: Acacia spp., Combretum spp. and Brachystegin - Isoberlinia (commonly called Miyombo woodland). The vegetation of the area shows marked local variation. Due to man's activities the vegetative cover of the zone has been altered in various places to varying degrees by man's activities (Matteucci, pp. 3-5). During the times of the slave trade, the Arabs developed extensive areas around the cities or towns to feed the incoming slaves and stock trading expenditions. After the de-facto abolition of the slave trade in 1976, the consequent reduction of the overall forest cover was slowed but not halted by the switch to alternative forms of plantation agriculture employing slaves. Operations on the Tanzania coastal zone aimed at controlling tsetse flies led to the

clearing of natural vegetation around Government-owned dairy ranches, townships, and many other areas suitable for human habitation including the traditional and present villages. One good example of man's activities is the physical environment of Mzizima Farm. Matteucci (1971, p. 10) reports that most of the then present vegetation cover on the farm was coconut trees and, except for relics near the river, no original vegetation was to be found.

Areas that have not been much disturbed by human activities such as farming, bush fires, and clearing for settlements have maintained more or less the original vegetation. There are also wooded grasslands. These include lands carrying grasses and herbs as well as scattered trees. Bushland and thickets prevail in the less arid areas. Along the hill slopes the soils are rather infertile and species of Hyperrhenia are predominant. These are intermingled with Cymbopogon, Panisetum, Panicum, Chloris, Cynodon, Sporobulus, Eragrotis Brachystegia species.

Woodland or bushland and thicket, together with the man-induced savannas and grasslands, form suitable habitats for tsetse flies (Economic Survey Mission to Tanganyika, 1961). Consequently tsetse fly prevents full utilization of the land unless measures are taken to eliminate the fly or control the disease which it carries. These measures are costly in relation to the expected return from the land which is of low potential in some cases. Matteucci (1971) remarks that the method of eliminating the fly by destruction of its breeding grounds is a difficult one

because of the wide coverage of the bush. Agricultural activities, whether in the smallholder sector or in the advanced sector, have relatively little influence on fly presence, for no complete elimination of all breeding grounds result from their activities since unproductive areas are never put under cultivation.

Areas of the zone that have been undisturbed by human activities harbour appreciable numbers of original wild animal species. Animals and birds that are of major interest in relation to this study are those that attack field crops. These include monkeys, wild pigs, elephants, porcupines and a variety of birds that feed on grain such as the Sudan dioch. The greatest concentration of these animals and birds is in Handeni Districts and small patches in Morogoro, Bagamoyo and Korogwe Districts.

Vermin seem to be the greatest problem as regards destruction of crops especially on the communal fields. Villages that suffered most were Mkata, Kizinga, Kikundi and Sinya Uline in Morogoro District; Lunga and Msata in Bagamoyo District; Manga Mkata (H) in Handeni District; and Kwamsisi and Kiloza in Korogwe District. Damage was more serious on communal fields after planting than on individual plots because people paid more attention to their individual fields.

The ecological conditions for the areas in which sample villages are located permit various economic activities to be undertaken. Apart from agricultural activities, several villages utilize forest products to supplement their income. Many villages burn charcoal for sale. One bag of charcoal may cost up to

T.Shs. 25 or more. Other villages such as Lunga in Bagamoyo District and Mlembule in Korogwe District cut down trees and sell the logs to saw mills. A few villages are engaged in bee-keeping and other economic activities (Table 4.3).

Table 4.3. Village economic activities other than farming

Livestock keeping	Grain milling	Charcoal burning	Lumbering	Commerce or trade
Bwilingu	Kauzeni	Kauzeni	Lunga	Lunga
Kauzeni	Kwamsisi	Kitumbi	Mlembule	Mlembule
Kwamsisi	Lunga	Mboga		Mkata (H)
Lunga	Manga			Msata
Mazingara	Magamba			Segera
Msata	Mkata			Sinya Ulime
Segera	Sinya Ulime			

Source: Sample survey.

4.4. Livestock

Rainfall and tsetse flies are the limiting factors to the expansion of livestock raising for the greater part of the coastal zone. Over 60 percent of the total area of Tanzania is infested with tsetse flies (Ministry of Land, Settlement and Water, 1967) and the coastal zone forms part of this area. In these infested areas of "fly belts" trypanosomiasis, the disease transmitted by tsetse flies, keeps human settlement sparse and the domestic livestock population low. This disease in man is called "sleeping sickness" and in his animals "nagana." Areas that are heavily infested with tsetse flies and those that are permanently dry or dry for a greater part of the year are devoid of people and livestock. These conditions apply more to Handeni and Bagamoyo Districts and less so to Morogoro and Korogwe Districts.

Contrary to many areas of Tanzania where presence of tsetse fly effectively completely excludes cattle keeping, and where seasonal grazing of the animals in tsetse areas is bought at the cost of substantial losses of animals, a low cattle population density thrives in many areas of the coast in the presence of these flies. It has not been determined whether such coexistance is due to non-preference by the flies or whether it is the result of an acquired, or even inherited, pre-immunity of the stock. It can be assumed that, confronted with the practical impossibility of tsetse elimination (at least with traditional methods), man has tended to ignore the presence of the fly and that such an attitude has not led, as expected, to disaster, but to a certain degree of low-level equilibrium, which in recent years has been supplemented by extensive use of tryponocides.

The present pattern of livestock keeping in the zone is characterized by small herds, sporadically distributed throughout peasant communities with the greatest concentration in areas where the Wakwavi (Baraguyu) live. The rest of the villages keep limited numbers of animals. With the exception of Mkata and Kauzeni villages that own limited numbers of cattle communally, the livestock in all other villages are owned privately by villagers.

The Wakwavi are a pastoral people who do not live permanently in specific villages but lead a semi-nomadic type of life. They are forced to migrate by their main-source of subsistance, cattle. The crucial things in their life are grass for animals and water for both cattle and humans. Ndagala (1974) reports that the

Wakwavi have adapted themselves and their livestock to the environment so successfully that, economically, they surpass their agricultural neighbours. They have put Bagamoyo District on the map of the Coast Region as far as cattle production is concerned. They remain as a distinct group socially and occupationally.

The Wakwavi regard cattle as the source on which all other social and economic activities depend. The factors of production necessary in the economic process of production among the Wakwavi are cattle, land (pasture and water) and labour. Besides the exchange of cattle by way of gifts, loans and marriage, all of which aim at increasing social and economic security against risks by gaining more relatives, the size of the productive herd (female calves or young cows) is never allowed to deteriorate.

The famed resistance by Wakwavi (and indeed all pastoral Masai) to changing the structure of their mode of production and its major supporting institutions is not for its own sake but for the sake of the economy to which the way of life is tied and on which their entire livehood depends. The Wakwavi have for a long time rejected various innovations, both social and economic. Consequently they have contributed little to the social and economic development of the coastal zone despite their potential wealth. Livestock are sold daily when the need for cash is acute or when the price is considered favourable. This attitude toward livestock can be utilized to raise the economic conditions of the area and to integrate livestock keeping more closely with the rest of the farming activities.

The portion of the herd that forms the major off-take source for the market comprises surplus bulls, very old cows and sick cattle that show no signs of recovery. Cattle among the Wakwavi are not kept as an end in themselves but as a means to subsistance production in their harsh environment. The subsistance food of the pastoral Wakwavi is milk and blood and the chief factor of production for such items is cattle. The other local tribes (agriculturists) have remained superior as far as goats and sheep are concerned. The most recent count (1971) shows Bagamoyo with 70,150 cattle and a stocking rate of 15 ha per animal.

In order to produce a surplus necessary for capital formation, the current pastoral subsistence cycle has to be broken. Mdagala (1974) sees that, with the current conflicts, the social stability that the culture used to enjoy is slowly being reduced. He correctly states that substantial sums of money and expertise have been invested in agriculture and that relatively little has been put into cattle production apart from state ranches.

4.5. Fisheries

Fishing is one of the major economic activities in the strip along the Indian Ocean shore. None of the sample villages was in this strip but there are strong ties in fish trade between sample villages and villages in the strip along the shore. Reliable data suggest that production along the coast could be substantially increased by adopting modern fishing techniques and vessels. Currently, fishing activities are as profitable as farming for most of the villages in the strip. Fishing competes against

farming and the adoption of crop-farming innovations. With an increase in fishing technology and equipment and hence production, farming is likely to lose. However, increased production should not be over-emphasized; equally important, if not more so at the present time, are improvements in processing and distribution to ensure that fish reach the consumer in edible form. At present, traditional methods are used in preserving the little amount that is caught.

4.6. Agriculture

4.6.1. General Features

Agriculture and livestock development are the major or principal preoccupation of the people in this zone. The dominant position of agriculture is shown in the contribution it makes to the income of the people in the zone and the role it plays in the provision of food and employment to the people in villages. Well over 95 percent of the population is engaged in agricultural production and the same percentage of their total income is derived from agriculture. There are two types of agricultural employment, "sisal estate" employment, which gives villagers regular cash flow not received from farming, and "self-production by farming" which gives them seasonal cash incomes as well as rural domestic food requirements. The economic growth of the zone is for the foreseeable future closely tied to increase in agricultural production and productivity. Since the area lacks extensive mining or manufacturing industries, the development of other sectors of the economy at present depends largely on how

rapidly and cheaply the existing agricultural potential is developed, especially since this potential can best be exploited through increased effort by the area itself.

In areas not infested with tsetse, farmers use ox-cultivation and the Ministry of Agriculture has established some ox-training centres, for example in Chanika and Segera villages. As in most parts of Tanzania, the level of agricultural technology of villagers is low. Intensification of peasant production could be achieved by promoting a comprehensive drought-animal technology. Present non-use of animals for cultivation is mainly because of the infestation of tsetse fly which is the vector of trypanosomiasis animal disease organisms. Where animal power is feasible, a different technology would be expected. For the greater part of the zone, tools used for farming are of the most elementary type. So, lack of fixed investment, absence of mechanization, and dependence on manual labour imply that the area to be cultivated per family or per person will be generally small.

The main cash crops grown in almost all villages are cotton and sunflowers. Great effort is being made by the Ministry of Agriculture in introducing or expanding other cash crops such as coconuts, cashewnuts and a variety of fruits. Food crops grown in the villages include maize, rice, sorghum, simsim, cassava, cowpeas, chickpeas, and beans. The surpluses of some of these crops after satisfying domestic requirements are put on local markets. Production per ha of all crops mentioned above is low as observed in this study and in other studies conducted by various

researchers from the Ministry of Agriculture and the University of Dar es Salaam.

4.6.2. Shifting Cultivation

Peasants living in the Coastal zone practice shifting cultivation. Allan (1967, p.5) describes the shifting cultivator as follows:

> (He) has an understanding of his environment suited to his needs. He can rate the fertility of a piece of land and its suitability for one or another of his crops by the vegetation which covers it and by the physical characteristics of the soil; ... can assess the "staying power" of a soil, the number of seasons for which it can be cropped with satisfactory results, and the number of seasons for which it must be rested before such result can be obtained again. His indicator of initial fertility is the climax phase that follows cultivation.... He has a vocabulary of hundreds of names of trees, grasses and plants, and he identifies particular vegetation associations by specific terms ...

This quotation shows the fundamental ecological knowledge which forms the basis of shifting cultivation and which the shifting cultivator should have and in most cases does have.

Shifting cultivation has been defined in different ways by different people. Among the best definitions are those given by Ruthenberg (1968, p. 59) and Allan (1967, p. 5-8). These basically state that shifting cultivation is the ratio between the length of time the soil will sustain cultivation with satisfactory results and the period required for the restoration of fertility. Shifting cultivation as a process is characterized by structural attributes such as clearance of land by means of fire and hoe with limited investment of human labour. The resulting impermanent clearings are cropped for a shorter

period than they are fallowed. When a piece of land is exhausted by cropping, it is left fallow and goes back to natural vegetation before being considered again as potential clearings for new fields.

Allan differentiates two types or forms of shifting cultivation. One is what he calls obligatory shifting cultivation which refers to a periodic move of the exploiting group from one area of land to another. This applies largely to land unsuitable for cultivation but which may be cultivated for longer or shorter periods in restricted belts or patches of better soil. The second form is voluntary shifting cultivation which is found where land is so abundant, in relation to the population and its requirements, that the period of natural soil regeneration has no practical significance and a man needs not necessarily think in terms of returning to land he has cultivated within the foreseeable future or, perhaps, within his lifetime.

Voluntary shifting cultivation was the form or type practiced in the coastal zone. This form was associated with the movement of the homestead to a new place. This periodic dying of the homestead was one of the most important features of voluntary shifting cultivation and, as a traditional limitation of general character, it was a great obstacle to the farmer's adoption of fixed investments, innovations, and therefore to his agricultural progress.

Apart from voluntary shifting cultivation, there were rebuilding of villages which were frequent occurrences in nearly all

village-dwelling societies, or with the movement of part of a village because of schism within the group. Probing the memory of old men, the author was given the following reasons for the shifting of the homestead or whole village (in order of importance): first, death of a wife; second, repeated misfortunes such as death of children and sickness amongst the household; thirdly ritual reasons, and fourth, repeated failure of crops or continuous decline of crop yields and land degeneration which led to difficulty in finding suitable land for cultivation.

Semi-permanent and permanent cultivation are now replacing shifting cultivation. According to Ruthenberg (1968) when cultivation is extended so far at the expense of fallowing that the characteristic "R" (the number of years of cultivation divided by the cultivation period plus the fallow period, i.e. by the total length of land utilization) reaches or exceeds the value 0.5, so that one can hardly any longer speak of shifting of the field, then a level of intensity of land utilization known as semi-permanent cultivation is reached. Similarly permanent cultivation is reached when the characteristic "R" exceeds 0.7.

Datoo (1973) gives a sophisticated review of how such a process takes place. Using data from Morogoro District, he found that when a system develops into a new form, all the structural adjustments which should accompany the change-over may not be automatically made. There is often a time-lag, especially if farmers experience a change from shifting cultivation to sedentary agriculture within a relatively short period. The author believes

that this change in the coastal zone is the result of the constant modications being made in customary socio-economic, political, and physical demands. Three of the most important vectors of changes in recent years have been the increased human and livestock population, introduction of cash crops, but most importantly the adoption of village and Ujamaa village policy. Although Datoo agrees generally that population increase can be a contributing factor to changes in agricultural systems, depending on the attributes of the society, his study found that agricultural systems in the Uluguru Mountains are not, on the whole, congruent with population density. His explanation for the failure of the system to evolve are: first, that there may not be any evidence of stress within the agricultural systems to satisfy investment in effort to intensify agriculture, or secondly, that population growth may not have been slow and sustained but rather rapid and sudden so that farmers may have not made swift structural adjustments. It should be noted, however, that a great degree of variation on this issue exists from one District to another even within the coastal zone.

4.7. Social and Cultural Background

According to the 1967 census there were 562,000 people in all four Districts under study with an overall population density of 19 persons per km^2 (Ministry of Land, Settlement and Water, 1967). The breakdown according to Districts was as follows: Bagamoyo 89,000; Handeni 93,000; Korogwe 113,000; and Morogoro 267,000. As shown in the

1967 census, the percent rate of previous growth in population in the survey area for 10 years was: Bagamoyo 11.6; Handeni 22.5; Korogwe 24.9, and Morogoro 14.4. For the entire zone, the average rate of population growth was 1.8 percent per year. According to the 1978 census the population of the four Districts are: Bagamoyo 136,000; Handeni 177,000; Korogwe 191,000; and Morogoro 343,000, totalling to 847,000. Interpolation between these two sets of figures suggests a population for the final year of the survey of this study (1975) of Bagamoyo, 123,000; Handeni, 154,000; Korogwe, 170,000; and Morogoro, 323,000, giving a total for the four Districts of 770,000, with an overall population density of 26 per km^2.

This zone is inhabited by several minor tribes but the main ones are the Waluguru, Wakwere, Wazaramo, Wazigua, Wakame and the Wakwavi or Baraguyu. The tribal distribution along the coastal zone is not uniform, particularly in the south. These tribes are sociologically and culturally different from each other, especially the pastoral nomadic Wakwavi as contrasted to the others who are mainly agriculturists. The different tribes are also not linguistically equivalent. However, the coastal zone has been much affected by the coastal Swahili culture and social systems for a long time so that superficially the different tribes appear to have a fairly homogeneous cultural and social system.

Prior to the establishment of villages, the vast majority of people lived in isolated huts or hamlets but some lived in traditional villages, which were often trading centres. Some of these

traditional villages and trading centres have formed the nucleus of the present villages. As discussed in this Chapter, some have been traditional villages and trading centres for a long time. Lunga, Bwilingu and Msata in Bagamoyo District, and Mkata (H), Konkonga and Segera in Handeni District existed even before the construction of the all-weather Morogoro-Chalinze-Tanga road in 1960 but the rest of the villages along this road were recently established during "Operation Vijiji" in 1974. Similarly, Mlembule and Kiloza were established before the construction of the Moshi-Korogwe road in 1960. Some villages were established before "Operation Vijiji" to serve sisal estates or as trading centres. These include Lukobe in Morogoro, Segera in Handeni; and Mlembule and Magamba in Korogwe District.

As noted earlier, there are striking differences between tribes inhabiting the coastal zone. The most apparent difference is between the Wakwavi and the rest of the tribes in the zone. The following discussion is focussed mainly on these differences.

The greatest concentration of the Wakwavi is in the Central part of Bagamoyo District. In the east their area is bounded by the Ruvu River and in the south the area extends as far as the Msua and Kisuka Rivers which are the boundary of the district, but quite a number of Wakwavi "overflow" across the neighbouring districts of Morogoro, Kisarawe and Handeni which are said to constitute their original home after being driven off from the north. To the north, the current limit is the Wami River. This area is shared with several sedentary agriculturist tribes. These

tribes differ slightly in respect of their languages, but they understand each other's tongue. These sedentary farmers used to keep cattle but through historical disasters they abandoned cattle husbandry and now concentrate on goats which are less demanding. Due to the low fertility of land, poor rains and poor tools, the agricultural tribes produce very little over and above subsistance requirements. With no surplus to convert into capital, the majority of the farmers have remained on mere subsistance. The government has almost annually supplied famine relief to them following crop failures. Economically, pastoralists seem to have fared better than the farmers. However, the farmers despise the Wakwavi for being wanderers and for refusing to send their children to school.

The Wakwavi live in kraal camps called "enkang" which are circular or horseshoe shaped. Several families may live close to each other, and such families are usually related. With their cattle, the Wakwavi enjoy mobility of their capital (cattle) and are more secure from disaster of drought. Both the Wakwavi and the agriculturists have maintained their economic status. Of late the agriculturists, particularly the Wakwere, are being employed by the Wakwavi on various tasks. The agricultural tribes live in organized villages.

The Wakwavi are a sub-tribe of the Masai. In the nineteenth century they were defeated by the Masai and driven southward. The Wakwavi are strong fighters and raiders. When the Wakwavi arrived in the coastal zone, the coastal people were perplexed because of

the fantastic stories they have heard about their prowess and raiding, but the Wakwavi did not portray these qualities. Unlike their fellow agriculturists with their permanent settlements, the Wakwavi were moving from one place to another. Somebody (among the agriculturists) would tell a friend that at such and such a place there are Masai. When they got to the place they would find it deserted. The friend would then ask "Wako wapi?" meaning, "Where are they?". As time went on Wako wapi eroded into Wakwavi as a name for the Baraguyu. The Wakwavi are polygynous and are patrilineal in descent but membership in different family units in the kraals is established through mothers by way of matrifiliation. Married women are members of their father's descent groups.. However, traditionally, the Wakwavi practice patrilineal inheritance and kinship. The other tribes around are either patrilineal or matrilineal in descent, inheritance and kinship. The Wakwere practice a muslim type of patrilineal inheritance and kinship, while the Waluguru are matrilineal in descent.

Due to the shallowness of the descent groups for the Wakwavi and complexity of loyalties to the origin of mothers or gateposts, there are no localised groups for communal work, and no clan leaders exist apart from heads of large compound families. So, although the Wakwavi are egalitarian, they are without hierarchical leaders, while the tribes around have traditional Muslim-type hierarchical leaders. As the result of these differences (leadership, residence, occupation, and dialects) in villages where there is a high concentration of Wakwavi, there is a sharp

internal cleavage with considerable conflict between the Wakwafi and sedentary agriculturists. Competition is serious over land useage and land rights as well as leadership. During the four years of study there were annual complaints that the Wakwafi cattle destroyed crops on communal as well as on private fields because they were indiscriminately grazed. Also it was not easy to secure the required cooperation between the two groups on the question of communal activities.

Within the survey area there were marked differences between peri-sisal estate villages with a great mixture of tribes, many of them coming from outside the four districts making up the study area, and the more homogeneous or indigenous coastal villages.

Despite the mechanization of many activities on a sisal estate, it still remains a labour-intensive enterprise. Mascarenhas (1970) observed that a Corona decorticator processing 25,000 leaves per hour required some 240 labourers, and that in the heyday of sisal the population of many sisal estates exceeded 1,000 workers. Considering the large numbers of estates that were established, the coastal zone could not supply enough labour to satisfy requirements of the estates. So, recruitment of labourers was done from up-country regions which included several tribes of varying social, cultural and economic backgrounds. Bavu (1971, p.33) gives a list of over 17 tribes represented in Kabuku-Ndani village. As in Kabuku-Ndani, the majority of villagers in peri-sisal estate villages were ex-sisal estate workers who originally came from up-country Regions. Villagers represented tribes such

as the Nanyamwezi, Wasukuma, Wasakonde and several other minor tribes. The mixing up of the various tribes affected the social and cultural structure of the peri-sisal estate villages. In most of these villages the degree of social unity was very low because of tribal heterogeneity and hence conflict between tribes. Leadership in the village was frequently changed, and where it was stable it was rather unpopular and often was accused of favouritism or of theft.

Village meetings took unnecessarily long time because of arguments over even minor issues. A lot of time was wasted before coming to a decision over an issue. In short the presence of many tribes with differing sub-cultures and values made co-operation and control of the peri-sisal estate villages rather a difficult task for leaders, apart from reducing belongingness to the village community. For while the groups were striving to unite their efforts and experiences in the struggle for economic and social development, some individuals affected by the false consciousness ingrained by colonial ideology tended to become victims of tribalism. The tribal affiliation together with the urge to maintain social security with their clan members further affects the belongingness of the villagers to their villages. The consequences of tribal affiliations are very serious because they affected production not only on communal fields but also on private fields. This is an important internal variable which likely affected survey results.

In typical Swahili villages such as Msata, Sinya Ulime, and Kauzeni, for which agricultural extension workers came from Kilimanjaro, Ruvuma and Rukwa respectively, the degree of social and work cooperation between agricultural staff and village leaders and villagers was low. The agricultural staff were newly posted to these villages and were not familiar with the coastal Swahili people, their social systems and their way of working together. The staff regarded themselves and were also regarded as being outsiders to the local social system. The situation was aggravated by the fact that the staff were civil servants and so were economically better off than the average village member. The staff often complained of the low co-operation they obtained from villagers. The staff said that villagers were very quick at theoretically accepting suggestions, innovations and ideas and making promises that are hardly fulfilled.

Villages far from sisal estates or District and Regional headquarters were tribally homogeneous. Villagers manifested an appreciable degree of togetherness and cooperation as contrasted to those in peri-sisal estate and peri-urban villages. Table 4.4 shows the grouping of survey villages according to the degree of homogeneity of ethnic origin and table 4.5 groups the same villages according to their degree of work organization.

Village members in some villages were from the same tribe (Kaluguru), clan, and had blood relationships and had stable leadership with a satisfactory system of work organization. During the first two years of its establishment all economic activities in

Table 4.4. Degree of homogeneity of ethnic origin of sample villages

High	Medium	Low
Kiluwani	Chekelei	Bwilingu
Kizinga	Kauzeni	Magamba
Konkonga	Kiloza	Mdaula
Kwamsisi	Kitumbi	Mkata
Lunga	Lunga	Mlembule
Manga	Lukobe	Segera
Malivundo	Manga	Sinya Ulime
Mboga	Mkata	
	Msata	

Source: Sample survey.

Table 4.5. Degree of work organization of survey villages

High	Medium	Low
Kizinga	Bwilingu	Chekelei
Kwamsisi	Lukobe	Kikundi
Kiloza	Lunga	Kitumbi
Magamba	Kauzeni	Kiluwani
Mlembule	Manga	Malivundo
	Mboga	Mazingara
	Mkata (H)	Mdaula
	Msata	Mkata
		Segera
		Sinya Ulime

Source: Sample survey.

Kizinga, for example, were communally owned. There was generally no competition for leadership between tribes in such villages. Villagers showed more respect and a favourable response toward the leadership.

4.8. Administrative and Leadership Pattern

Socialist leadership is constantly a challenge to itself and more so acts in antagonistic contradiction with colonial and neo-colonial leadership. As discussed farther in chapter VIII, some village leaders or administrators that are supposed to preach socialism to other villagers are either not committed socialists but are just conforming to a given socialist economic order to safeguard their positions, or if they are committed they are confused after having gone through the old colonial educational system and now having to operate in a socialist-oriented economic structure. This situation not only applies to village level administrators and leaders, but also at the District and even Regional levels.

The following administrative set-up prevailed prior to passing of "The Villages and Ujamaa Villages (Registration, Designation and Administration) Act of 1975" which has defined the administrative structure and the roles to be played by individual leaders from the regional level to the village level, including committee members of the villages.

The 10-house cell system was the basic administration unit. Each ten houses constituted a cell and each cell in turn elected its leader. Cell leaders formed the communication link between cell members and the Village Development Committee (VDC). The VDC members were elected during the Village Assembly (VA) meeting of all adult registered residents, and was the main executive body

for the village. It took charge of the overall administration of the village, although its decisions were subject to ratification by the popular will of all the villagers during the Village Assembly Meeting. The VA meeting had the final say and normally no decision made by the VDC could be carried out without the assent of the VA meeting. Issues were supposed to start from villagers, then to be channelled through their committees to reach the secretary who later summoned the VDC members to discuss the issue and draw up the decisions which were finally brought to the people for approval and execution.

The other basic unit of leadership was the Tanganyika African National Union (TANU) branch office which had a chairman and secretary, both elected from among villagers for the same tenure of office as the VDC members. This situation applied only in villages where a TANU office existed.

Finally, there was the general Extension Service which was also a potential source of leadership. As defined in this study, general extension service means village-level civil servants from various Ministries such as Agriculture, National Education, Health, and Ujamaa and Cooperative Development. The term "agricultural extension personnel or workers" refers only to the technical agricultural staff.

On a structural-functional basis, two categories of leadership can be identified in the village. One is that of the leaders elected from among the villagers and the other can best be described as "Bureaucratic." The general extension service people

from various Ministries were "outsiders" who came to the villages not because of ideological motivation, or grasp of the concept of "Ujamaa," but because they were sent there by the government. This situation had repercussions on the services rendered by these bureaucrats. It had also repercussions on relationships between the extension staff and villagers and village-elected leaders.

Agricultural extension workers occupy uncomfortable positions in villages. Villagers often view the local agricultural extension worker as a possible mediator between themselves and the District or as inspectors (the title given to them during the colonial administration) who have to ensure that they keep their part of the bargain. The more dishonest the relationship between villages and Districts, the more difficult the position of the local agricultural extension staff. If they report to the District that the village is not working as expected, or if they try to convince the villagers to improve their performance, they attract the displeasure of the village which fears that critical staff might spoil their relationship to the District. If the staff avoids a critical stand they will find themselves blamed by their superiors for idleness. In either case they will find themselves in the position of a scapegoat.

As pointed out earlier, the wealthy peasants are often appointed or selected as leaders. They are elected mainly for their skills in communication with higher levels or because of expected economic favours on the part of villagers in borrowing money or getting other t pes of assistance from them. As a rule, these wealthy peasants are not only against spending much time on

the communal field, they are also interested in diverting some of the communal property to their own pockets. For example, dishonesty and theft were alleged in Segera, Konkonga, and Lunga villages, and all cases involved the leadership who were also the custodians of the village fund. Bavu (1971) and Freyhold (1971) encountered similar cases in Handeni District villages.

The staff who might want a more honest deal are soon regarded as a potential danger to these kinds of abuses. By denouncing the government staff, the village leader also gained prestige among the common members since the latter never see any good in associating with the staff anyhow, and take the courageous stand of their leaders as a guarantee that these leaders will also steer them through other potentially dangerous dealings with the outside world. Such conflicts between staff on the one side and villagers and village leaders on the other side, as reported by Bavu, caused Kabuku-Mdani village to resolve to dispense with employed government personnel stationed in the village.

Village leader-staff relations become even more complex when the leader himself is an appointee of the District. Such leaders are forced into a double role. On the one hand they have to assure the villagers that they are protecting the village from any demands coming from above while on the other they have to see to it that some of the demands are fulfilled to maintain the support of the District without which they would not be able to hold their position. Such leaders can be heard sometimes publicly denouncing the staff as incompetent and urging the villagers to recommend the

replacement of staff. When such conflicts arise, the government staff and village leaders appeal to the District headquarters and most often village leaders win and the government staff involved get transferred to another village or District headquarters. Often village leaders have a strong interest in isolating the local government staff from other members in order to ward off dangers of being caught in embezzlement of communal funds, to enhance their prestige in the village, and to safe-guard their position as the sole mediators to higher authorities. They therefore do their best to downgrade any service which the staff might render. This situation explains part of the cause for the ineffectiveness of the agricultural extension workers in the villages.

Now the position is changing slowly after passage of "The Village and Ujamaa Village Act, 1975" and after the adoption of the new Party guidelines. These guidelines, issued under Chama cha Mapinduzi (CCM) which replaced TANU in 1977, cover the selection of village leaders, tenure of office, and their roles. In the guidelines and in the Act, clauses require prospective village leaders to be thoroughly scrutinized before they take up the leadership. It is hoped that in so doing the undesirable candidates would be rejected, and a committed Village Socialist leadership would evolve.

CHAPTER V. ECONOMIC ACTIVITIES AND INFRASTRUCTURE OF SURVEY VILLAGES

5.1. Economic Infrastructure

Prior to detailed discussion of the study results, an analysis of economic information pertaining to the area and to each survey village is given here in order to document the basic status of the villages immediately before and after the study. Such information first helps to show the economic, social, infrastructural, and other changes that took place within the 4-year period of study. Second, it helps to indicate possible causes for such changes, some of which might be attributed to the programmes or group-based agricultural extension methods applied in these villages. Third, this information might help in explaining deviations from the regressions tested in this study relating to the effectiveness of the group-based agricultural extension methods.

Supporting infrastructural development differed between villages (Table 5.1). However, the majority had godowns for storage of crops, farm equipment, fertilizers, and insecticides.

Table 5.1. Level of infrastructural development of sample villages in terms of amenities available[1]

High	Medium	Low
Bwilingu	Kauzeni	Chekelei
Lunga	Kisinga	Kiluwani
Mlembule	Mazingara	Kitumbi
Msata	Magamba	Kilundi
Sinya Ulime	Mkata (H)	Komkonga
	Kwamsisi	Lukobe
	Segera	Manga
		Malivundo
		Mboga
		Mdaula

Source: Survey results.

[1]High = 11 and above, Medium= 6-10, Low=1-5.

The majority of villages have primary schools. Two major problems are associated with primary school education: first, poor attendance particularly with girls. According to coastal Swahili society, especially Moslems, when a female child reaches the puberty age, she is confined to the house and not allowed to be seen by the public for sometimes over a year. This takes place at the age of 11 or 12 when the child is still pursuing her primary education and therefore is drawn out of school for that whole period. Secondly, female children generally marry immediately after the confinement mentioned above. These two factors contribute to the low literacy percentage observed in the coastal zone villages despite the large number of primary schools.

According to the Village and Ujamaa Village Registration, Designation and Administration Act of 1975, every registered village is deemed to be a cooperative society. By the beginning of 1975, almost all villages operated as cooperative societies, marketing both cash and surplus food crops of the villagers.

Insofar as demographic characteristics are concerned, peri-urban and peri-sisal estate villages and those forming parts of the old Swahili trading centres or minor settlements had household heads mostly with an age of over 65 years (Table 5.2). This is an important factor because it affects labour contribution to the village. Households heads, with an average of about 70 years, were oldest in Sinya Ulime village. The same village had the highest average numbers of non-working dependents per family. Villages with high numbers of old household heads had higher

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percentages of illiteracy as compared to other villages. These villages had slightly higher average levels of wealth than the others and several people were engaged in trade and commercial activities. Some families in these villages did not grow enough food for domestic use, so they supplemented the little they grew with that bought from the market. Under these circumstances little attention was paid to cash crops. Poor record of attendance at village meetings was also observed in these villages.

Table 5.2. Average age of village household heads

47 years & below	48-59 Years		60 years and above
Kikundi	Chekelei	Kwamsisi	Bwilingu
Kitumbi	Kauzeni	Lunga	Mkata (H)
Kizinga	Kilo...	Malivundo	Mlembule
Lukobe	Kiluwani	Mazingara	Msata
Manga	Kitumbi	Mdaula	Sinya Ulime
Mboga	Komkor...		Segera
Mkata			

Source: Sample survey.

Some villages are connected to the main road by feeder roads that are only useable during the dry season. Others are located on the main all-weather roads (Table 5.3). Although Sinya Ulime village is off the main road, it does not experience transportation problems because it is one of the stations on the Morogoro-Dar es Salaam railway line.

5.2. Competing Interests

Agricultural co-operation is enmeshed in a structure of economic and social variables. It was noted that farmers' attitude to their existing economic opportunities as well as their

Table 5.3. Accessibility of transportation facilities of sample villages

Good		Fair	Poor
Bwilingu	[illegible]	Lukobe	Mikundi
Chekelei	Mboga	Magamba	Kiluwani
Kauzeni	Mdaula	Malivundo	Mizinga
Kiloza	Mkata (II)	Sinya Uline	Mwamsisi
Kitumbi	Mlembule		Mazingara
Komkonga	Msata		
Lunga	Segera		

Source: Survey results.

degree of involvement in them were determined not only by the immediate demands of these opportunities but also by the tradition, interests, and habits they have accumulated through the course of operating in previous situations. To understand the current farmers' behaviour in the new farming situation in village farming, consideration must be given to factors arising from their previous social origins.

The degree of importance of cash cropping or agriculture in general as contrasted to alternative economic activities differed greatly between villages depending mainly upon the location of the village and the previous historical background and occupational experience. As we have seen, the Wakwavi in Baraguru areas have been and are occupationally engaged fully in livestock-keeping. Anything that diverts their effort away from livestock meets with resistance. Similarly, in old Swahili areas along the Indian Ocean strip fishing is the main occupational activity of the villagers. These people resist shifting to farming because to them it symbolizes slavery. Most villagers in peri-sisal estate

villages have part-time employment on the sisal estates. As a result they are not able to exert maximum effort and attention to private or communal fields. In peri-urban villages and villages that are either former minor settlements or trade centres, some village members are engaged in petty trade or commercial activities which occupy most of their time. Others are more or less involved full time in the sale of services to the lorry-trade complex. Some rich individuals employ other villagers to work on their fields. All these activities mean less labour contribution to communal and individual crop production for the villagers concerned. In old Swahili areas, most villagers concentrate on horticultural crops such as vegetables and on coconut, mango, palm oil and citrus fruits as compared to the main cash crops such as cotton, cashewnuts, and sunflower or on food crops such as maize, cassava and beans. Returns realized from horticultural and tree crops are in most cases low as compared to these from conventional cash crops but they also are less labour demanding.

5.2.1. External Interests

Farmers or villagers have two types of interests - external and internal. External interests are those that necessitate the villagers being physically away from the village. Some newly-established villages, especially those whose members had to shift from their former traditional villages or sisal estate camps to new sites, tended to maintain their previous economic and social interests outside the new cooperative institutions and village activities (Table 5.4). They were caught up in a web of rights

and obligations which are related to their tradition and previous activities but which at the same time affect their choices or level of participation within the village activities. Agricultural production in most newly-established villages was accompanied by new locations for both communal and private farms. It was clear from this study that farmers still maintained their fields in their old traditional villages or homesteads. Their interests on these fields were strong and of long duration if the fields were planted with permanent or perennial crops. Such farmers travelled 15-20 km to their old fields and sometimes stayed there for seven days attending to the crops. This situation was possible because in most cases their hamlets were not demolished when shifting to new sites. Some villagers did not want to part completely from their traditional villages, the place where parents and grandparents had lived and where the ancestors were buried, so they made these places second homes. Similarly, at Kwamangugu village in Iringa Region Feldman *et al* (1969) found that women had a strong interest in land which had been traditionally allocated to them since it represented either dependence on or independence from their husbands. Their responses to new organizations was partly a function of these rights. Women had to maintain their interest in these rights irrespective of whatever distance the traditionally-allocated land happened to be. The same situation was observed by the author in villages in Handeni and Korogwe Districts.

Table 5.4. Type of external village interests

Land away from the new village	Wage employment on sisal estates and elsewhere	Family ties outside the village
Malivundo	Lukobe	Ukata (Morogoro
Mboga	Maganba	
Kilundi	Mdaula	
Kizinga*	Mlembule	
	Segera	

Source: Sample survey.
*After the second year of its establishment, villagers started developing great interests on their old abandoned fields away from the village.

As indicated earlier, in peri-sisal estate villages the majority of members have permanent or part-time employment on sisal estates in order to earn extra income for purchase of food and other domestic requirements.

5.2.2. Internal Interests

These are interests that do not necessarily require villagers to be physically away from the village but hinder them from participating in communal activities. In some villages, typically those along main roads, people are interested in trade or commercial activities (shops, bars, hotels) and in the sale of services to the lorry-trade complex (Table 5.5).

Wealthy people, who mostly compose the leadership of villages, employ part-time labourers on their individual fields. The man who works on other peoples' fields because he needs cash misses the time not only to attend to and to expand the communal field but also to attend to and to expand his own field and,

Table 5.5. Type of internal village interests

Commerce or trade	Sale of services to lorry trade-complex	Farming
Bwilingu	Lunga	Kauzeni
Kauzeni	Mata	Kiloza
Mlembule	Msata	Kiluwani
Msata		Kitumbi
Sinya Ulime		Komkonga
		Kwamsisi
		Manga
		Mazingara

Source: Sample survey.

unless the harvest is very good, he may find his stock exhausted before the next harvest comes so that he is again forced to work for somebody else.

The maintenance of interests on land away from the new village, on part-time employment, on trade or commerce, and sale of services necessitates the person concerned to be away from communal activities. Since these private activities compete with village or communal activities, it means that some resources, particularly labour and capital, are not used adequately for village farm activities (Table 5.6). This situation can be

deleterious to communal farming. This is part of the theoretical explanation for the generally poor results on communal fields.

Table 5.6. Degree of commitment to communal activities

High	Medium	Low	
Kizinga	Kauzeni	Bwilingu	Mazingara
Kwamsisi	Kiloza	Chekelei	Mdaula
Mboga	Lunga	Kilaundi	Mkata (H)
	Lukobe	Kiluwani	Mkata
	Manga	Kitumbi	Msata
	Malivundo	Konkonga	Sinya Ulime
		Maganba	Segera

Source: Sample survey.

5.3. Ownership of Village Activities and Property

The essence of Ujamaa Vijijini is to revolutionize the individualistic attitudes of villagers. The revolution is based on a drastic change of attitude from their individualistic production to a socialist production and distribution, and from individual management of one's labour to communal organization, all of which requires guidance by dedicated leadership, rational labour organization and division of labour, democratic decision making, calculation of man-hours and man-days to be spent on communal fields, and worked-out incentives for individual efforts for their communal work. This type of revolution has not been easy to achieve in coastal zone villages. In all villages during one time or another, there were two types of ownership with the relative amounts depending on the degree of communalism that the village had attained. These were communal and individual ownership of

enterprises and property.

5.3.1. Communally-owned Enterprises and Property

Such enterprises in most villages include mainly crop farming and to a lesser extent livestock keeping, grain mills, shops, bars, local beer shops, ploughs, and a variety of hand tools. One major characteristic of communal enterprise is poor performance as compared to private or individual enterprises (Tables 5.7, and 5.8). Table 5.9 shows ha cultivated individually and communally for all four Districts combined. Figure 5.1 shows a diagramatic comparison of these areas. Although there is an upward trend in the area under both types of farming, hectareage under individual farming systems has increased faster than that under the communal farming system. Causes for these differences are discussed in Chapter VIII. Similarly communal property is poorly looked after. Constant breakdown of either grain mills or ox-ploughs were often reported. This could reflect the fact that these items were given free to the villages by government or where purchased by communal funds.

Table 5.7. Average income per ha per year per village*

Nature of activity	1971/72	1972/73	1973/74	1974/75	Average
			T.Shs.		
Communal	468	560	564	834	629
Individual	1,045	1,350	1,351	1,823	1,393

Source: Sample survey.
* For details see appendix A-3.

Table 5.8. Average income per man-day per year per village*

Nature of activity	1971/72	1972/73	1973/74	1974/75	Average
			T.Shs.		
Communal	2.05	1.90	3.20	3.65	2.70
Individual	4.17	5.46	5.33	6.79	5.44

Source: Sample survey.
*For details see appendix A-4.

Table 5.9. Average area cultivated per year per village*

Nature of activity	1971/72	1972/73	1973/74	1974/75	Average
			Ha		
Communal	25.4	18.7	19.7	38.5	25.6
Individual	31.2	35.9	28.0	30.4	31.4

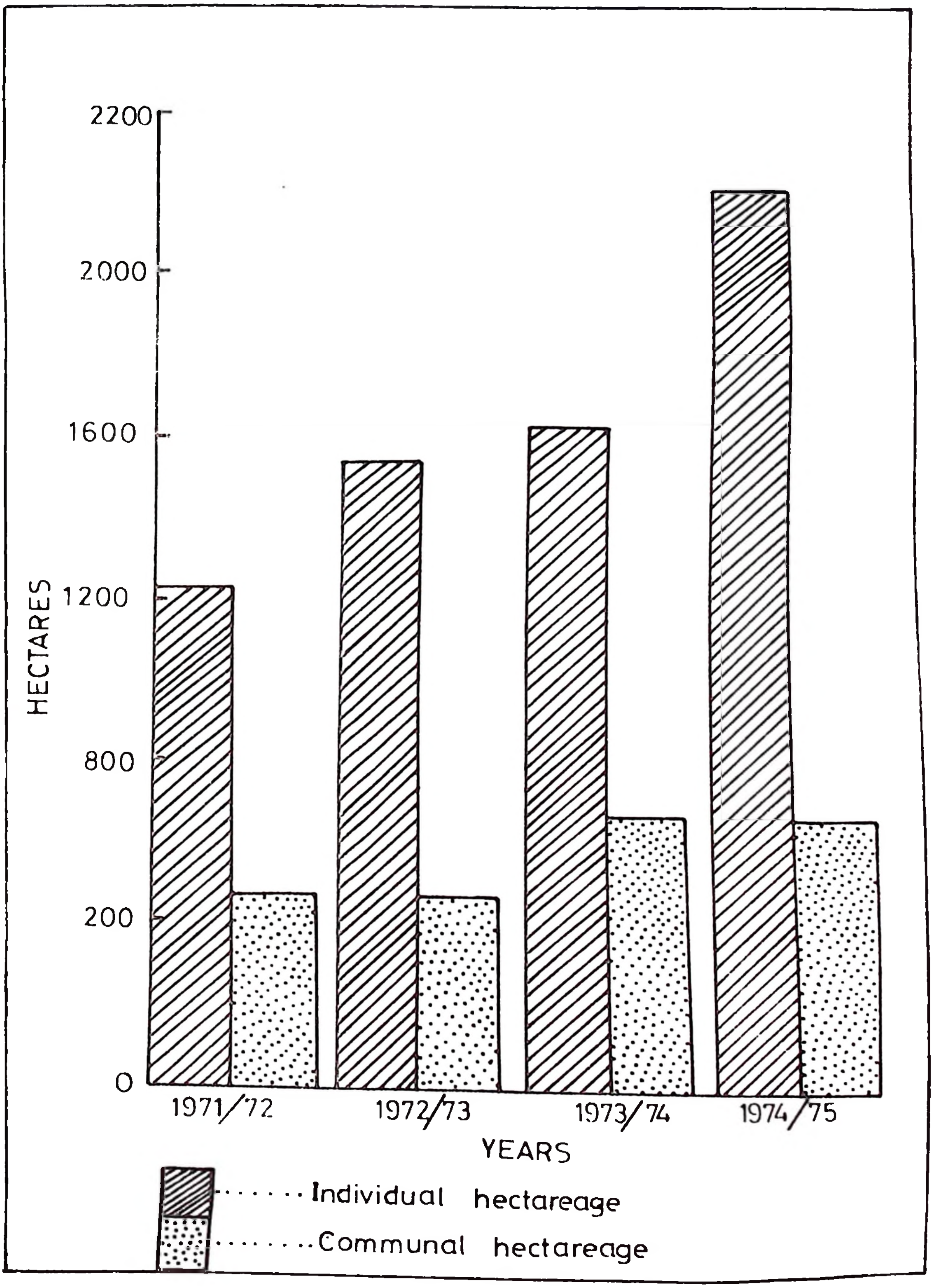
Source: Sample survey.
*For details see appendix A-5.

The system of work organization adopted in villages differed depending on the level of cooperation. Most villages spent two to three days per week doing communal activities. Where communal work was concerned, in most villages a muster-roll recording the presence or absence of each member was kept, and where appropriate, tasks were alloted to each member or group. At the end of the year, proceeds from communal activities are divided among village members in proportion to the number of work-days contributed.

5.3.2. Individually-owned Activities and Property

As might be expected from the previous explanation, the larger part of the economy in the coastal zone villages is still in the hands of individual village members who compete seriously with the village as a whole in the ownership of economic activities

Figure [illegible] [illegible]rea cultivated on individual [illegible] per [illegible], average for four years and [illegible]



such as farming, livestock keeping, shopkeeping, bars, hotels, charcoal burning and other small-scale industries. As indicated earlier, private enterprises seem to be flourishing in comparison with village or communally-owned enterprises.

For this reason, to understand how the survey results may have been affected by village economic characteristics, it is useful to describe each village individually as it was during the time of the survey. Villages are reviewed District by District, and information on additional features at the local level which might explain or have affected the survey results are presented in subsequent chapters.

5.4. Bagamoyo District

5.4.1. Lunga Village

Lunga village, along the Chalinze-Tanga main road, is a divisional headquarters, as well as a market centre for the area. The village was established out of two separate villages--Lugoba and Tonga--hence the name Lunga. The village had a fairly well developed infrastructure from time of its establishment, including a primary school, market, post office, cooperative shop, grain grinding mill, hotel, bar and a godown. After four years the village had expanded its cooperative shop, and had built a large health centre and a community centre. The total costs for this expansion were met by increased crop sales which were the result of the effectiveness of agricultural extension methods used in the village.

Lunga village experienced severe drought during the 1972/73 and 1973/74 crop seasons which reduced crop yields considerably. The knowledge and the rate of adoption of recommended farming practices were average. Although the leadership of the village was stable in the sense that it did not change frequently, it was weak and uncommitted. It was unable to organize villagers effectively and lacked the push necessary. During demonstrations and discussion meetings, it was apparent villagers understood what was being demonstrated and discussed.

Lunga is located on a large area of flat and moderately-fertile soil with high potential for agricultural development. It has a market within the village for all of its agricultural products. Although it has no transport of its own, villagers have no problems in this respect for there are private and public means of transport to Tanga, Korogwe, Dar es Salaam and Morogoro. Lunga stands a good chance for both social and economic development.

5.4.2. Msata Village

Msata is also located on the Chalinze-Tanga main road. Initially it had a small market, primary school, dispensary, cooperative shop, godown, post office and piped water. At the end of this study there were no changes in this infrastructure. Like Lunga village, Msata is surrounded by a large, moderately-fertile area of land suitable for agriculture and it also experienced severe drought during 1972/73 and 1973/74, which adversely affected crop yields (particularly maize). Fertilizers and insecticides were applied on maize and cotton on communal and individual fields but

no substantial increase in crop yields occurred, particularly from communal fields, because overall crop husbandry practices were below standard. Extension methods applied in the village were fairly effective as evidenced by the level of knowledge and rate of adoption of recommended practices (above average, and just average, respectively).

The leadership of the village effecient and committed to communal activities. However, both the chairman and secretary were unpopular among village members. The leadership was stable because these two leaders could not be removed from their offices since they were at the same time chairman and secretary of the political party (UNIP).

Being on the main road with large unclaimed, moderately-fertile land and with other essential services for development, Msata has the potential for increased agricultural production. The village has no transport problems. Like Lunge's, Msata's villagers can obtain access to other neighbouring villages and to any large town within the region.

5.4.3. Mboga Village

The newly-established Mboga village is on the Chilinze-Tanga main road. The village started without any infrastructural development. Within the 4-year period from its establishment, the village had built a primary school and cooperative shop. It had also bought some goats. All this was realized from increased crop sales, attributable to the relative effectiveness of extension methods applied. Extension effectiveness is evidenced by increased

knowledge of recommended farming practices (above average), and by an increased adoption rate (average). There was a steady increase in yields per ha on both communal and private fields. The village has plenty of moderately-fertile land which can allow for expansion of agricultural activities. Like previous villages, Mboga was affected by drought during the 1972/73 and 1973/74 crop seasons. The leadership of the village was strong, effective and popular and was devoted to its work. There was a fair amount of work organization in the village.

Given the unlimited amount of fairly fertile land at the disposal of the village, its location on the main road, and also a leadership that is committed, the village stands a good chance for development.

5.4.4. Bwilingu Village

Bwilingu village is part of the Chalinze minor settlement located at the junction of the Morogoro-Dar es Salaam and Chalinze-Tanga main roads. As a part of Chalinze minor settlement, Bwilingu village enjoys the infrastructural development that existed before its establishment. There were already a primary school, health centre, market, post office, electricity and a police station. In a 4-year period the village had built an office, bar, and poultry unit, and had established a vegetable garden. A greater part of the funds for the establishment of these activities was raised from increased crop sales resulting from the effectiveness of methods applied in teaching farmers. This situation is confirmed by the increase in the level of

knowledge of practices of farmers which was far above average and by the increase in the adoption of these practices, which was average. Bwilingu has enough arable land for its present and future population for probably the next 10 years.

The village had stable and capable leadership. The village secretary, who was also the ward secretary, had 10 years of basic education and several years of work experience in rural areas. He got most things done in spite of villagers' resistance.

Bwilingu has potential for development. It has an adequate amount of fairly fertile arable land, easy means of transport to Dar es Salaam, Morogoro or Tanga and a local market for all that it can produce. The major economic activity of the village is agriculture, but as the village grows, commercial activities are also increasingly involving more and more people.

5.4.5. Malivundo Village

Malivundo village is off the Chalinze-Tanga main road. The feeder road joining Malivundo and Chalinze minor settlement is usable only during the dry season. This situation makes transportation rather difficult for villagers especially during the rainy season, when they have to walk and carry their products on their heads to the market. During the establishment of this village, the infrastructure of the village was undeveloped. After four years the village had built its own primary school and office. Malivundo has an adequate amount of arable land. The village was also affected by drought during the same period as the previous villages. Extension methods applied in this village were not

effective; it was found that villagers' knowledge of recommended farming practices was far below average and the rate of adoption of these practices was just average. There was no significant difference in yields per ha between individual and communal fields; in fact communal fields performed slightly better than individual ones. Villagers showed a relatively high degree of commitment to communal farming. The leadership of the village was stable and average in performance.

Malivundo is a promising village for development, However, it has transportation problems and lacks a market for minor agricultural products which have to be carried by head to Chalinze, 10 km away.

5.4.6. Mdaula Village

Mdaula village is on the Morogoro-Dar es Salaam main road. There was no infrastructural development in the village at the time of its establishment. After four years it acquired a fairly large hotel between Morogoro and Chalinze. Mdaula has a limited amount of moderately fertile arable land because it is surrounded by a sisal estate. Like previous villages, Mdaula was badly affected by drought during the 1972/73 and 1973/74 crop seasons. Extension methods applied in this village were not effective. The final assessment shows that knowledge of recommended farming practices was far below average and the rate of adoption of these practices was just average. Little attention was paid to communal fields. Most village members had part-time employment on the nearby sisal estate and consequently village labour force for

communal as well as individual farming activities was reduced. There was poor attendance of farmers at group discussion meetings, and little understanding of what was discussed.

Mdaula faces a serious problem of labour force shortage because most villagers have part-time employment on the sisal estate. The village has a limited amount of arable land. Mdaula village stands a poor chance for both social and economic development unless the leadership and location of the village are changed or the sisal estate is relocated.

5.5. Handeni District

5.5.1. Segera Village

Segera village is located on the Korogwe-Tanga main road. At the time of its establishment, the village had a small dispensary, primary school, piped water and a shallow-water well. After four years the village had built a large godown, a new and large dispensary and an elaborate office. It had also established a poultry unit, a cooperative shop, and a hotel. A greater part of the cost of these items was met by the government, and so had nothing to do with the extension methods applied. Contrary to expectations, extension methods applied in this village were not successful. Villagers' level of knowledge and their rate of adoption of recommended farming practices were just average. Lack of success of the methods was mainly caused by lack of interest on the part of the villagers in demonstrations and group discussion meetings. Most villagers never attended these. Moreover a good number of villagers had part-time employment in the nearby sisal

estates and consequently were not committed to communal activities. Out of the four years of this study, the village had a communal field for one year only.

Complaints of dishonesty or theft of village funds were frequent, but the amounts and persons involved were not disclosed. It was alleged that the leadership (chairman) was involved.

Segera has an adequate amount of fertile arable land for agricultural activities. It is strategically located for getting products to markets in Korogwe, Muheza or Tanga. Poor leadership, poor-work organization and tribal conflicts among village members are major obstacles to village development.

5.5.2. Mkata Village (II)

Mkata village is on the Chalinze-Tanga main road. When this study started the village had a dispensary, primary school and piped water. After four years the village had built a godown, a post office, and a cooperative shop. Funds for building the godown and the shop were raised from increased crop yields resulting from agricultural extension methods used. Extension programmes or methods conducted in this village were successful. Although increased yields per ha were not substantial, villagers' knowledge of recommended farming practices was far above average and the rate of adoption of these practices was average. Villagers appeared to have understood what was demonstrated or discussed in the meetings.

The leadership of the village was stable but weak, and its lack of push was recognized by most villagers.

Mkata is fairly well located for agricultural activities. It has an adequate amount of fertile land suitable particularly for maize and cotton. Given effective leadership, this village stands a good chance for infrastructural, social and economic development.

5.5.3. Komkonga Village

Komkonga village is located on the Chalinze-Tanga main road. At the time of its establishment, it had a primary school and a small market. At the end of the 4-year period the village had built a godown, cooperative shop, and dispensary and had bought a grain mill. Part of the cost of these items was met by funds from increased crop sales which were attributable to extension methods applied in the village. Villagers' knowledge of advocated farming practices was far above average. The rate of adoption of these practices was below average, simply because of the poor financial position of villagers since some of the advocated practices require sizable capital investments.

The leadership of the village was stable and village members were ready and willing to cooperate with it. The chairman was not keen and aggressive enough, particularly in respect of communal activities, perhaps in part because he had the largest shop in the village and was economically better-off than the average village member.

Komkonga village, with a large area of fertile black soil, is well located for agricultural activities. Its development will largely depend on agriculture. The village lacks effective leadership to organize the village labour force and induce commitment to

communal activities. By 1974/75 most villages had their own cooperative shops but Komkonga had just started one.

5.5.4. Manga Village

This village is located on the Chalinze-Tanga main road. The infrastructural development that the village started with included a primary school, large health centre and a market. At the end of this study the village had bought a grain mill, started a cooperative shop, and had built a godown and an office. The cost of all this was met by funds realized from increased crop sales.

Extension programmes or methods used in the village were fairly effective. There were steady increases in yields per ha, particularly on private fields. Villagers' knowledge of recommended farming practices was far above average and the rate of adoption of these practices was average.

The leadership of the village was stable and determined. Village members respected the leadership and had good cooperation with it. Nevertheless, village members' participation in communal activities was only satisfactory.

Manga has a high potential for increased agricultural production and for overall development. Although the village's market for minor agricultural products is small, these products could be delivered easily to Korogwe or to Mbewe village, which is the next largest market for minor agricultural products.

5.5.5. Kitumbi Village

Kitumbi village is located on the Chalinze-Tanga main road. At the start the village had a primary school and a cooperative

shop. By the end of this study the village had built a small dispensary. Agricultural extension methods applied in the village were relatively effective. Kitumbi village scored above average in knowledge of recommended farming practices but was far below average in respect of adoption of these practices. This is mostly because of the poor financial position of farmers. There was no substantial increase in crop yields per ha for either communal or private fields.

The village has poor leadership. There is no work organization in the village. The leadership did not have sufficient push to induce villagers to work, so that during the last two crop seasons of this study the village had no communal fields.

Kitumbi village, with a vast amount of fertile arable land, has the potential for agricultural expansion, but it is far away from marketing centres. Poor leadership and remoteness from marketing centres are among the many problems hindering development.

5.5.6. Mazingara Village

This village is located on the Handeni-Mkata feeder road. It is a divisional headquarters for other villages around. When this study started the village had a primary school, dispensary, market, post office and a cooperative shop.

Mazingara received no government aid for the entire 4-year study period, and there were no additional infrastructural developments. Extension programmes conducted in the village were slightly effective. There were increases in yields per ha particularly on individual fields. Villagers' knowledge of recommended

farming practices was above average but the rate of adoption of these practices was just below average.

Villagers manifested a low degree of commitment to communal activities. During the 1974/75 crop season the village had no communal field. The leadership of the village, although stable, was weak. It was not able to organize the village labour force effectively.

Although Mazingara has a vast amount of fertile arable land, it has no market and is faced with transportation problems. The road between Mandeni and Mkata is not easily passable during the rainy season. During the dry season few vehicles use the road. For the greater part of the year the village is cut off from towns and markets.

5.6. Korogwe District

5.6.1. Kiloza Village

Kiloza village is located on the Moshi-Korogwe main road. At the beginning of this study, the village had a small market, primary school and a dispensary. By the end of the study the village had built an office, a cooperative shop and had piped water. The cost of building the office and of establishing the cooperative shop was met by funds derived from increased crop yields, the result of effective extension programmes applied in the village. The final assessment showed that villagers' knowledge of recommended farming practices was far above average and the rate of adoption was average. There was a steady increase in yields per ha on communal fields.

The leadership of the village was stable, capable and committed to the work, and villagers responded favourably to it. Kiloza is among the few villages that had effective work organization.

Kiloza has a limited amount of land for agricultural expansion. The soil is rather stony and of poor fertility. The village experienced attacks by wild animals on crops every year. Although the village is strategically located on the main road, increased agricultural production and hence economic and social development can only be achieved if the village could be re-located on a new site with an adequate amount of arable land, and if effective control measures over wild animals could be developed.

5.6.2. Kwamsisi Village

Kwamsisi village is located 4 km off the Korogwe-Tanga main road. At the beginning of the study the village had a dispensary, primary school and a modern shallow-water well. By the end of the study the village had established a fairly big shop and had built a handicraft centre and a godown, the cost of which was met by funds raised from increased crop yields resulting from effective extension methods used in the village. The final assessment of the effects of agricultural extension methods used in the village showed that villagers' knowledge of recommended farming practices and the rate of adoption of these practices were both average. There was a substantial increase in yields per ha from both communal and individual fields. The leadership of the village was stable, capable and highly committed to the work. Villagers respected and responded to it favourably. There was commendable

work organization in the village and high commitment to communal activities. There were no significant differences in yields per ha between communal and individual types of farming systems. Attendance at communal activities demonstrations and meetings was good.

Kwansisi has the potential for increasing its agricultural, social and economic development. It has an adequate amount of fertile arable land. One major problem is that the village is far from the market, and the feeder road joining it to Korogwe-Tanga main road is not easily passable during the rainy season.

5.6.3. Kiluwani Village

Kiluwani village is 5 km off the Moshi-Korogwe main road. The feeder road joining Kiluwani and Moshi-Korogwe road is only usable during the dry season. At the start the village had a primary school and a godown. At the end of the study there were no additional infrastructural development in and around the village. Agricultural extension methods applied in the village had little effect. There was a gradual increase in yields per ha particularly on individual fields. Both knowledge and rate of adoption of recommended farming practices were average.

The leadership of the village was poor both in education and in the ability to lead and get things done. There was no sign of development during the entire four years of this study.

Kiluwani has an adequate amount of moderately-fertile arable land for increasing agricultural production. Increased agricultural production is however hampered by lack of market. The only

market available is 22 km away in Korogwe and transport from the village to the Moshi-Korogwe road is lacking. Poor leadership and location of the village contribute to the underdevelopment of the village.

5.6.4. Chekelei Village

Chekelei village is on the Moshi-Korogwe road. At the beginning of this study the village had a primary school, village office and a godown. There were no additional infrastructural development made. Contrary to expectations, extension programmes applied in the village were not effective. One major reason was the negative attitude of villagers towards group meetings. There was poor attendance at the meetings and consequently the level of knowledge of recommended farming practices of villagers was just average and the rate of adoption of these practices far below average.

The leadership of the village was weak and uncommitted to the work. There was poor work organization. It appeared as if the village and the leadership did not attract the attention of authorities at either District or divisional levels. During the last two years of the study, the village had no communal fields.

Chekelei does not have an adequate amount of land for agricultural purposes. Moreover, the soil fertility on present fields is low. There were complaints of attacks by wild animals on crops every year. In order to achieve increased agricultural production and hence social and economic development, the village will have to be re-located on a new site having an adequate amount of

fertile arable land and free from wild animals.

5.6.5. Mlembule Village

Mlembule village is on the Moshi-Korogwe main road. It is part of Mombo minor settlement which is also a divisional headquarters. As a part of Mombo, Mlembule right from its establishment had a fairly well-developed infrastructure. It had a big modern market, health centre, court, post office, primary school, piped water and electricity. At the end of the study there were no additional infrastructural development but the village inherited some agricultural equipment from the old Irrigation Scheme. Agricultural extension methods used in Mlembule were not effective. Villagers' knowledge of recommended farming practices was below average and the adoption of these practices was just above average. There were marginal increases in yields per ha.

Village leadership was unstable due to tribal conflicts. The leadership was capable but villagers were not easy to control due to the influence of the minor settlement and the nearby sisal estates. There was a satisfactory level of work organization. Most villagers had part-time jobs on sisal estates or in Mombo, others were engaged in various minor commercial activities, and thus the village labour force was seriously reduced.

Mlembule has most of the necessary infrastructure for social and economic development but these facilities are not fully exploited. For instance, there is plenty of fertile arable land suitable for maize, rice and vegetable growing with a permanent water supply for irrigation, but people lack motivation to use these facilities.

Availability of part-time jobs in Mombo and the surrounding sisal estates reduce villagers' level of participation in village activities.

5.6.6. Magamba Village

Magamba village is 22 km off the Moshi-Korogwe main road. The feeder road between Magamba and the Moshi-Korogwe road is not easily passable during the rainy season. There is no regular transport from Magamba to Mombo or to Korogowe. The village received much assistance in terms of equipment and finance from the sisal estate. At the beginning of the study, the village had virtually nothing. After four years the village had built a market, godown, primary school, had bought a grain mill, and had established a poultry unit and a fairly big cooperative shop. Extension methods applied in the village were not effective. The final assessment of villagers' knowledge of recommended farming practices shows that it was below average and the rate of adoption of these practices was just about average. Moreover, there was no significant increase in yields per ha or in village development during the four years of study.

The leadership of the village was unstable due to tribal conflicts. Major problems hindering increased agricultural production are lack of markets, poor transportation facilities and competition between communal and private activities together with part-time employment outside the village.

5.7. Morogoro District

5.7.1. Kauzeni Village

Kauzeni village is on the old Morogoro-Iringa road. At the beginning of the study the village had a cooperative shop, primary school, godown and piped water. At the end of the study the village had bought a grain mill and some cattle. These were purchased using realizations from increased crop sales which were the result of the extension methods applied. This statement is supported by the level of knowledge of recommended farming practices which was far above average and also by the rate of adoption of these practices which was average.

Both the chairman and his secretary were ineffective although they held offices for quite a long period. Village members did not abide by village regulations and rules.

Village development is hampered by a number of obstacles, the major ones being inadequate amount of land for the expansion of agricultural production; attack by wild animals on crops; and proximity to Morogoro town and sisal estates. Because of nearness to these places, most people had either part-time or seasonal employment in town or on the adjacent sisal estates. This situation reduced the labour force available to the village.

5.7.2. Kizinga Village

Kizinga village is located 10 km off the Morogoro-Dar es Salaam main road. Kizinga, being a new village, had virtually no infrastructural development at the beginning of the study. Within four years the village had built a primary school, godown, bought

a grain mill and established a poultry unit. All except part of the building materials were financed from increased crop sales resulting from effective extension methods used. This is evidenced by increased knowledge of recommended farming practices and adoption rate of these practices both of which were far above average. Kizinga is the only village out of the 24 studied that had no individual fields during the first two years of its establishment.

The leadership of the village was stable, active, effective and highly committed to communal activities. The chairman and his secretary had exceptionally good work organization. Village members responded favourably to the leadership, and all village members were from the same tribe (Waluguru) and had some blood relationship. In other words the village membership was highly homogeneous. During the first two years village membership was rather small. It is presumed that these are some of the factors for the cohesiveness of village members.

Kizinga, with a vast fertile arable land, stands a high chance for social and economic development. However, agricultural production is limited by lack of transport facilities and attacks by wild animals on crops.

5.7.3. Kikundi Village

Kikundi village is 15 km from the Morogoro-Dar es Salaam main road. As a newly established village, there was no infrastructural development in the village. Within a 4-year period the village had built a primary school, a godown and an office. One major natural resource is the vast amount of fertile land. Agricultural

extension methods used were not effective because both villagers' level of knowledge of recommended farming practices and the rate of adoption of these practices were far below average. Discussion meetings were used by villagers as a forum to air their complaints against the government for not having solved most of their problems.

Although the leadership was stable, nevertheless it was ineffective and not respected by village members. There was poor work organization, and misunderstanding among village members.

Possibilities for expanded agricultural production exist. However, the village has no market for its minor agricultural products and faces serious transportation problems. For a greater part of the year the road joining Kikundi with the Morogoro-Dar es Salaam major road is not useable. Moreover, the area around Kikundi is heavily infested by wild animals that cause crop losses every year.

5.7.4. Sinya Ulime Village

Sinya Ulime village is part of Negerengere minor settlement which is also a divisional headquarters and one of the railway stations between Morogoro and Dar es Salaam. Sinya Ulime as a part of Ngerengere minor settlement enjoys infrastructural developments already in existence before its establishment. At the beginning of this study the village had a primary school, market, dispensary, piped water, community centre, post office, court, electricity, cooperative shop, and several private shops. There were no additional infrastructural developments at the end

of the study. One unique characteristic is that over 50 percent of village members are 65 years old and above. The effective labour force in the village is small.

For the entire 4-year period the village received no government aid. The village appears to have been ignored by both District and local leaders. During the last two years of the study the village had no communal field. Extension methods applied were not effective. The level of knowledge of recommended farming practices and the adoption of these were both far below average. There was very little progress in performance on either communal or individual fields. When group discussion meetings were called, often less than half of village members attended. Village members consistently blamed the chairman for being autocratic and for the disappearance of communal funds.

Sinya Ulime stands a poor chance for development. Village membership is mainly composed of old people who are unable to work effectively. Some young and strong village members have part-time employment in the nearby dairy farm or sisal estate or at the Army base. A few others are engaged in commercial activities within the village. These competing activities leave Sinya Ulime with practically no village labour force. The village has limited land for agricultural expansion. The soil is sandy and poor, requiring heavy manuring or fertilizer application to bring its fertility up to a minimum level of production.

5.7.5. Lukobe Village

Lukobe village is located 11 km outside Morogoro town. The village is adjacent to the sisal estate that occupies the best part of the land. As a newly-established village, Lukobe had no infrastructural development at the beginning of this study. At the end of the study the village had only established a cooperative shop. Lukobe responded slightly favourably to extension methods applied. The knowledge of recommended farming practices was above average but the rate of adoption was far below average. Villagers were cooperative and their attendance at the group discussion meetings was satisfactory. There were slight increases in yields per ha, particularly on private fields.

Village leadership was stable and capable of having things done. It was held in high respect by village members who also showed a high level of cooperation with it. Work was fairly well organized, but due to the small size of the effective labour force, little was accomplished in terms of communal farming. The village experienced a slow growth in terms of population.

Lukobe has a limited amount of suitable arable land. In order to increase agricultural production, the village will have to acquire more land, probably from the nearby sisal estate. It will also have to apply great amounts of manure or fertilizer in order to raise its soil fertility. Moreover, the village has no market for its minor agricultural products. Although the road to Morogoro is passable all-year round, the village has no means of transport to Morogoro town.

5.7.6. Ikate Village

This village is located 10 km off the Morogoro-Iringa main road. Ikate started as a settlement scheme in 1962 and, as such, the village had amenities such as a primary school, dispensary, tractor and piped water. After four years, the village had constructed a cattle dip, community centre and an office. The cost of these was met by funds realized from increased crop sales. Extension methods used were not effective. They did not improve villagers' knowledge of recommended farming practices or the adoption of these practices both of which were below average. There were little increases in yields per ha even on private fields.

Although the village as a settlement scheme was established a long time ago, little social and economic development had taken place. This is probably partly because of the spoon-feeding done on settlement schemes in early days, and partly because most founders of the village came from places such as Dar es Salaam city or Morogoro town as part of a repatriation exercise. When these people joined the settlement scheme, they were not interested in farming. Moreover the leadership was poor and could not exercise control over them.

The majority of the first settlers of the village, who were brought in from outside the Region, have now left. The remaining members of the village have greatly changed their attitude toward village life and farming in particular. Possibilities for the expansion of agricultural activities exist. The village suffers

annually from crop losses due to attacks by wild animals. Moreover the village is located far away from a reliable market in Morogoro town, and transporration facilities between Ukata and Morogoro are poor. In addition, the portion of the road between Ukata and the Iringa-Morogoro main road is not easily passable during the rainy season.

5.8. Other Characteristics of Survey Villages

Tables 5.10, 5.11 and 5.12 show a summary of characteristics of survey villages which have not been documented in detail in this chapter.

5.9. Summary

Most villages are located on the Morogoro-Chalinze-Korogwe-Moshi road. For those villages located near towns, sisal estates, or those that are former minor settlements or trading centres, the majority of village members have part-time employment in these places. These villagers could not participate fully in both communal and individual village activities. Generally, there was a low degree of commitment to communal activities in these villages.

Villagers whose villages were subjected to demonstrations together with intensive group discussion meetings showed a higher level of understanding of what was discussed and demonstrated than villagers for which the other two methods were applied. This high degree of apparent understanding shown by villagers was confirmed by the level of knowledge of recommended farming practices which

Table 5.10. Characteristics of villages

Type of village	Distance from minor settlement/ town/city/ main road	Year of establishment	Families		Area of communal fields		Government aid	Leadership stability S / RS / US a/	Effectiveness of extension E / RE / IN b/	Wild animal attacks L / M / H c/	Residence of agric. extension worker R / NR d/
			Initial	End of study period	Initial	End of study period					
	Km		No.	No.	Ha.	Ha.	1,000 T.Shs.				
Traditional:											
Bwilingu	105	1970	91	338	16	100	3	S	E	L	R
Chekelei	7	1971	78	80	11	0	1	RS	IN	H	NR
Kauzeni	9	1969	87	200	40	80	77	RS	E	L	NR
Kiloza	10	1971	65	90	29	18	3	RS	E	M	NR
Kiluwani	15	1969	65	100	3	35	1	RS	RE	M	NR
Komkonga	60	1969	184	209	7	32	58	S	RE	M	NR
Kwamsisi	12	1970	61	94	22	45	0	S	E	M	R
Lunga	21	1970	155	235	20	55	66	S	E	H	R
Mango	101	1968	175	270	36	8	53	S	RE	H	NR
Mazingara	40	1968	144	404	40	0	0	RS	RE	M	R
Mdaula	5	1970	66	290	20	50	3	US	IN	L	NR
Mkata (M)	110	1969	310	404	18	0	28	RS	E	M	R
Mlembule	43	1970	62	100	34	82	1	US	IN	L	R
Msata	45	1970	223	350	28	50	28	S	E	M	R
Segera	24	1969	75	449	79	0	27	US	RE	L	R
Sinya Ulime	65	1969	80	190	7	0	0	RS	IN	H	R
New:											
Kibundi	15	1969	42	60	27	60	61	RS	IN	M	R
Kitumbi	80	1968	99	303	12	0	23	RS	RE	L	R
Mizinga	20	1971	40	70	36	122	88	S	E	M	NR

(Cont.)

Table 5.10. Characteristics of villages

Type of village	Distance from minor settlement/ town/city/ main road	Year of establishment	Families		Area of communal fields		Government aid	Leadership stability S / RS / US a/	Effectiveness of extension E / RE / IN b/	Wild animal attacks L / M / H c/	Residence of agric. extension worker R / NR d/
			Initial	End of study period	Initial	End of study period					
	Km		No.	No.	Ha	Ha	1,000 T.Shs.				
Traditional:											
Bwilingu	105	1970	91	338	16	100	3	S	E	L	R
Chekelei	7	1971	78	80	11	0	1	RS	IN	H	NR
Kauzeni	9	1969	87	200	40	80	77	RS	E	L	NR
Kiloza	10	1971	65	90	29	18	3	RS	E	M	NR
Kiluwani	15	1969	65	100	3	35	1	RS	RE	M	NR
Komkonga	60	1969	184	209	7	32	58	S	RE	M	NR
Kwemsisi	12	1970	61	94	22	45	0	S	E	M	R
Lunga	21	1970	155	235	20	55	66	S	E	H	R
Manga	101	1968	175	270	36	8	53	S	RE	H	NR
Mazinyora	40	1968	144	404	40	0	0	RS	RE	M	R
Mdaula	5	1970	66	290	20	50	3	US	IN	L	NR
Mkata (M)	110	1969	310	404	18	0	28	RS	E	M	R
Mlembule	43	1970	62	100	34	82	1	US	IN	L	R
Msata	45	1970	223	350	28	50	28	S	E	M	R
Segera	24	1969	75	449	79	0	27	US	RE	L	R
Sinya Ulime	65	1969	80	190	7	0	0	RS	IN	H	R
New:											
Kihundi	15	1969	42	60	27	60	61	RS	IN	M	R
Kitumbi	80	1968	99	303	12	0	23	RS	RE	L	R
Kizinga	20	1971	40	70	36	122	88	S	E	M	NR

(Cont.)

Table 5.10 (cont.)

Type of village	Distance from minor settlement/ town/city/ main road	Year of establishment	Families		Area of communal fields		Government aid	Leadership stability S / RS / US a/	Effectiveness of extension E / RE / IN b/	Wild animal attacks L / M / H c/	Residence of agric. extension worker R / NR d/
			Initial	End of study period	Initial	End of study period					
	Km		No.	No.	Ha	Ha	1,000 T.Shs.				
New: (cont.)											
Lukobe	11	1971	40	79	6	58	21	RS	RE	M	NR
Magamba	22	1970	107	150	9	80	16	US	IN	M	R
Malivundo	10	1969	99	177	17	10	3	S	IN	L	NR
Mboga	8	1970	56	201	24	85	102	S	RE	L	NR
Msata	75	1971	80	90	45	100	230	US	IN	H	NR

Source: Sample survey.

a/ S - stable, RS-relatively stable, US-unstable.

b/ E - effective, RE-relatively effective, IN-ineffective.

c/ L - low, M-medium, H-high.

d/ R - resident of the village, NR-non resident.

Table 5.11. Type of aid given to the village*

Village	Building materials	Ferti-lizers	Insecti-cides	Improved seeds	Spray pump	Live-stock	Other
Bwilingu	-	AR	AR	AR	-	-	-
Chekelei	AR	-	-	AR	-	-	AR
Kauzeni	AR	AR	AR	AR	-	AR	AR
Kiloza	-	AR	AR	AR	AR	-	-
Kiluwani	-	AR	AR	AR	AR	-	-
Kikundi	-	AR	AR	AR	-	AR	-
Kitumbi	-	AR	AR	-	AR	-	-
Kizinga	AR	-	-	AR	-	-	-
Komkonga	-	AR	AR	AR	-	-	-
Kwamsisi	-	-	-	-	-	-	-
Lukobe	AR	AR	AR	AR	-	AR	-
Lunga	AR	AR	AR	AR	-	-	AR
Maganba	-	-	-	AR	AR	-	AR
Malivundo	AR	-	-	AR	-	-	-
Manga	AR	AR	AR	-	AR	-	-
Mazingara	-	-	-	-	-	-	-
Mboga	AR	AR	AR	AR	-	-	-
Mdaula	-	AR	-	AR	-	-	-
Mkata (H)	-	AR	AR	AR	-	-	-
Mkata	AR	AR	AR	AR	AR	-	AR
Mlembule	AR	AR	AR	AR	-	-	AR
Msata	AR	AR	AR	AR	-	-	-
Segera	-	AR	AR	-	AR	-	-
Sinya Ulime	-	-	-	-	-	-	-

Source: Sample survey.
*AR-aid received; - aid not received.

was above average, although the rate of adoption of these practices was in most cases just average. These villagers also obtained relatively higher yields per ha and per man-day under both communal and individual farming systems than villagers whose villages were subjected to the other two types of extension methods. Villagers in villages for which formal scheduled group meetings only were applied not only showed less understanding of topics discussed compared to those discussed above but also their level of knowledge and rate of adoption of recommended farming

Table 5.12. Area cultivated communally and individually over four consecutive years by village

Village	Communal			Individual		
	Minimum	Maximum	Average	Minimum	Maximum	Average
	Ha.					
Dwilinga	0	16	4	18	41	27
Chekelei	0	4	11	15	38	38
Kauzeni	20	47	36	7	36	21
Kiloza	2	29	12	39	74	47
Kiluweni	0	4	2	21	40	33
Kikundi	15	48	29	8	24	14
Kitumbi	0	15	7	30	45	38
Kizinga	28	40	34	0	36	13
Konkonga	0	71	28	16	82	34
Kwansisi	4	45	20	21	69	44
Lukobe	0	16	7	3	23	11
Lunga	3	137	71	16	42	27
Magamba	7	88	43	45	57	50
Malivundo	10	56	27	13	65	42
Manga	3	37	16	17	67	38
Mazingara	0	44	19	32	82	53
Mbogo	3	70	30	28	75	48
Mdaula	0	200	51	15	48	26
Mkata (II)	0	27	11	13	67	46
Mlata	12	84	47	13	30	18
Mlembule	34	36	80	13	30	20
Msata	0	44	21	21	41	27
Segera	0	102	26	13	67	31
Sinya Uline	0	9	4	11	40	23

Source: Sample survey.

practices were just average but higher than those in villages where informal, unscheduled or general meetings alone were applied. Production per ha and per man-day were also higher in these villages than in villages where only informal, unscheduled or general meetings alone were used.

During the 1972/73 and 1973/74 crop seasons, most villages were seriously affected by drought which reduced crop yields considerably. Several villages also suffered seriously from annual vermin attacks on crops.

Most villages have the potential for development. They have adequate amounts of at least moderately fertile land, are strategically located in terms of accessibility to markets, and most have the labour force required. However, almost all these villages are faced with a number of problems—economic, social, political or administrative--that hinder their development. Economically, apart from lack of entrepreneurship, all villages are in a weak financial position. They cannot afford to undertake any economic activity that involves relatively heavy initial capital investment. Lending institutions such as the National Bank of Commerce, Tanzania Rural Development Bank, Tanzania Housing Bank, and the Tanzania Investment Bank impose restrictive conditions before they extend credit to villages which disqualify most from getting these credits. It is a credit-worthy village and not a credit-worthy project which is considered the most important criteria for extension of credit.

Socially the coastal zone is peculiar in the sense that people traditionally lack motivation for development even if opportunities are offered to them. There is a feeling of complacence insofar as development is concerned. This serious handicap has been observed by various researchers in the coastal zone. This might explain the underdevelopment of the zone despite the opportunities at its disposal. From time to time, and more so in the last 10 years, projects have been initiated and imposed on villages without consultation with them and in many cases without having made a feasibility study. Many of these projects were

started through political pressures. Projects and certain agricultural extension recommendations that were economically unsound were imposed on villages and failed; as a consequence villagers were demoralized. Politically the level of commitment and hence participation in communal or government-imposed activities is extremely low. Failure or poor performance of these activities may be attributed to these conditions. Most villages have ineffective leadership, in many cases caused partly by illiteracy and partly by lack of commitment to the whole concept of Ujamaa and its demands. Some village leaders felt insecure about their property for in most cases the leadership was composed of people who were better-off than the average village member. So, the administrative machinery in villages was confused and less willing to participate in effective economic planning and work organization. Finally lack of village-level government experts or extension personnel from various development ministries aggravates the situation.

CHAPTER VI. DISSEMINATION OF RECOMMENDATIONS IN THE COASTAL ZONE

6.1. The Communication Process

Agricultural extension is essentially a process of communication of ideas, skills, and farming innovations between the farmer and the agricultural extension worker in such ways that each gains a common understanding of the meaning and intent of the message. Good communication, therefore, is the essense of good extension teaching. The basic means of communication are words and visual symbols. Whatever symbols are chosen to convey ideas, they must be appropriately selected and used so that their meaning is clear to the learners, otherwise no communication will take place.

It is intended in this chapter to give a theoretical background of how the communication process of agricultural information takes place in the coastal zone and also to show the coherent limitations of this process encountered by the agricultural extension service in the zone.

6.2. Sources and Channels of Communication for Farm Information

6.2.1. Sources

The basic and applied research leading to the recommendation of agricultural innovations comes from a variety of sources. These include: (i) international research centres, (ii) national research stations together with zonal experiment or trial stations, and (iii) the Faculty of Agriculture, University of Dar es Salaam. The findings from these centres form a basic

part of the curriculum in all the institutions engaged in training staff for the Ministry of Agriculture and its parastatal organizations. In addition, the national research stations and the Faculty of Agriculture maintain regular contact with senior staff who are doing work related to their particular specialties. Research reports are distributed to the Ministry of Agricultural headquarters, agricultural training institutions, crop authorities and boards, and to all regional agricultural offices. Periodically, national conferences of research workers, and staff from the Ministry of Agriculture at the headquarters, Regions, and agricultural training institutions are held to exchange ideas on recent developments and field problems that have been encountered. Zonal and Regional experiment or trial centres do their own work in refining and adapting research findings for regular farm use in specific areas of the country. The coastal zone has five major research stations: at Ilonga, Mlingano, Amani, the Faculty of Agriculture in Morogoro, and a research sub-station at Bagamoyo. This zone is therefore well covered by research institutions in comparison to other zones.

6.2.2. Transmittal System or Channels of Communication

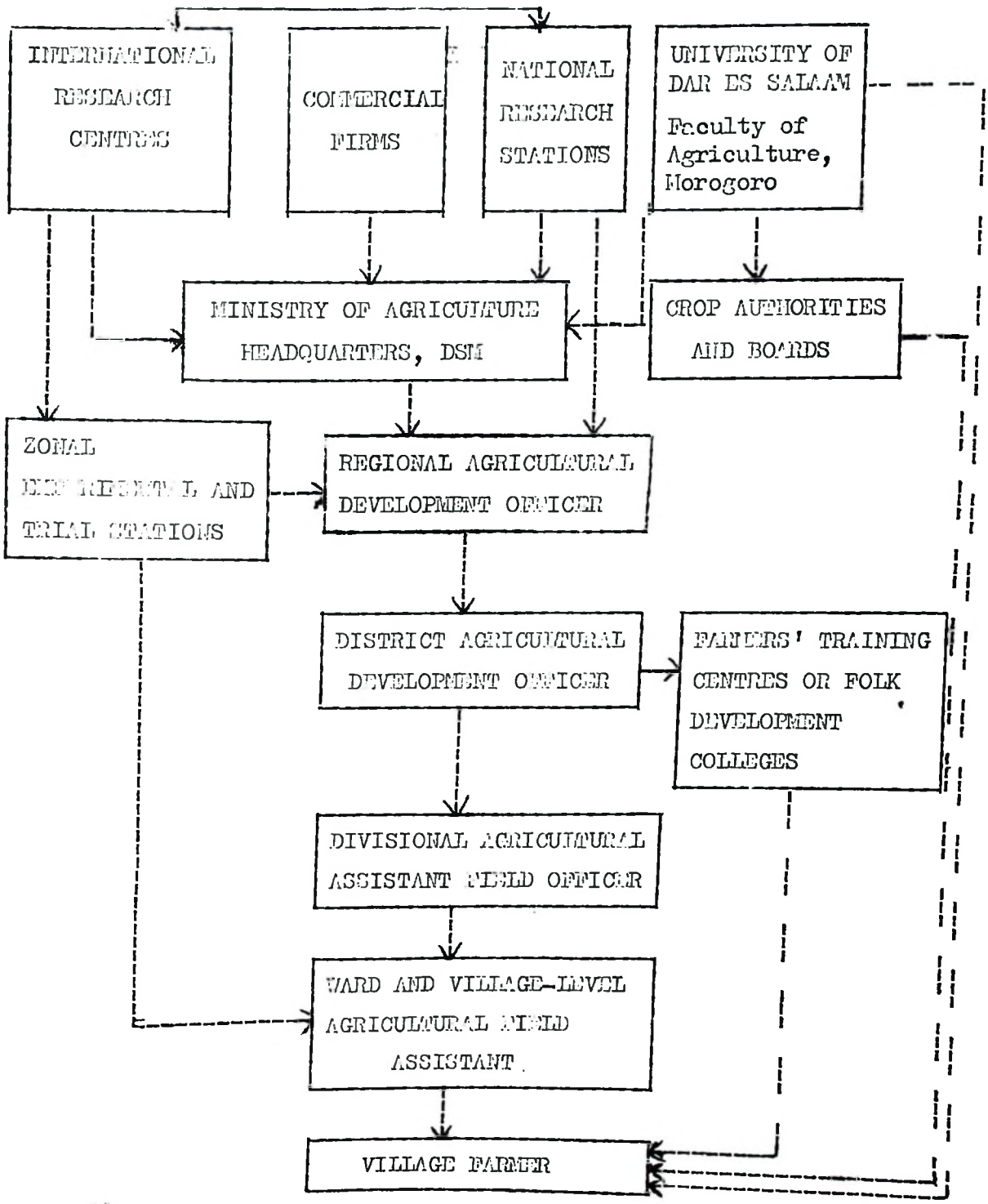
The village-level agricultural extension worker, whom we have seen to be inadequately trained, is the vital link in the chain of communications between the agricultural research stations and village farmers. Little information on technological innovation reaches the village farmer without passing through the village-level agricultural extension worker. Some sources of information

that are genuinely independent of these workers are the farming experience of the farmer through "trial and error" or through traditional knowledge, parents and neighbours, Crop Authorities and Boards, students from agricultural training institutions, radio, and Farmers' Training Centres or Folk Development Colleges as they are now called.

The village-level extension worker potentially obtains technological information and advice through a considerable variety of communication links, as figure 6.1 illustrates diagrammatically.

The information transmittal system shows that mainly the senior staff at the Ministerial Headquarters and Regional Agricultural Development Officers (RADO) receive direct information from research institutions. The Ward and village-level extension worker gets information after it has passed through several steps. He has no routine contact with the research institutions which create the recommendations he is expected to disseminate to the farmers. He neither reads research reports nor meets with researchers formally or informally. So he has almost no opportunities to gain first-hand knowledge of technical innovations. The transmittal system shown in figure 6.1 is a bureaucratic, hierarchical, and downward communication system which needs further research. This hierarchical formation from the village farmer up to the Ministerial Headquarters and research institutions hampers upward communication of problems and insights,

Figure 6.1. Channels by which village-level agricultural extension workers receive technical information



— — — Infrequent transmittal system of agricultural information to the farmer.

Source: Personal communication with the Ministry of Agriculture Staff Headquarters, Dar es Salaam.

what in communications' theory we call "feedback."

6.3. Methods used in Communicating Agricultural Information and Advice

One might say that there is hardly an agricultural extension service as such in Tanzania when compared to technologically advanced countries. This is particularly true with respect to the way methods of agricultural information communication are used and to the skills of communicators. Yet there are systems or methods that are currently used in Tanzania that are similar to those in developed countries.

It is quite true that these systems are rudimentary and are poorly and inadequately used. This situation is a result of inadequate training of agricultural extension workers, lack of facilities, and the limited number of agricultural extension workers, all of which account in part for the ineffectiveness of the agricultural extension service.

Methods of communicating agricultural information and advice in the coastal zone villages are basically divided into three major groups: (1) personal or individual methods, (2) mass methods, (3) and group methods.

6.3.1. Individual Methods

Individual methods are those based on direct contact between the agricultural extension worker and farmers individually. As in other parts of the country, these methods used to be the most common and widely used in the coastal zone before the shift of emphasis to group methods. This study was made during the

transitional period from individual to group methods. Individual methods include face-to-face contact during farm or home visits, unplanned encounters at the socializing centres, and other unofficial situations. Under face-to-face contacts, extension workers on their own initiative paid visits to farmers to see how things were going and also to see whether there were problems that they could help solve. Sometimes visits were made on request from the farmers in order to explore a specific problem situation. It was observed that village-level extension workers had neither schedules for making visits nor work programmes. As a result, useless visits were often made because the extension workers had nothing to offer to the farmers or farmers were not found at home since they were not informed of the visit.

6.3.2. Mass Media

Mass media are divided into two major groups: first, the written word, which covers all press articles such as farm newspapers, booklets, bulletins, pamphlets, leaflets, brochures, and ordinary newspapers. Secondly, the spoken word which includes radio broadcasts, film shows, speeches and lectures. "Ukulima wa Kisasa," a farm magazine, together with other printed materials were sold in villages to literate villagers. Often exhortation meetings were also held in villages, and agricultural subjects were sometimes discussed. During the campaign for cotton production, Landrover-mounted cinema projectors were used in showing films on cotton husbandry. Moreover at the headquarters of the Ministry of Agriculture, an information unit gives 15-30 minute

radio programmes five times a week called "Shambani Jumn Hili" (Farm news for this week). During these programmes, which are aimed at the farming communities, a wide range of information and advice on farming is given.

6.3.3. Group Methods

Group-based agricultural extension methods include scheduled and unscheduled meetings, group discussions, method and result demonstrations, farm visits, conducted tours and short courses of instructions. In the coastal zone, these methods were used in varying degrees of combination and intensity, with varying levels of success.

Experimental or trial plots which were incorrectly regarded as demonstrations were set up in various parts of the zone. Farmers near the plots were sometimes taken to visit them. Farmers near research stations, such as Ilonga in Morogoro District, Ilingano in Muheza District, Bagamoyo sub-station in Bagamoyo District, the Faculty of Agriculture in Morogoro District, and Amani in Korogwe District, were also sometimes taken to visit these stations to learn mainly crop husbandry practices. Once or twice a year selected farmers were sent to Farmers' Training Centres (now known as Folk Development Colleges) to undertake short courses of instructions in agriculture lasting for 1-2 weeks. Although there was only one Folk Development College per District, they were underutilized during the time of the study.

6.4. Obstacles to Agricultural Information Communication

When evaluating the effectiveness of an agricultural extension service, it is essential to consider the circumstances under which the evaluation process is carried out. Most criticisms regarding the effectiveness of the extension service are based on the rather poor achievement of existing services in relation to the assumed final goals. An agricultural extension service can only perform well and achieve the assumed final goal when the essential prerequisites are satisfied. This means that there must be sufficient numbers of properly trained agricultural extension workers, extension programmes aimed at responding to farmers' needs and wants, necessary work facilities, farmers' attributes conducive to adoption of farm innovations, and an appropriate agricultural extension organization—all of which have an influence on the efficacy of the extension methods applied. As observed in the coastal zone villages, the author found the following obstacles affecting the communication of agricultural information.

6.4.1. Difficulty of Comprehension

Each episode of communication involves two components: a sender(s) and a receiver(s). The one has a message that is supposed to be communicated for some purposes to the other. A message can vary in its complexity. The more complex it is, the more difficult are the acts of transmitting and receiving. In order to transmit the message, the sender must put it into some communicable form. In speaking or writing it, or making another

type of signal, the sender is using an encoder, of which there are several types such as letters, pamphlets, conversations, lectures, radio broadcasts, and so on. The message is sent through a particular communication channel and at the other end of the channel the message is received by a decoder. The particular decoder used by the receiver depends on the character of the message sent. The end product is then a message received, which will contain a certain proportion of the original information transmitted, the rest having been lost or subverted through distortion.

The whole process of communication has at least three phases: (i) expression, (ii) interpretation, and (iii) response. Unless the expression is clear, the interpretation accurate, and the response proper, one's effort to communicate will not succeed. The typical coastal zone rural society is unsophisticated, unable to speak and understand Swahili properly, and mainly illiterate. Extension workers serving this society have a rather low basic educational qualification with inadequate professional training in both the extension content to be disseminated and in the art of communication. Both senders and receivers are in a weak position to communicate effectively.

The decoding ability of the receiver (farmer) is determined by his capacity to handle complexity in the messages and his efficiency in dealing with particular message channels. Agricultural information is disseminated in Swahili, which is the official language. As previously mentioned, not all villagers are proficient enough in this language to understand difficult

messages. Similarly, education generally increases an individual's linguistic depth and efficiency, and hence his decoding ability. The author has the impression that problems in communicating agricultural information in coastal zone villages usually stem from the language used, the meaning of words and other symbols used, the specificity, selection and organization of messages, the selection and utilization of channels of communication and finally, the development and understanding of facts. All these problems are highly related to extension workers' and farmers' attributes. The end result in most cases in the coastal zone is poor expression and interpretation of agricultural information and little or no response to the message disseminated because it cannot be fully comprehended.

The method used in communicating the message should be closely related to its contents. If a procedure being disseminated involves a complicated series of movements, the method chosen should be able to convey the idea of movement. Some methods, such as demonstrations, meet this qualification well. This is definitely one reason for the effectiveness of demonstrations where they were applied as part of this study in the coastal zone villages. With rural audiences, the method should be as direct as possible. Other methods, such as printed graphs, are abstract and require considerable interpretation by the audience. If printed or spoken words, as well as visual symbols, are to be used, they must be ones that have meaning to the audience.

Comprehension of an object or action is synonymous to deriving meanings from visual symbols or actions. Giltrow (1973)

found that there are audience attributes that assist people in comprehending or deriving meanings from visual symbols or actions. He noted that live rendition was more accurately comprehended than animated rendition of the same content. Adolescent school children with a wide variety of geographic, age, and prior film-viewing backgrounds could easily comprehend the action in different combinations of perceptually filmic elements when presented shot by shot with familiar, readily understood content.

Diagrams or verbal description may frequently be inadequate as a means of communication. On the other hand if the objective, for example, is to get a farmer to sow seeds at a particular time, then a verbal message on a poster or over the radio would be satisfactory to a mainly illiterate community provided there are enough radios in the community and the majority of the people can read comprehensively. If the last two conditions are not satisfied, then a verbal message on a poster or over the radio would be ineffective. This means that the effective extension worker must not only have at his command a variety of tools and methods for communicating information, but must also know what method to use, where to use it, and how to use it.

6.4.2. Farmers' Economic and Social Constraints

The extension worker needs to have a thorough understanding of his audience if he is going to transmit his ideas effectively. He has to understand farmers' personal characteristics, values and attitudes, socialization patterns, economic and technological situations, and the stages in the diffusion and adoption process.

Knowing the personal characteristics of the audience provides a basis for the selection and organization of the message.

The farmers' economic situations influence the effectiveness of the extension method applied. The direct influence of the economic situation is that farmers with limited financial resources cannot afford the purchase of information media such as a radio and printed materials. Like other parts of the Tanzania mainland, the coastal zone receives a regular supply of an agricultural newspaper "Ukulima wa Kisasa" and a variety of booklets and pamphlets on various crops grown in the area. Some of these materials are given free of charge to villagers, while others are sold at prices ranging from 30 cents for "Ukulima wa Kisasa" to Shs. 1/50 a copy for some crop husbandry booklets. Due mainly to the weak financial position of individual farmers and villages, these materials sell poorly, and often bundles are returned to the District headquarters unsold. Likewise, the radio is an important media for the spoken word in disseminating information. In the 24 villages surveyed, only 6 village radio sets and 15 privately-owned radio sets were owned. These were concentrated mainly in peri-sisal estate villages and in peri-urban villages. Because of the weak economic positions of farmers and villages as a whole, mass media have not been effective as a means through which farmers in the coastal zone could increase their technical knowledge in farming.

An indirect influence relates to cost: innovations that cost little will be adopted more quickly than those requiring large expenditures. The farmer must see an advantage in adopting any

innovation and expect satisfaction as a result. He must also possess the required resources and be willing and able to take the risk. This factor had a great influence on the coastal zone village farmers as reflected in the higher adoption rate of timely and proper weeding, which in financial terms cost them nothing, as compared to the relative adoption of fertilizers and insecticides that cost a lot of money. Therefore, extension staff need information that indicates the economic situation in deciding which extension method to use in disseminating a particular innovation and which innovations to promote most actively.

People belong to many groups, each of which tends to set up standards of behaviour for its members. The reward for conformity to these standards is acceptance and prestige; the penalty for nonconformity is loss of them (Lionberger, 1964). Generally speaking, farmers are conservative and the rural community has a certain resistance against non-traditional practices. When one farmer starts using a new practice he is often criticized and even laughed at by the other members of the community. Typically, coastal zone Swahili farmers are envious of economic or social success. Villagers said that individuals feared, say, to build modern houses because of public opinion and the likely punitive sanction in form of being bewitched. Similar sanctions are likely to be applied against an individual who might get a bumper crop in a particular crop season due to an adoption of certain agricultural innovations. Some villagers complained that such mechanisms of social control were retarding development in the

coastal zone. This is one of the likely sociological causes for ineffectiveness of some extension methods, such as individual and personal contacts, in the past. The weaker personalities would not take the risk of being labeled as deviants from the society's norms. To overcome such problems, the extension worker must utilize extension methods that start with the involvement of groups of farmers in introducing an innovation. This becomes an additional justification for the use of group-based extension methods. Results of this study support the above statement in that villages in which demonstrations were performed had rather high adoption rates of recommended farming practices both on communal and on individual fields. Ruthenberg (1964) also draws attention to the sociological factors as a constraint on extension effectiveness.

Although these constraints are not of equal importance in all parts of Tanzania, they are important in the coastal zone areas. Freyhold et al (1972) defend coastal Swahili farmers by saying that during the colonial period coastal farmers were willing to work on sisal plantations for a short period of casual work when there was nothing to do on their own farms or when there was an urgent need for cash. They were also interested in working as clerks or supervisors, if they had the chance, but they were not interested in becoming professional sisal cutters or weeders as long as they could earn more on their own farms. She concludes by saying that it was their refusal to be exploited on the sisal estates that earned them the reputation of being lazy. The author has some reservations concerning this conclusion because farmers

in other coastal areas such as Bagamoyo and Rufiji Districts, where insignificant amounts of sisal are grown, exhibit the same behaviour as do farmers in areas where sisal is grown in large amounts. From the observations of this study on farmer's attitude towards farming and work in general, it appears that Ruthenberg's comment given above is more relevant than anywhere else in up-country Regions.

6.4.3. Unsuitable Methods

It would be ideal if an extension worker could select the best possible method and then use it, but there are various practical factors that may make this impossible. Perhaps it would be desirable to set up a small demonstration plot on every farmer's piece of land. But this procedure would not be practicable because there are rarely enough extension workers to carry out such a procedure. Under such situations, a demonstration field for, say, every village might be a possible solution. When materials such as films, filmstrips, and slides are used, there is a possibility of selecting from what is already available. A large number of films are available from the Ministry of Agriculture, covering a variety of agricultural techniques, but most of these were produced for audiences in nations that are more technologically advanced. The setting for such films is usually from a totally different culture, making it difficult for village audiences of the coastal zone to identify with them. In such circumstances a locally-produced film, say from Mlingano or the Bagamoyo research sub-station, might be the best solution for the

coastal zone area. These stations are located within the zone and therefore villagers can identify themselves with the people, place, crops, and practices which would be shown. Such a film could have a great impact on the villagers. However, economic and personnel limitations impose many restrictions. The method that is eventually chosen is usually a balance between what is best and what is possible. Due to high costs in making films and lack of expert personnel, most films, slides, and filmstrips shown in the coastal zone villages during the campaign for cotton production on the utilization of fertilizers and insecticides were imported from the United States; the rest were produced from Ilonga and Ukiriguru cotton research centres.

6.4.4. Frequency and Intensity in the Use of Methods

Although some demonstrations had been conducted in a limited number of coastal zone villages, their effect on farmers' agricultural knowledge and adoption rates was insignificant. One of the reasons is that these demonstrations were erratically and sporadically conducted. Skeptical farmers would like to see the demonstration repeated a number of times before deciding to adopt or reject the recommended innovation, skeptical farmers who predominate in rural communities of the coastal zone, and who are cost and risk conscious, insist on having evidence before first trial and adoption. Repeated exposure to a demonstration deepens the effect. The other reason for ineffectiveness of demonstrations in the coastal zone was that they were conducted at only a few sites, in one or two villages per District. Villagers were involved in

the last or final stages of these demonstrations, thus missing all the crucial steps of the process. In this study, demonstrations were conducted for four consecutive years, and effects of frequency of demonstrations can be observed from the significant increases in the level of knowledge and rate of adoption of recommended agricultural practices in villages where demonstrations were conducted.

6.4.5. Limited Government Financial Resources

In order to allocate or reallocate available resources in an efficient and productive manner, planners and others must in the first instance be in possession of these resources in adequate amounts. Such resources are frequently deficient for various reasons such as the impingement of administrative, social or other obstacles which vitiate resource utilization. The coastal zone suffers from serious shortages of agricultural extension workers. Financial limitations force extension administrators to organize their services on an extensive rather than intensive basis. Consequently there is one extension worker per 15-20 villages. These limitations force the extension service to operate through and with organized groups, hence the use of group-based extension methods. Demonstrations are costly programmes which require relatively heavy financial expenditure in purchasing demonstrational material (depending on the type of demonstration to be performed). Audio-visual equipment such as films and projectors also are expensive. Dissemination of information through the written word is equally expensive. In short, the government does

not have sufficient manpower and financial resources to provide the extension service with all it needs to perform its communication role satisfactorily.

6.4.6. High Levels of Illiteracy

Farming newspapers and publications such as "Ukulima wa Kisasa" might play an integral part in the overall dissemination of farming information and advice. They could supplement other methods and stimulate villagers to request information and advice and to solve their problems on their own. Publications could make excellent handouts after meetings. In developed countries farm magazines (weekly or monthly), usually in specialized subject fields, are likely to be an important source of innovative ideas. Also TV and radio are highly important. In these countries mass media ensure large and regular audiences, fast communication with lasting value, and sometimes have been called "magic multipliers." In Tanzania, and particularly in the coastal zone, mass media are not very effective in part because of a high percentage of illiteracy. The coastal zone is predominately settled by Moslems. Their adherence to Islam deprived them of educational opportunities which came only from the missionaries and only to those who were willing to accept Christianity. Results of this study show that 45 percent of the total population on average can read comprehensively and write legibly. Percent literacy ranges from 31 for the lowest village to 53 for the highest village in the study. The household heads who are also decision-makers account for 25 percent of this literate group. When the literate group

was asked how often they saw and read "Ukulima wa Kisasa" magazine during the last six months, 20 percent of them said they had seen it several times and the rest said they had never seen it at all. Of those who said they had seen it, only 15 percent actually read the magazine.

6.4.7. Inappropriate Nature of the Message Content

Some obstacles in the use of agricultural extension methods are caused by the nature of the methods themselves and by the way the message content is prepared. Sometimes the messages do not match the farmers' environment. Most articles in "Ukulima wa Kisasa" are clearly written for the farmer growing cash crops on a fairly large scale or for agricultural export. Such information does not mean much to the villagers in the coastal zone with their small hectareages. They fail to identify themselves with the information in the articles because these articles deal with situations and objectives beyond their attainment. If one examines closely the articles written in Swahili, he will notice that they were translated from English, often times not very skillfully. Moreover many articles require some technical expertise to understand because they are delivered in the highly technical form received from research institutions. The written word, such as stories, news articles or features, are only as good as the reporter's or writer's skill. Currently the Ministry of Agriculture does not have a qualified editor for the "Ukulima wa Kisasa" magazine. Moreover farmers who can read farm newspapers comprehensively often times do so selectively to support their own

biases, needs, perceptions and expectations.

Mytton (1976) held an interview with the agricultural radio programmes master. He was informed that when questions on a subject previously discussed on the radio were put into the programme and listeners were asked to write in, only 150 answers were received and most of these came from towns. Even when prizes were offered, the programme was still a failure. The programme master thought illiteracy was the cause of the failure; or else farmers never listened to the radio at all. The programme master said that when he sent out questionnaires, the answers received showed a misunderstanding of the questions. This situation emphasizes the weakness of mass media because there is no feed-back. The source of information has no way of telling whether the farmer or anticipated receiver of the information listened to the radio and how much attention he paid to the information given, or read the newspaper and understood the message.

Scholars in the study of underdevelopment widely agree that attitude change plays an important part in creating the right conditions for economic, social and political change. It is also generally recognized (Mytton, 1976) that impersonal media like the radio and the press have less impact on attitudes than informal interpersonal channels of communication. Due to an inadequate number of agricultural extension workers in the coastal zone, few interpersonal channels of communication between farmers and extension workers take place; this is an additional cause of the low effectiveness of mass media in the coastal zone. Social and

economic conditions, combined with existing cultural attitudes and values in the coastal zone, determine whether attitude change of villagers is likely. On their own, neither the press nor the radio can be expected to have much impact on deeply-seated values, practices or beliefs.

Although Swahili is the national language, not every one in Tanzania understands it fully. When administering questionnaires to villagers for this study, it was necessary sometimes to translate the questions into local dialect or vernacular, especially when elderly members of the sample were involved. Hence the radio was limited in its impact in these rural coastal zone villages because it uses a language which did not play an important part in everyone's daily life at home or at work. This observation is confirmed by Mytton (1976) who also found that many people in some rural areas were not familiar with Swahili and consequently much of the content of both press and radio was strange to them.

Mytton also observed a centripetal tendency in media consumption. He found that regular newspaper readers were more likely also to be regular radio listeners, and vice versa. This factor serves to increase the disparity in the ability to acquire knowledge through mass media between areas of high and low media exposure. This situation is even more serious in the coastal zone where, as already observed, because of financial constraints and high illiteracy there are a limited number of radios and people who are able to read comprehensively and write legibly. Unevenness was also observed in the fact that young people were

more exposed to the mass media than the older people, men more than women, and rich more than poor. These facts emphasize how little the old, the poor, the women, and the illiterate villagers, whom we have seen do most of the agricultural work on the farms, benefit from mass media.

Meetings and demonstrations as means of communicating agricultural information and advice have also not been effective in the coastal zone villages. They have often not been used effectively to conscientize villagers and mobilize them into an effective force to throw off all forms of oppression. Although meetings convened for planning purposes have often been used as a way to legitimize the extension organization's plans for villages, these meetings did not genuinely involve all adult village members. Village assembly meetings, as mentioned earlier, are supposed to give the blessing to decisions made by the Village Development Committee before their implementation. There is lack of popular participation of villagers in the discussions of matters affecting them. In spite of decades of experience in many countries with different organizational approaches of hierarchy and participation, Finucane (1974) sees that we are as yet largely unable to reliably estimate the probable effectiveness and efficiency of one form or another in terms of goals such as output and equality. Involvement of all people through meetings in discussing issues concerning them forms the basis for equality, and is a democratic way of getting effective decisions and solutions.

Where general meetings are called for all villagers to discuss agricultural issues in the coastal zone villages, the technique used is to rely on exhortation rather than discussions. Under such circumstances, meetings do not contribute to the liberation of agricultural extension methods because villagers' involvement in the discussions leading to problem-solving and decision-making is completely ignored. The very essence for arousing villagers' awareness and enabling them to unleash their potential creativeness, which is a prerequisite for self-reliant development, is lost.

One serious defect at village meetings in the coastal zone, particularly in Handeni and Bagamoyo District, and which renders meetings ineffective as group agricultural extension methods, is the absence of women. This absence in public gatherings might have been reinforced by colonialism, tradition, or the Moslem religion. As indicated in Chapter II, women are expected to look after the fields, and they work harder on the farms than their men in the coastal zone. This situation applies to both individual and communal fields. Since women do not attend meetings and therefore do not participate in the discussions, they can easily undermine decisions of which they do not approve by passive resistance. Such a situation can be detrimental to the farming activities. Freyhold (1972, p. 16) report that in one village in Handeni District women actually went on strike when the men had decided during the meeting to change regulations for communal work. When the dispute was brought to the village

meeting, a man had to be appointed to defend the women's case. This is one example showing how discussion meetings as an extension method for disseminating agricultural information and advice are at times inappropriate.

Demonstrations on fertilizers and insecticide application, use of improved varieties of seeds, and use of ox-ploughs were being tried in some coastal zone villages. From the stand point of the way they were conducted, it is questionable as to whether these types of demonstrations were advantageous to the villagers at all. First, demonstrations were conducted on the extension workers' fields or on primary school fields. Second, these demonstrations were conducted by either the extension worker alone or a research officer of the Ministry of Agriculture. Villagers were called just to see the final results. The demonstrator performed all the operations of the demonstration alone without involving the villagers or learners. Thus they failed to have a feel of the practice and to comprehend exactly what the demonstrations meant or were all about. Third, demonstrations were conducted on rather small plots, about a quarter of a ha, and in most cases this was done in one or two villages per District. Moreover, where these demonstrations were conducted, the practice was not repeated or done as a routine in order to give villagers a chance to observe and become convinced. Fourth, there is also a general lack of understanding of and consequently lack of distinction between demonstrations and experiments or trials. Demonstrations are not experiments, nor are experiments demonstrations. Though the difference between the two is generally

known, in actual practice in the coastal zone villages the two were not properly differentiated. Some agricultural extension workers introduced new practices, use of fertilizers and insecticides, and new crops into the areas on an experimental or trial basis with the intention of observing how these innovations would perform or what their results would be. Mistakenly, these were regarded as "demonstrations." The danger with this is that in case of failure, it becomes exceedingly difficult for the villagers to be convinced. This situation re-affirms the inadequacy of the training programme of extension workers in the identification and use of group extension methods.

In conclusion, it could be said that choosing the best medium for a particular message requires an understanding of media characteristics as they relate to the various kinds of message content as well as an understanding of the audience. It would be ideal if an extension worker could select the best possible medium and then use it. It is true that economic and personnel limitations for the production and use of media impose many restrictions that limit the choices, but the medium that is eventually chosen is usually a balance between what is best and what is available and possible. It is worth remembering that farmers are influenced to make changes in farming practices or attitudes and behaviour towards farming in direct proportion to their contact with several different types of agricultural extension methods. Kelsey et al (1963) observed that as the number of methods of exposure to extension information increased from one to nine, the number of

farm families changing their behaviour increased from 35 to 95 percent. Extension staff endeavor to assist people to reach objectives set forth in the extension programme. These objective imply change. When broken down into teaching units, these objectives usually involve specific practices and/or ideas that specific audiences should adopt. In such cases specific means of communication are used to suit the type of audience. The problem of extension workers is to determine how most of a particular clientele group (audiences) can be moved from the awareness to the adoption stage as quickly and efficiently as possible. If one could really know the cause-and-effect relationship involved in changing human behaviour, extension teaching would become more systematic and less mysterious. Some things about teaching are well known; when these are applied properly, a significant impact on the learner can be anticipated.

CHAPTER VII. THE EFFECTIVENESS OF GROUP BASED AGRICULTURAL EXTENSION METHODS

7.1. Objectives

The word evaluation as used here means measuring performance against a predetermined goal by a comparison of the situation before and after group-based methods have been applied for a period of four years.

The major reason for evaluating group-based agricultural extension methods is to help in understanding the factors which make for success or failure, those that enhance or retard progress towards the goal of increased agricultural output. The major objective of evaluation, then, involves a recurring analysis of the operation of the methods to be evaluated, focusing on two chief questions: (i) why has, or has not, there been progress towards the goals set? (ii) why have the methods achieved greater or lesser success than expected within the period? The answers should provide a broad analytical base for policy decisions to determine which group method should receive greater emphasis or priority in application.

Extension has been defined as an educational process with the purpose of bringing about desirable changes in people's behaviour (knowledge, skills and attitude) which will contribute to better farm practices and consequently to better family living. The conceptual changes (thinking or feeling) must precede the technical changes (action) and can be brought about best by education. Evaluation is used as the process of determining the extent to

which these behavioural changes have been accomplished in ways of thinking, feeling, and acting.

Evaluation means to appraise carefully. It not only helps to determine the effectiveness of a method used but also to clarify what is really being done and how it is done. Even though assessment of extension methods is by no means a new concept, it is not often done as part of the effort to improve the effectiveness of extension methods. There are many reasons for this such as lack of trained personnel to supervise evaluation, lack of well-specified objectives, reluctance to face the responsibility of undertaking evaluation, fear of revealing weakness to the public, as well as lack of time and pressure of routine activities. It is perhaps more a lack of understanding of the purposes and methods of evaluation and the role it plays in an educational process that prevents most workers from using evaluation as an extension tool. The degrees of evaluation range from casual everyday observations and informal inquiries to systematic and formal investigations. The local extension worker should be more concerned with the relatively simple evaluation processes which give him an insight into his work and should leave the more complicated studies to evaluation specialists.

In this study an attempt was made to measure the effectiveness of demonstrations together with formal, scheduled group discussion meetings, formal, scheduled group discussion meetings alone, and informal, unscheduled meetings or contacts alone in diffusing recommended agricultural practices in selected villages

representing the coastal zone. The measurement was done by examining a number of factors that were expected to affect land and labour productivity, village development increase, and villager's responsiveness to the agricultural extension methods applied in respect of levels of knowledge and rate of adoption of recommended farming practices using mainly simple and multiple regression analyses. An upward shift in the multiple regression equation, measured by use of 0-1 variables, was expected for those villages using extension methods which were expected to be most effective in transmitting to the farmers recommended farming practices.

7.2. Results of the Study Based on Analysis of Variance

7.2.1. Difference Between Group-Based Agricultural Extension Programmes

Differences between group-based agricultural extension programmes are indicated by the averages for each independent variable involved under each programme (Table 7.1). According to the hypotheses, programmes or methods were expected to differ significantly from each other in respect of their effects on the dependent variables.

Results of an analysis of variance (ANOVA) for each factor, supplemented by least significant difference (LSD) tests in those cases in which the ANOVA identified significant differences, show that there are no significant differences between the three group-based extension methods in respect of knowledge level, rate of

small and the annual range for mean highs or lows is smaller than the daily range. The mean annual temperature ranges between 23° and 28°C. At no time does temperature impose a total restriction on agricultural and pastoral pursuits, except indirectly by its contribution to evapotranspiration.

Most coastal zone villages experienced severe droughts during the 1972/73 and 1973/74 crop seasons covering half of the study period. In these two crop seasons, crop yields were drastically reduced. This reduction affected calculations for income per ha and per man-day.

In respect to rainfall, the survey villages can be divided into two groups. Villages along the Morogoro-Chalinze-Tanga main road form one group with some common characteristics. This group includes Sinya Ulime in Morogoro District; Mdaula, Dwilingu, Malivundo, Mboga, Lunga and Msata in Bagamoyo District; and Mkata (H), Manga, Kitumbi, Segera, Mazingara and Komkonga in Handeni District. These villages experience a triennual rainfall pattern which at times goes below 700 mm and seldom goes above 1000mm. West of the line of the Ruvu River, water is chronically short. Water supplies in most of these villages are almost entirely from natural water pools, most of which dry up during severe dry conditions. Generally water is insufficient for human, livestock, and agricultural activities.

The second group of villages comprises Kauzeni, Kizinga, Kikundi, Mkata and Lukobe in Morogoro District; and Kwamsisi, Kiloza, Kiluwani, Mlembule, Magamba and Chekelei in Korogowe

District. The average annual rainfall for these villages is 1400-1800 mm so that water is not so much of a problem. These villages are located on higher altitudes than those in the first group. With the exception of Kauzeni in Morogoro District and Mlembule in Morogwe District, which are on the main roads, the villages are far away from the main road and less people are engaged in commercial or trading activities. Due to differences in rainfall between the two groups of villages, the second group does slightly better in crop production than the first group. Major cash crops and marketing facilities for the two groups are the same.

4.2.2. Indirect Effects

Indirect effects of rainfall on the overall survey results was caused by serious scarcity of water in the zone resulting from inadequate amount of rainfall. Water scarcity compelled villagers to walk sometimes over six km in search of water. In so doing they wasted time and energy, both of which could have been otherwise used in productive work such as farming. Water scarcity in the coastal zone is one of the most serious problems faced by villagers and indirectly retards both the social and economic development of the zone.

Three types of costs are incurred by villagers in the process of hauling water: Energy cost, opportunity cost, and limiting cost. The unit cash price that an urban dweller pays for his water can be determined. It is harder to give a cash price to the energy his rural cousin may use in carrying water home. However, the method adopted by researchers on this subject is to estimate

the amount of energy used and then determine the amount of staple food required to supply this energy and the price of that amount of food (White, 1972, pp. 93-97). The same approach could be repeated to calculate the cost of energy expended by villagers fetching water in the coastal zone villages.

When calories are converted into cash, as in the above-mentioned calculations, the question of the opportunity cost of the time and energy arises. In carrying water, the woman sacrifices the opportunity of do something else, perhaps something which would produce a greater return for her labour. In a situation where the carrier could find no productive alternative employment of her time and energy, the opportunity cost for her carrying water becomes zero, from society's point of view. In this zone, as in many parts of Tanzania, the women do much of agricultural work which occupies the largest share of the time of a majority of married women. Table 4.2 shows water sources to the villages. As can be seen, most villages get water from natural water pools. Villagers using these pools have to travel long distances because natural water pools are not permanent water sources near which villages can be established.

Extreme distances to water sources often limit human settlement in particular areas only. There are several areas in Handeni and Bagamoyo Districts with high potentials for agricultural and other types of development. Resources in these areas have not been fully exploited mainly because of water or rainfall shortages.

Table 7.2. Averages for dependent variables per village when arranged by type of extension programmes in each District[1/]

Programme	Income				Adoptions 2/	Knowledge 2/	Development increase 3/
	Per ha		Per man-day				
	Individual plots	Communal plots	Individual plots	Communal plots			
	T.Shs.				No.		
	Demonstrations together with formal scheduled group discussion meetings						
Bagamoyo	968	408	7.2	5.0	5.0	8.5	0.50
Handeni	671	380	5.4	6.6	6.0	7.5	0.00
Korogwe	907	808	6.8	6.0	7.0	10.5	1.00
Morogoro	1147	333	8.7	2.5	7.0	8.5	0.50
	Formal scheduled group discussion meetings only						
Bagamoyo	654	552	4.7	4.9	5.0	10.0	0.50
Handeni	717	338	5.3	2.7	5.5	10.5	1.00
Korogwe	886	336	6.6	2.5	3.5	4.0	1.00
Morogoro	641	343	1.8	2.8	4.5	6.0	0.50
	Informal unscheduled general meetings or contacts						
Bagamoyo	493	335	3.8	2.2	4.5	3.0	0.00
Handeni	721	317	5.3	2.5	5.0	7.5	0.50
Korogwe	672	185	5.5	0.9	5.5	6.5	0.00
Morogoro	696	457	4.3	3.5	7.0	4.5	1.50

Source: Research results.
1/ For details see appendix A-2.
2/ and 3/ (Same as for table 7.1.)

Difference between Districts for methods in respect of rate of adoption are not significant. This is likely due to the similarity of factors affecting adoption rates in the villages (as discussed in Chapter VI), one of them being the poor financial position of villages. Korogwe is significantly lower than Bagamoyo and Handeni Districts for formal scheduled group discussion meetings only in respect of level of knowledge of recommended

farming practices. One possible reason is that some villagers in Korogwe District—particularly Magamba, Mlembule and Kiluwani—were not interested in attending formal scheduled discussion meetings. Handeni District is significantly lower than Bagamoyo, Korogwe and Morogoro Districts for demonstrations together with formal scheduled group discussion meetings in respect of village development increase. The reason is that Handeni had the largest number of traditional villages or minor settlements. This means that these villages had already acquired most of the amenities used as indicators for village development increase before the village was established. For the same reason Bagamoyo District is significantly lower than the other three Districts for informal unscheduled meetings or general contacts in respect of village development increase.

7.2.3. Differences Between Districts in Relation to Nature of Activities

It was expected that Districts would react differently or carry-out communal activities at varying levels of effectiveness depending on the political awareness and degree of commitment to communal activities of their respective residents. The degree of commitment presumably would affect income obtained per ha and per man-day although it is realized that other factors also would be of importance. These were, however, controlled to some extent by ANOVA. Table 7.3 shows averages for income per ha and income per man-day in respect of individual and communal types of farming systems for each of the four Districts under study. Results show

that there are some differences between coastal zone Districts in respect of these income variable averages but none of these differences were statistically significant.

Table 7.3. Averages for communal and individual fields per village in respect of income per ha and per man-day for each District

District	Income			
	Per ha		Per man-day	
	Individual plots	Communal plots	Individual plots	Communal plots
	T.Shs.			
Bagamoyo	705	432	5.2	3.6
Kandeni	703	345	5.3	3.5
Korogwe	821	442	6.3	2.8
Morogoro	828	378	4.9	2.6
Average	764	399	5.4	3.1

Source: Research results.

7.2.4. Differences Between Nature of Activities in Relation to Extension Programmes

LSD results show significant differences between communal and individual types of farming systems in respect of income per ha and per man-day under all three types of group-based agricultural extension methods (Table 7.4). A significant difference also exists between the overall averages of individual and communal types of farming systems in respect of the same variables as shown by the ANOVA. This situation is what was expected under present socio-economic and villagers' level of understanding, acceptance, and commitment to communal activities or to villagization and Ujamaa policy in general. Possible causes for such differences are explained in Chapter VIII.

Table 7.4. Averages for income per ha and per man-day per village in respect of individual and communal types of farming systems under the three types of extension programmes[1/]

Extension programme	Income			
	Per ha		Per man-day	
	Individual plots	Communal plots	Individual plots	Communal plots
	T.Shs.			
Demonstrations together with formal scheduled group discussion meetings	923	482	7.0	4.4
Formal scheduled group discussion meetings	724	392	4.6	2.7
Informal unscheduled meetings or contacts	645	324	4.7	2.3
Average	764	399	5.4	3.1

Source: Research results.
1/ For details see appendices A-3 and A-4.

7.3. Multiple Regression Equations and Correlations

7.3.1. List of Computer Code Names and Units Used

Code names were assigned to all variables used in the analyses to facilitate the handling of these variables by the computer. Below is a list of code names and the units used for their measurement:

Dependent Variables

INCHA - Income per ha in T.Shs

INCMD - Income per man-day in T.Shs

ADOPT - Adoption: Number of recommended practices adopted, e.g. application of fertilizers, insecticides, and so on

KNOW - Knowledge: Number of recommended farming practices known by the villager or farmers

DEVIN - Development increase: The difference between the number of amenities (schools, dispensaries, markets, etc.) found in the village before the beginning of the study and those after the completion of the study

Independent Variables

AID - Amount of aid given to the village by the government or other donors per year in T.Shs

CONTA - Contacts: Number of visits the agricultural extension worker made to the village per month

FIDEV - Final development: Development level reached by the village measured in terms of number of amenities found in the village at the end of the study

INDEV - Initial development: Development level of the village at the beginning of the study measured in terms of number of amenities (see above)

PCLIT - Percent literacy: Average percentage of villagers who can read and write

PODEV - Potential for village development: measured in terms of good land, roads, markets, nearness to town, and so on

DUMM - 0-1 variable (1-Demonstrations together with formal group discussion meetings)

MONLY - 0-1 variable (1-Formal scheduled group discussion meetings only)

BAGAN - 0-1 variable (1-Baganoyo District)

KORO - 0-1 variable (1-Korogwe District)

MORO - 0-1 variable (1-Morogoro District

In the multiple regression equations shown in this overall section, variables that entered with signs contrary to theoretical expectations are omitted. The reader can check the variables included versus the list of all variables shown above to see which ones were omitted. The District 0-1 variables also are omitted here but are shown in the comparable equations in Appendices A-6 and A-7. However, results from these equations are summarized here. Standard errors are shown in parentheses below the regression coefficients, and statistical significance is indicated by a single asterisk (*) at P = 0.05 and a double asterisk (**) at P = 0.01. For the regression coefficients, a 1-tailed test was used, since signs were presumed to be known.

7.3.2. Results for Individual Farming Systems

Results in Appendix A-6 show that the value of the R^2 are all 0.47 or less for the equations. This means that factors that are not included in the analysis in all cases are important even when adjustment for average variability by Districts using 0-1 variables has been made. When District variables are not included in the equations, the highest R^2 is 0.35. The only R^2 that differed significantly from zero was the one for income per ha when the District variables were omitted.

In all analyses, with the exception of the two for village development increase, the expected positive sign for demonstrations

together with formal scheduled group discussion meetings was obtained. For 5 of the 8 analyses for which demonstrations together with formal scheduled group discussion meetings entered with a positive sign, the coefficients were statistically significant, 4 analyses at P = 0.05 and 1 at P = 0.01. Thus demonstrations together with formal or scheduled group discussion meetings have a statistically significant effect on these dependent variables.

The expected positive sign for formal scheduled meetings only was obtained in 8 out of the 10 analyses and for 4 of these the coefficients were statistically significant.

The five regression equations omitting the District 0-1 variables are shown in table 7.5 based on the code names listed in section 7.3.1.

Of the other variables included initially in the multiple regressions, only a few entered with the expected positive signs. Aid was one of these in the equations for income per ha and per man-day and for village development increase. Those for the income variables were statistically significant. This is to be expected because the aid component in this context should be viewed as a means for the village to acquire the inputs demanded by the recommended farming practices which may eventually lead to increased income and hence to increased village development. The percent literacy came into the equations for adoption and knowledge of recommended farming practices. Contacts and potential village development entered the equation for village development increase, with contacts being statstically significant. All these results seem reasonable.

Table 7.5. Individual plots: Multiple regression equations that omit the 0-1 variables for District[1/]

Equation	R^2	F	S	D.F.
INCHA = 587.2 + 274.0 DEME* + 94.57 MONLY + 0.07028 AID* (111.6) (108.64) (.03190)	0.35*	3.81*	223	21
INCID = 4.506 + 2.016 DEME* + 0.6416 MONLY + 0.0004513 AID* (0.875) (0.8512) (0.0002499)	.30	3.03	1.8	21
ADOPT = 2.4 + 0.05954 PCLIT + 1.124 DEME* (0.04446) (0.560)	.23	3.46	1.3	22
KNOW = 2.1 + 0.07562 PCLIT + 3.176 DEME** + 2.441 MONLY* (0.08455) (1.242) (1.191)	.30	3.03	2.4	21
DEVIN = 0.9 + 0.1377 CONTA* + 0.07044 PODEV + 0.6423 MONLY* + 0.0000876 AID (0.0575) (0.21147) (0.2980) (0.0000982)	.33	2.50	.7	20

Source: Survey results.

1/ A single asterisk indicates statistical significance at P = 0.05 and a double asterisk at P = 0.01. A 1-tailed test was used for the partial regression coefficients since the sign was specified in advance. Only variables with positive regression coefficients were retained in the multiple regression analyses except for those that relate to the individual Districts. Analyses are shown both with and without the 0-1 variables for Districts in Appendix A-6.

These results agree with the hypotheses. They confirm that multiple regression analysis was a useful analytical tool because such results would have been difficult if not impossible to achieve by simpler methods of analysis.

The fact that adoption and knowledge of recommended farming practices did not enter with the expected signs for income per ha and per man-day is understandable. The knowledge and eventually the adoption of the recommended farming practices for increased income per ha and per man-day depend not only on the profitability and risks associated with the recommendation package but also on the availability of inputs, the financial capability of the farmer to afford the costs of inputs demanded by the recommended farming practices, markets for the products, and farmers' motivation. Moreover the income variables are indirectly affected by weather and vermin attacks on crops. It can be argued on this basis that adoption and knowledge did not enter with the correct or expected signs for income per ha and per man-day primarily because of situational constraints. The fact that adoption did not enter with correct signs suggests that the total package of recommendations may not have been too important under the conditions that prevailed.

7.3.3. Results for Communal Farming Systems

These analyses and tests of significance were handled in the same way as in the preceding section. Results when the District variables are omitted are given in table 7.6, and both sets of equations are shown in Appendix A-7.

Table 7.6. Communal plots: Multiple regression equations that omit the 0-1 variables for District[1]/

Equation	R^2	F	S	D.F.
INCHA = 4.0 + 58.14 ADOPT + 114.8 DEME + 129.0 MONLY (34.01) (101.7) (99.8)	0.21	1.84	197	21
INCHD = 0.925 + 0.01542 PCLIT + 0.1453 CONTA + 0.2815 ADOPT + (0.0784) (0.1842) (0.3932)				
2.728 DEME + 1.114 MONLY (1.152) (1.35)	.34	1.92	2.2	19

Source: Survey results.

1/ Same as for table 7.5 except that details are in Appendix A-7.

Results in Appendix A-7 show that the value of the R^2 are all 0.44 or less. This means again that factors not included in the analyses in all cases are also important even after the adjustment for average variability by District based on 0-1 variables. When District variables are excluded in the equation, the highest R^2 is 0.34.

There was again the expected positive signs on demonstrations together with formal scheduled group discussion meetings in all analyses but none of the coefficients for this variable were statistically significant. These results are not surprising because of the many problems associated with communal activities in most villages studied. There was also the expected positive sign on scheduled group discussion meetings in all four analyses but none of these were statistically significant.

Of all other variables considered, only three entered with the expected positive signs. These were adoptions for income per ha and per man-day and percent literacy and contacts for income per man-day. None of these variables were statistically significant.

7.4. Simple Correlation Coefficients

7.4.1. Results for Individual Farming Systems

Table 7.7 gives the simple correlation coefficients between each dependent variable and the several independent variables that were statistically significant. Results show that the only significant positive r is for demonstrations together with formal

scheduled group discussion meetings in respect of income per ha. This confirms the importance or effectiveness of demonstrations together with formal scheduled group discussions meetings in promoting sound agricultural practices. For income per man-day, demonstrations together with group discussion meetings had a statistically significant negative effect. It was necessary here to control for other factors to bring out the expected positive relation as found for the multiple regression analysis.

Table 7.7. Individual plots: Simple correlation coefficients between dependent and independent variables that are statistically significant[1]

Dependent variable	Independent variable	r
Income:		
Per ha	Demonstrations together with formal scheduled discussion group meetings	0.43
Per man-day	Demonstrations together with formal scheduled discussion group meetings	-.42
Adoptions[2]	Demonstrations together with formal scheduled discussion group meetings	.42
	Formal scheduled discussion group meetings only	.46
Knowledge[2]	None	
Development increase for village[3]	Percent literary	-.43
	Adoptions	-.44

Source: Research results.
1) For correlations not included here due to lack of statistical significance, see top of appendix A-6.
2) Of specific husbandry recommendations.
3) Increase over 4 years in village amenities.

For the adoption rate, demonstrations together with formal scheduled group discussion meetings and formal scheduled group discussion meetings only (MONLY) were both statistically significant. This is to be expected because both are means of promoting these practices to the farmer.

Percent literacy and adoptions each had a significant negative relation to village development increase. These statistically significant negative correlations could have arisen by chance (1 out of 20) when the true r is equal to zero.

Table 7.8 shows the simple correlations among independent variables for the individual plots that were statistically significant. Initial village development is positively related to both extension contacts and potential village development. These findings suggest that village level agricultural extension workers work more with developed villages. In fact there is a tendency of posting extension workers in relatively developed villages under the expectation they will supervise other villages in the vicinity. There appears to be a slow but continuous reversion in the agricultural extension approach from the present group or village approach to a "progressive village approach" which is similar to the "progressive farmer approach" used during colonial times. The only difference is that the emphasis now is on the village rather than the individual farmer. This approach should be as objectionable as "the progressive farmer approach" for the same basic reasons given in chapter II. These results suggest that a high initial village development means a greater likelihood of potential

development of the village and vice versa. Such an extension approach might lead to a situation whereby developed villages will become more developed and the underdeveloped will remain at a status quo or even deteriorate (the rich shall get richer). This is a situation which is contrary to socialist development which the country is persuing.

Table 7.8. Individual plots: Simple correlation coefficients among independent variables that are statistically significant 1/

Independent Variable		r
First	Second	
Extension contacts	Initial village development	0.54
Potential for village development	Initial village development	.42

Source: Research results.

1/ A correlation between the 0-1 variable for type of extension programmes is omitted since it was caused by the experimental design.

7.4.2. Results for Communal Farming Systems

Table 7.9 for communal plots is comparable to table 7.7 for individual plots. It shows that there is a significant negative relation between adoptions and formal scheduled group discussion meetings. This can be ignored since both demonstrations together with formal scheduled group discussion meetings and formal scheduled group discussion meetings entered with positive signs for the income variables in the multiple regression equations. Demonstrations together with formal scheduled group discussion meetings were positively related to a statistically significant extent for both adoptions and income per man-day.

Table 7.9. Communal plots: Simple correlation coefficients between dependent and independent variables that are statistically significant[1/]

Dependent variable	Independent variable	r
Adoptions[2/]	Demonstrations together with formal scheduled group discussion meetings	0.42
	Formal scheduled group discussion meetings	-.44
Income per man-day	Demonstrations together with formal scheduled group discussion meetings	.52

Source: Research results.
1/ For correlations not included here due to lack of statistical significance, see top of Appendix A-7.
2/ Of specific husbandry recommendation.

With reference to the significant correlation coefficients among the independent variables for communal plots (Table 7.10), initial village development is positively related to extension contacts and potential and final village development. The reasons for this were discussed in section 7.4.1.

Table 7.10. Communal plots: Simple correlation coefficients among independent variables that are statistically significant[1/]

Independent variables		r
First	Second	
Extension contacts	Initial village development	0.54
Potential for village development	Initial village development	.42
Final village development	Initial village development	.53

Source: Research results.
1/ A correlation between the 0-1 variables for types of extension programmes is omitted since it was caused by the experimental design.

7.5. Graphic Analyses to Test for Curvilinearity

Scatter diagrams for selected variables for individual farmers within selected specific villages were made in order to examine more fully the relationship between dependent variables. These diagrams were designed to indicate whether curvilinearity was a problem in the linear regression results. For making these diagrams, three villages were selected from each District such that one village represented each of the three group-based agricultural extension methods under study. In order to avoid as much as possible exogenous factors, villages selected were those that are not too close to towns, sisal estates, or minor settlements or villages that experienced vermin attacks on crops. Figures 7.1 and 7.2 show relationships between variables which had some indications of curvilinearity. Those that had little or no indications of curvilinearity are omitted.

The suggested curves appeared to be of a type that could be fitted by converting both variables to logarithms. This was done, and regressions were run based on both the linear and logarithmic relations. For income per ha versus knowledge of recommendations, the r^2 for both for the 120 farmers was the same, namely 0.58. For income per ha versus number of adoptions of recommended farming practices, the r^2 for the linear relation was 0.52, while that for the logarithmic relation was 0.42. Thus, at least for the type of curve tested, nothing is gained by a curvilinear versus a linear relation. All relations were positive and all were statistically significant.

There was little relationship between number of adoptions of recommended farming practices and knowledge of these practices or between the number of extension contacts and knowledge of farming practices. Scatter diagrams for these relationships are not shown due to their weak relationships. Nevertheless these results suggest that the larger the number of contacts the agricultural extension worker makes with particular villages the higher likely will be villagers' level of knowledge of recommended farming practices. Also, the higher the level of knowledge of farming practices, the more likely will be a high rate of adoption of these practices.

7.6. Village Distribution Among Dependent Variables in Relation to Extension Programmes

There is a clear distribution of villages among the five dependent variables used in the study. There were also noticeable differences among villages particularly in relation to village development increase (DEVIN),

7.6.1. Knowledge of Recommended Farming Practices (KNOW)

An examination of villages with high knowledge scores of recommended farming practices shows that 80 percent of these were exposed to either formal scheduled group discussion meetings alone or to demonstrations together with formal scheduled group discussion meetings. This suggests that the high level of knowledge of recommended farming practices was a result of the extension

FIGURE 7 : RELATIONSHIP BETWEEN KNOWLEDGE OF RECOMMENDED FARMING PRACTICES AND INCOME PER HA

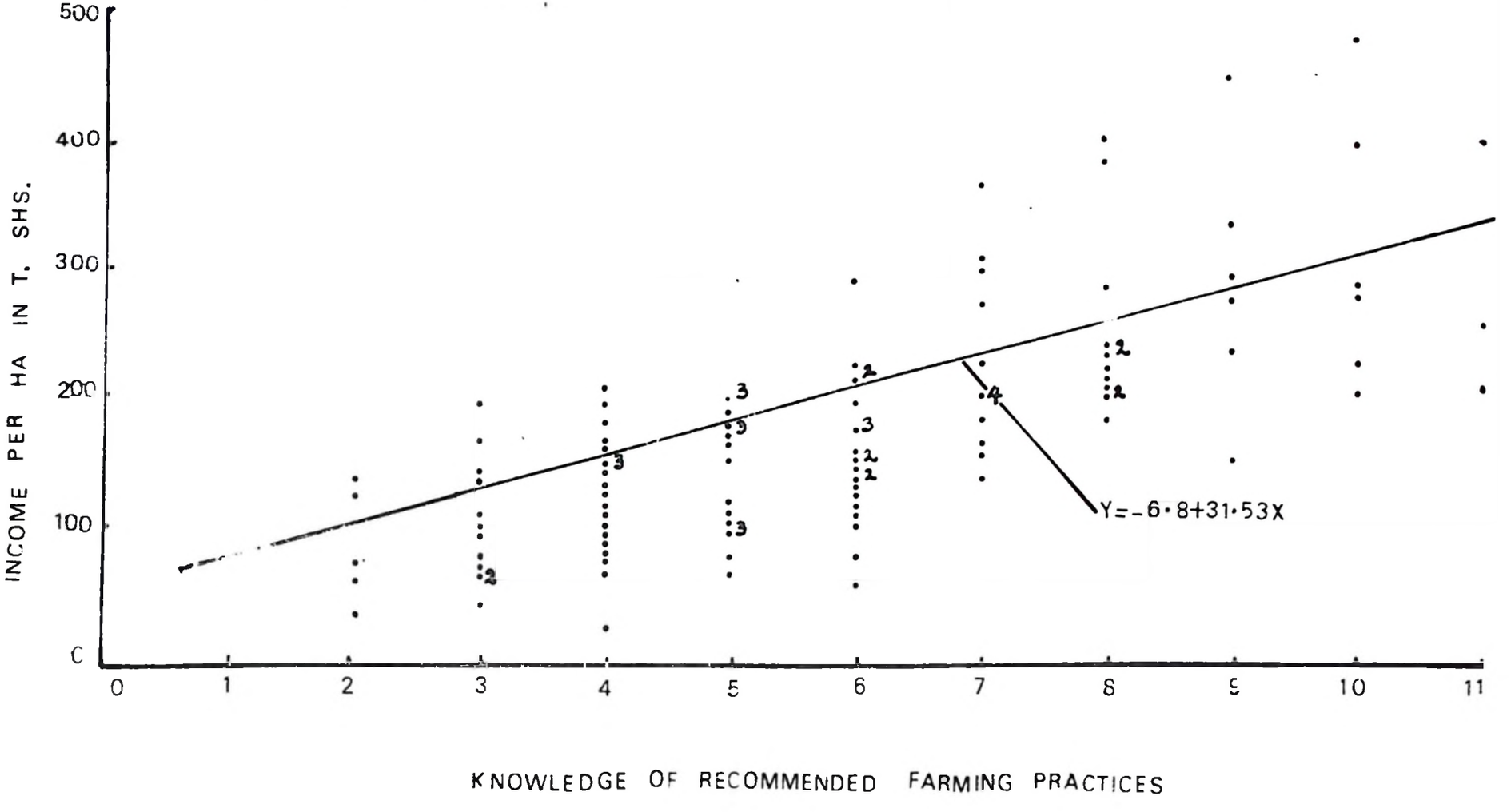


FIGURE 7 : RELATIONSHIP SETWEEN KNOWLEDGE OF RECOMMENDED FARMING PRACTICES AND INCOME PER HA

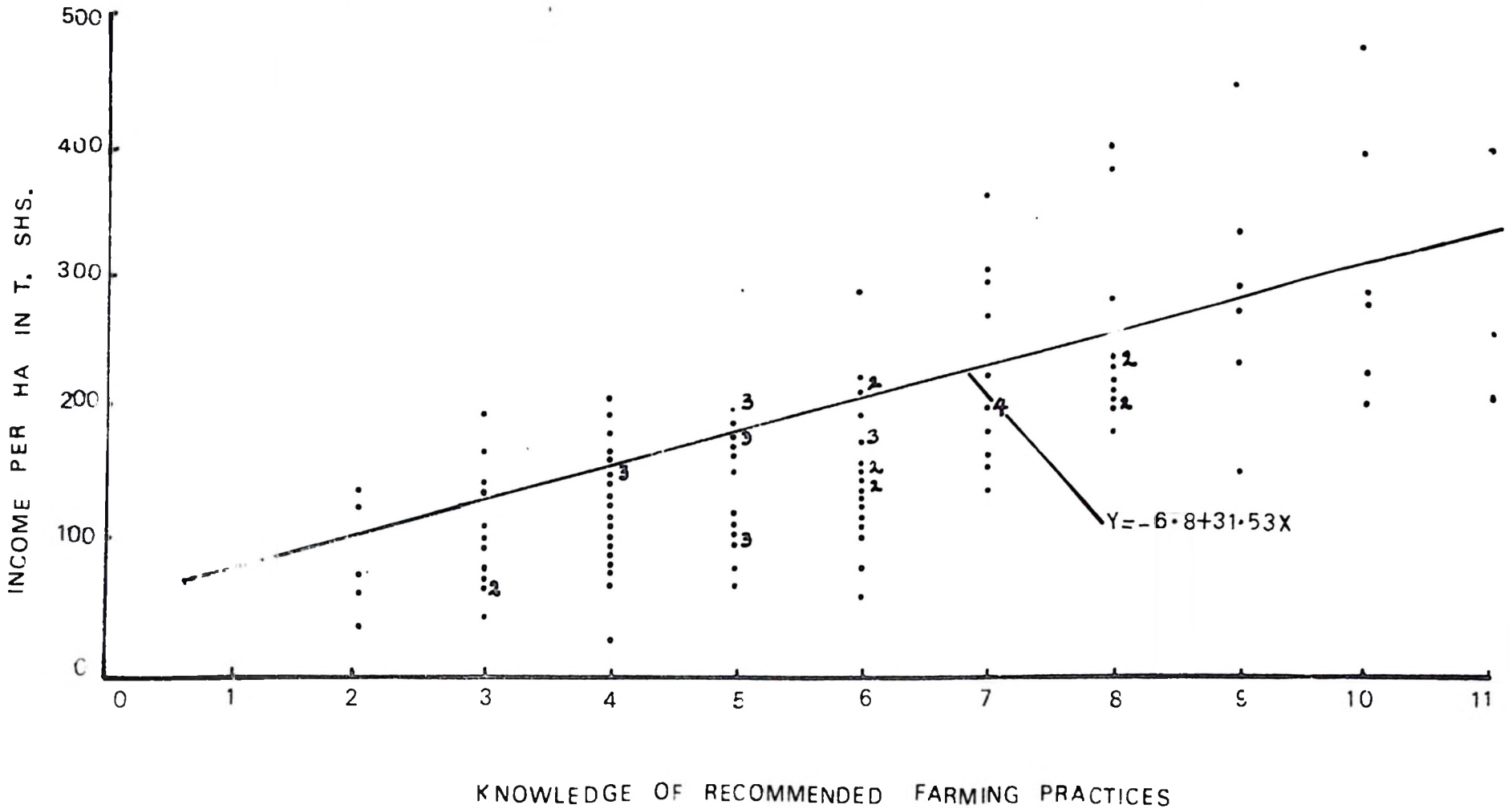
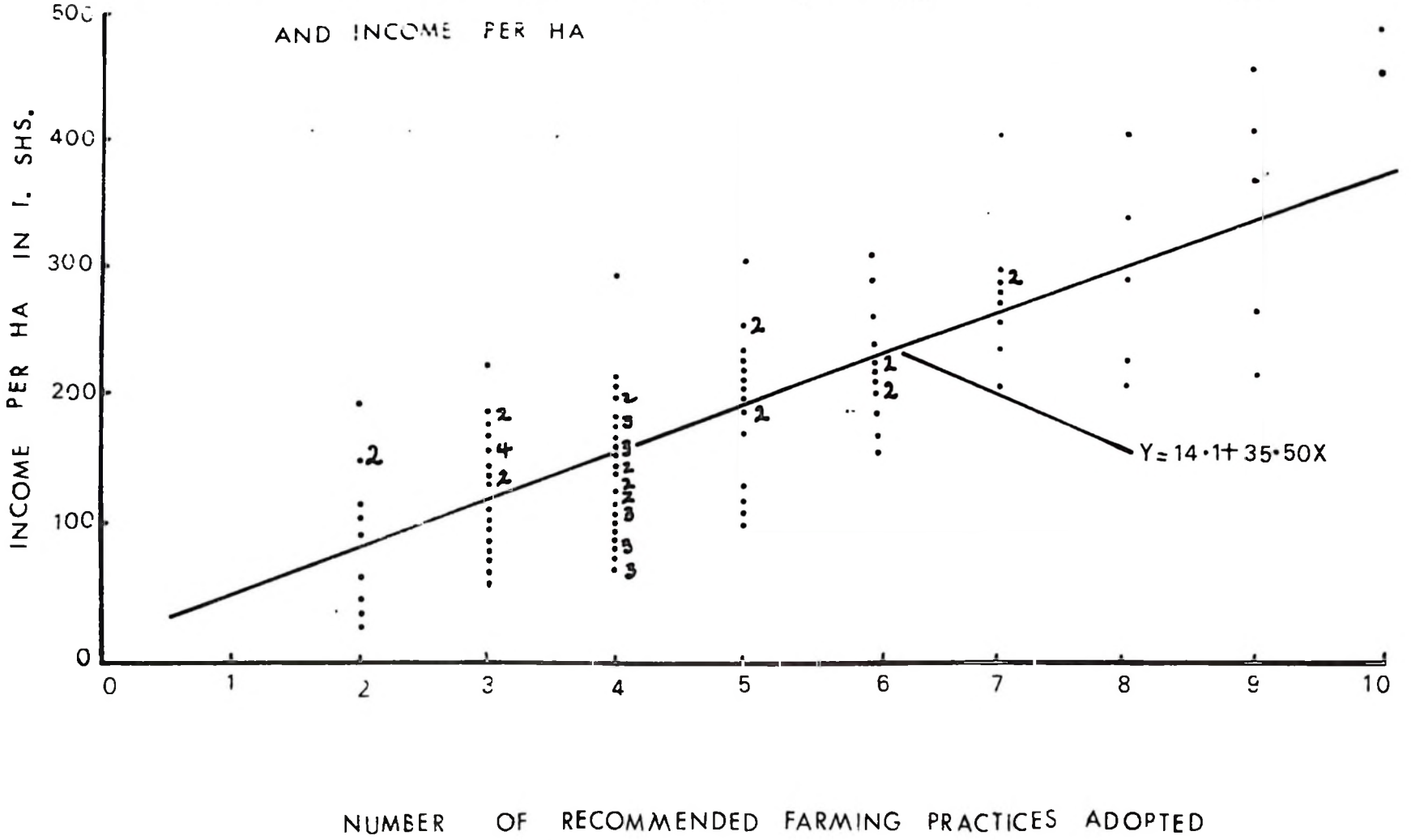


FIGURE 7·2 RELATIONSHIP BETWEEN ADOPTION OF RECOMMENDED FARMING PRACTICES AND INCOME PER HA



programmes applied in these villages in teaching farmers about these practices. It confirms the hypothesis that extension methods applied in these villages were more effective than those applied in the other villages.

All these villages are located along the main road and so had no transport problems. The agricultural extension workers in this area had easy access to these villages. Moreover more than 50 percent of these villages had agricultural extension workers living within them. Results show that these villages had the highest scores of extension contacts with extension workers. All this suggests that the higher the rate of contact between the extension worker in teaching villagers recommended farming practices, the higher the villagers' knowledge of these practices. Survey results show that these 15 villages have on average a slightly higher literacy percentage rate than the rest of the villages.

7.6.2. Adoption of Recommended Farming Practices (ADOPT)

Survey results show that villages with high adoption rates of recommended farming practices are also the same villages as those discussed above, in which either formal scheduled group discussion meetings alone or demonstrations together with formal scheduled group discussion meetings were conducted. This high adoption rate is attributable to the extension programmes applied in these villages which were more effective than the programmes applied in other villages. These methods help in convincing or persuading villagers to adopt recommended farming practices.

There is some evidence from the work of Hruschka and Rheinwald (1965) and Erasmus (1961) that innovations that are "visible" (demonstrable) will be more readily adopted by farmers than those that are not. Erasmus has probably put his finger on the cause when he reports, "The results of adoption were so highly visible and widely discussed ..... that it was not necessary to convince the local villagers." The fact that the innovation was widely discussed suggests that the experience was shared by the demonstrators and village members. It is generally accepted that attitudes are both formed and changed by interaction (Homans, 1959). This suggests that "visibility" accompanied by demonstration stimulates interaction which changes attitudes and influences adoption. So, visibility is an appropriate variable for predicting adoption behaviour.

Villages found to have high adoption rates also had slightly higher incomes per ha than the average for all villages. Some important recommended farming practices such as use of fertilizers, insecticides, modern equipment, and improved seed varieties require financial capability on the part of the villager for their adoption. It is logical that villages with above average incomes were better able to adopt these practices or innovations.

Survey results indicate that the majority of household heads in these villages are between 45 and 60 years old. It appears that elderly and younger villagers are somewhat less inclined to adopt new farming practices than the middle-aged villagers. Lionberger (1964, p.86) states that young farmers who may desire

to make changes in farming are not always in a position to do so because of capital restriction or because final decisions may rest with the moneylender or with the person who owns the farm.

Over 70 percent of these villages were long established or had evolved from traditional villages. This situation implies that villagers concentrated their financial and labour resource in improving their farming activities in contrast to newly-established villages in which villagers are busy getting themselves settled in new sites, concentrating their resources in building houses and preparing infrastructure. Most newly-established villages are located on virgin lands having their natural fertility unexploited and hence do not require artificial fertilization initially and also their fields have not accumulated insect pests and crop diseases. As a result the question of using fertilizers, insecticides, plant disease control measures, and practicing of crop rotation in order to increase or replace depleted soil fertility did not arise. This situation also accounts in part for the low adoption rate of recommended farming practices in newly-established villages.

7.6.3. Income Per Ha (INCHA)

Most villages with high income per ha have high adoption rates and high knowledge of recommended farming practices. Most of these villages are located on the main road. This suggests that these villages because of their favourable financial position are capable of adopting more of those recommended practices that require capital investment than villagers with low income per ha.

Villagers with a high level of knowledge of recommended farming practices are more likely to adopt these practices and consequently increase their income per ha than villages with low knowledge level of these practices. These villages had a high rate of extension contacts because of easy means of communication at the disposal of the extension workers since these villages are on the main road. As previously seen, this situation resulted in a higher level of knowledge and consequently in a higher rate of adoption of these practices.

7.6.4. Village Development Increase (DEVIN)

Out of 24 villages surveyed, 12 experienced some increase in development within the period of four years. Out of the villages which experienced increased development, the two with largest increase were Mkata in Morogoro District and Kiloza in Korogwe District. Great increase in development in Mkata was induced by the TANU Chairman for Morogoro District who selected Mkata village as his residential or home village. As a District Chairman of the Party, other leaders were influenced to support the village. Through his influence he caused the provision of several amenities. In addition to this, Mkata was a settlement scheme with certain facilities already provided before it was registered as a village, so there was a cumulative effect of these facilities and hence increased development. The large increase in development in Kiloza village is attributable to a combination of extremely good leadership which was stable, capable, and committed to the work, positive response of villagers to the leadership; high degree of

work organization, and finally to effective agricultural extension methods applied in the village (demonstrations together with formal scheduled group discussion meetings) which increased village's income and consequently its ability to accelerate its development.

The lesser development increase in the other 10 villages is due to a combination of factors, the most important being extension methods used in most of these villages whose effectiveness is reflected in increased production, good leadership and work organization for some villages; and finally due to government aid which ranged from T.Shs. 23,400 to T.Shs. 660,000 in this group of 12 villages.

Two villages, Segera and Kauzeni, experienced a slight decrease in development in spite of the fact that effective extension methods were applied in them. This situation is explained by extremely poor leadership, lack of work organization and villages' proximity to the sisal estates in the case of Segera village and to town in the case of Kauzeni village. In both cases participation in communal activities which help in creating and maintaining village amenities such as cooperative shops, hotels, and construction of building such as offices and schools, was poor. As a result, some amenities that had been established at the beginning of the study such as cooperative shops and hotels had stopped operating in the final year of this study.

7.7. Effect of Aid on Adoption of Recommended Farming Practices and on Village Development Increase

7.7.1. Aid Given to Villages

Although aid given to villages had effect on the adoption rate of recommended farming practices, as mentioned earlier, this effect was not as great as might have been expected. One reason is that aid was given mainly in the form of materials. Some materials given had little direct relationship to the recommended farming practices. A good example is aid in the form of grain grinding mills or building materials such as cement. The second reason is that in some villages there was misuse of aid given, particularly cash. These two reasons minimized the influence of aid on the adoption rate of innovations. For instance the three villages which received the largest amounts of aid (Table 5.10, Chapter VI) had adopted only half of the recommended practices.

7.7.2. Village Development Increase (DLVI)

Development increase of villages was influenced by aid to a great extent. Most forms of aid given are development oriented or have direct relationship with village development. As already noted, 12 of the villages in the study experienced development increase and received substantial amounts of government aid. Freyhold (1970) does not approve of the provision of government aid in forms of social services such as dispensaries, piped water, or water wells. She argues that these services are not productive and therefore not development oriented. She further claims that

the provision of these services create villages' dependence on the government. The author disagrees with this contention because it overlooks the indirect effect of the social services on production and consequently on development. If villagers can be treated for illnesses and can get water within the villages, they save much time and energy to do productive activities which are development oriented. Moreover, the mere fact of having piped water in the village is itself a sign of development.

7.8. Divergence Between Adoption and Level of Knowledge of Recommended Farming Practices

There is a great difference for some individual villages between their knowledge and their adoption scores in respect of recommended farming practices. The difference is not spread equally among villages but is most marked in four villages which adopted less than half of the recommended practices that they knew. It was originally expected that all villages with high knowledge scores would have corresponding high adoption scores. The observed situation shows that this is not always true. It also gives the impression that knowledge of recommended farming practices may be a better measure of extension impact than practice (adoption) indices because the latter are subject to many retarding social, cultural, personal, and situational factors surrounding the farmer under Tanzanian conditions.

Many research workers have thrown doubts on the assumption that it is lack of knowledge that retards the adoption of

innovations. Wilkening (1952) says "there is little evidence that lack of knowledge about innovations actually delays their adoption." Ryan and Gross (1943) state "it is evident that ... isolation from knowledge was not a determining factor in late adoption for many farm operators." Tully, Wilkening and Bresser (1964) showed that lack of knowledge of herd testing and its benefits did not account for non-adoption of this practice.

Communication research has also suggested that facts may be communicated without producing attitude change which they are intended or expected to produce. What appears to happen is that the facts communicated many simply not be recognized as pertinent to the attitudes they are intended to change. One might infer that this arises from the individual's inability to perceive the relationship, or perhaps, from his selective perception of what is relevant to his situation.

In Tanzania, where lack of information (knowledge) is an important factor in adoption of innovations, where poor financial position of farmers hinders adoption of recommended innovations, and where lack of effective extension communication means affects the adoption of innovations, knowledge is a better measure of the impact of extension service than adoption.

Reasons why farmers adopt practice more quickly at one time than another relate to the situation in which they find themselves when alternative courses of action become known. Although situational factors affecting the adoption of an innovation are many and varied, only three are dealt with here. These are farm

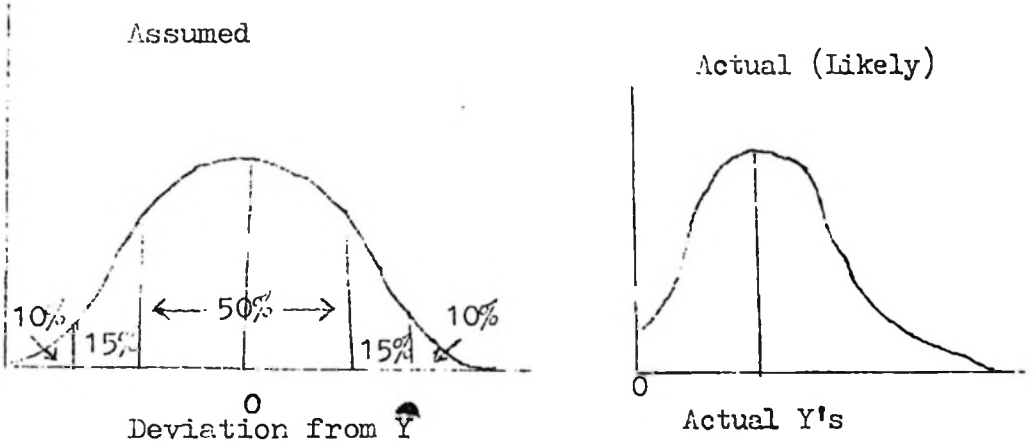
income, drought and farming practices or operations.

The divergence of the two variables (knowledge and adoption) in the four villages was mainly due to: (a) Poor financial position: some of the innovations recommended, such as use of fertilizers, insecticides, better varieties of seeds, and various farming equipment, require financial expenditure before they are acquired or adopted. The four villages are among those in rather poor financial position. High farm income nearly always is associated with high farm practice adoption levels (Lionberger, 1964, p.100). In addition to this, the four villages are among those that received little government aid, which ranged from T.Shs. 1150 to T.Shs. 58,000 over the 4 years. (b) Drought: the four villages under discussion were badly affected by drought for two consecutive years during the study period. The unreliability of rainfall in the coastal zone discourages farmers from investing money in farming innovations because they are not sure of returns for their investment. (c) Farming practices: due to unreliability of rainfall, farmers are discouraged from working hard and looking after their fields properly because they are not sure as to whether their efforts will be rewarded at the end of the crop season; as a result some not only plant seeds haphazardly without using recommended spacing but also ignore the weeding completely. These were major causes for the great divergence among villages between knowledge and adoption scores of recommended farming practices.

7.9. Analysis of Residuals for Multiple Regressions in Relation to Farm Income

By use of a t - table, deviations $(Y-\hat{Y})$ were split as shown on the left side of figure 7.3. This was done by tabulating for appropriate degrees of freedom $t_{0.2}$ and $t_{0.5}$, remembering that these leave half of the indicated probability in each tail. The actual distribution of Y is truncated (i.e. negative actual Y's cannot occur) and likely is skewed to the right (as shown on the right side of figure 7.3), so the t - distribution does not give a perfect allocation into the respective groups. Deviation, however, are more likely to be approximately normal than the initial Y's.

Figure 7.3. Theoretical distribution of residuals from regressions relating to farm income



Multiplication of the "Residual error" from the computer print out by the appropriate t-values gave cut-off points for each group for each analysis. Villages falling in the two extreme groups on each side of the distribution for the residuals are tabulated in table 7.11. This was done for each of the eight analyses relating to income.

Table 7.11. Village distribution of deviations from the regressions into segments as shown in figure 7.3[1]

Analysis	Analysis code for table 7-12	Deviations			
		Negative		Positive	
		Lowest 10%	Next 15%	Next 15%	Highest 10%
		Name of village			
Communal:					
INCHA:					
Without District variables		None	Bwilingu Chekelei Kauzeni Kizinga Komkonga Magamba Mlembule	Lukobe Malivundo	Kiloza Kwamsisi Mboga
With District variables	(1)	Bwilingu	Kauzeni Kizinga Magamba Mlembule	Lukobe Mkata (H)	Kiloza Kwamsisi Mboga
INCHD:					
Without District variables		None	Kauzeni Kizinga Lunga Magamba Mlembule	Lukobe Malivundo Mkata (H) Segera	Mboga Mkata
With District variables	(2)	None	Kauzeni Kitumbi Kizinga Komkonga Lunga	Lukobe Mboga Mkata Segera	Mkata
Individual:					
INCHA:					
Without District variables		Lukobe Magamba	Bwilingu Segera Sinya Ulime	Kiluwani	Kauzeni Mazingara Mlembule
With District variables	(3)	Magamba	Lukobe Segera Sinya Ulime	Mboga	Kauzeni Mazingara Mlembule
INCHD:					
Without District variables		Lukobe Magamba	Bwilingu Segera Sinya Ulime	Kiluwani	Kauzeni Mazingara Mlembule
With District variables	(4)	Lukobe Magamba	Segera Sinya Ulime	Kiluwani Mboga	Kauzeni Mazingara Mlembule

(Cont.)

Table 7.11. (continued)

Source: Research results.
1/ Positive deviations mean that the estimate was too low, so that factors not in the analysis were causing Y to be larger than expected based on the analysis.

Although the regression coefficients on the 0-1 variables for the Districts did not differ significantly from zero in most cases, analyses with these variables included likely are to be preferred. Table 7.12 tabulates results for these four analyses by villages to check for consistency, and table 7.13 lists those that were consistently either positive or negative. Villages in table 7.13 that are there based on more than one analysis are of greatest interest. These villages include Kizinga, Sinya Ulime and Magamba which have less incomes than indicated by variables in the regression analyses. All three villages had one common factor and that is their crops were annually attacked by wild animals. Sinya Ulime and Magamba were not committed to communal activities and participated poorly in these activities. Most village members from these two villages had part-time employment outside the villages. Moreover the two villages had poor leadership and work organization. Sinya Ulime was the leading village in having a large number of older household heads which means less productive work for the village. Kizinga started with a small number of households which increased slowly, so one problem with this village was an inadequate labour force. Villages such as Mboga, Mkata (H) and Mazingara had incomes higher than expected based on variables in the regression analyses. These villages had stable

leadership and few village members had part-time employment outside the village. Mboga village ranked high in the degree of commitment to communal activities. Most household heads in Mazingara were of middle age, hence capable of contributing their labout effectively to the village.

Table 7.12. Summary of deviations from the regressions by villages for four analyses with adjustments for Districts[1/]

Village	Deviations			
	Negative		Positive	
	Lowest 10%	Next 15%	Next 15%	Highest 10%
			Analysis	
Lunga		(2)		
Mboga			(2)(3)(4)	(1)
Bwilingu	(1)			
Kauzeni		(1)(2)		(3)(4)
Kizinga		(1)(2)		
Sinya Ulime		(3)(4)		
Lukobe	(4)	(3)	(1)	(2)
Mkata			(1)	(2)
Kiloza				(1)
Kwamsisi				(1)
Kiluwani			(4)	
Mlembule		(1)		(3)(4)
Magamba	(4)	(1)	(3)	
Segera		(3)	(4)(2)	
Mkata				(2)
Komkonga			(2)	
Kitumbi			(2)	
Mazingara				(3)(4)

Source: Research results.

1/ See table 7.11 for analysis codes. Villages not listed were within the ± 25 percent area for all analyses.

Table 7.13. Villages that are consistently positive or negative in table 7.12[1/]

Negative		Positive	
Bwilingu	(1)	Kiloza	(1)
Kitumbi	(1)	Kiluwani	(1)
Kizinga	(2)	Kwamsisi	(1)
Komkonga	(1)	Mazingara	(2)
Lunga	(1)	Mboga	(4)
Magamba	(3)	Mkata (M)	(1)
Sinya Ulime	(2)	Mkata	(2)

Source: Research results.

1/ Numbers in parentheses show number of analyses for which this was true.

CHAPTER VIII. DISCUSSION

This study shows that the effectiveness of communication of agricultural information and advice, and hence of the extension service, can be affected by a wide range of factors. Among these are the type of extension methods and how they are used, farmers' attributes, basic education and professional training of the extension worker, structural organization of the extension service, and other factors pertaining to the area and conditions under which particular extension methods are applied. This chapter discusses the differences in effectiveness of extension methods applied, interrelationship between extension methods applied and variables used, and the influence of exogenous "system variables" which were not directly studied but which are believed to have affected the research results. In addition alternative explanations for some of the results observed in this study are reviewed. Research results revealed significant differences in performance between individual and communal farming systems. Finally, therefore, this chapter explores possible causes for poor performance on communal plots.

The means and methods of communication of information, knowledge and skills are almost the same everywhere, but they differ in their effectiveness and applicability. The effectiveness of the methods depend upon the structure of the society, the community, and the patterns of behaviour of individuals. These together include religious sentiments, traditions and customs, the degree of cohesion amongst individuals forming the society, the

stage of socio-economic and religious development together with mental consciousness of the people, the soundness and utility of the programmes, age composition of the community, degree and standard of literacy, economic status and above all the integrity and attributes of the extension worker presenting the programme. These factors change continuously with changes in society. There is therefore a need for constant study and review of changes occuring in a society so that new means and methods of communication and programmes may be adopted from time to time to suit new situations.

8.1. Differences in Effectiveness of Extension Methods Applied

Study results show that of the three group-based agricultural extension methods studied, demonstrations together with formal scheduled group discussion meetings were most effective in disseminating recommended farming practices in the coastal zone. This was due to the combined qualities of demonstrations and meetings. Demonstrations convinced villagers quicker than the other two methods through the triple processes of observing, hearing, and learning by doing. Demonstrations initiated a process of learning, motivated, and encouraged farmers to change their old habits, customs, traditions, and farming practices and thereby hopefully helped to build a progressive attitude. This was a complete process, beginning with an awareness of the need for change in farming practices and ending in the adoption of the demonstrated farming innovations in actual practice. As pointed out earlier,

it is the incomplete understanding of demonstrations as an agricultural extension tool on the part of village-level agricultural extension workers that has been partly responsible for the meagre adoption and slow radiation of the recommended farming practices for increased agricultural production.

Scheduled, formal group discussion meetings supplemented the effects of demonstrations by propagating and spreading ideas and results of successful demonstrations and also by providing a very good forum for exchange of ideas, pooling of experience, developing understanding, encouraging thinking, modifying views and getting ideas and practices accepted. Discussion meetings were effective in changing and moulding the minds of the villagers. They provided an opportunity for full expression of opinion and ensured democratic thinking and action because all actions decided upon became the actions of the whole group and were, therefore, really democratic.

Study results show that formal scheduled group discussion meetings when applied alone were second in effectiveness. This situation should be expected because the contribution from demonstrations were missing. Informal unscheduled meetings alone were last in effectiveness. This is again to be expected as indicated from earlier discussion that in these meetings nothing specific or concrete was discussed.

8.2. Interrelationship Between Extension Methods Applied and Variables Used

Study results suggest that there are relationships between extension methods applied in villages and some variables used in the measurement of these methods. The relationships that exist particularly between demonstrations together with group discussion meetings form a vicious cycle. Villages that were subject to demonstrations together with group discussion meetings are the same villages most of which generally had a greater number of extension contacts, had extension workers either living within or near them, had a higher level of knowledge of recommended farming practices, had a higher rate of adoption of these practices and a higher level of income than villages subjected to other group-based extension methods.

These results imply that the villages should have been stratified according to these characteristics before being allocated to the experimental treatment groups. Because this was not done, the greater the number of extension contacts which will be made through that method, the higher the level of knowledge, the higher the rate of adoption of recommended farming practices, and the higher will be the likely level of income. The number of contacts, level of knowledge, rate of adoption and level of income are some of the indicators of the effectiveness of extension methods. These five items (contacts, knowledge, adoption, income and extension methods) form a vicious cycle which reduced the effectiveness of the intended evaluation.

This interaction indicates that the initiation of a learning process and creation of an urge to change in the adoption process of recommended farming process are hardly sufficient by themselves. They must be accompanied by favourable environments. These environments or factors are necessary for continued development. These include: adequate credit facilities and input supplies, favourable ratio between extension workers and villages, availability of transport facilities, and well trained agricultural extension workers. Let us examine each of these in turn.

8.2.1. Credit Facilities and Input Supplies

A great number of villages need finance for subsistence during certain seasonal periods, and almost all villages need finance before adopting some farming innovations for the purchase of, say, supplies or production inputs such as fertilizers, insecticides and improved seeds, or tools such as ox-ploughs or tractors. Under such conditions credit facilities must be tied to the adoption of improved practices or innovations. What is required is a system which can provide credit not only to those villages with assets or to those villages able to make down-payments as presently done, but to the villages in general. It is credit-worthy projects, not just credit worthy villages that deserve credit. The credit worthiness principle is inconsistent with ujamaa policy and can retard agricultural production in villages. Villages at this stage of economic infancy have no assets, and the only security for their credit is the anticipated increase in production and income. An immediate major problem is how to

provide against widespread productive indebtedness. Since villages start from a level of deep poverty and often complete ignorance of the value of new techniques as well as inability to take any risks, credit is required to help them up almost every rung of the ladder if the adoption of recommended farming practices is to take place at all.

Closely related to credit facilities are input supplies. A farmer may understand the value of fertilizers and be willing to adopt them, but if the right kind of fertilizer is not available at the right time at a price he can afford, or if the fertilizer is not available at all, the farmer will not adopt the use of fertilizer. Thus, lack of production inputs or their delay in delivery may hinder the adoption of the practices that are related to those production inputs. At the moment the actual delivery of production inputs is poor. Productivity is low in villages partly because inputs either arrive late or are not available at all. Problems like these originating from government, parastatals and private companies should be eliminated completely.

Moreover agricultural objectives must be attractive from the point of view of the farmer. For instance, a campaign to increase production by using fertilizer will not be worth-while if the fertilizer needed costs more in money and effort than the value of the increased production. Under such conditions an intelligent farmer will not adopt fertilizers. What is required in this case is an economically sound recommendation on the use of fertilizers.

8.2.2. The Ratio Between Available Extension Workers and Villages

Villagization as a programme with its quasi-socialist features can potentially create the kind of revolutionary environment that ought to bring the extension worker much closer to the farmer than during colonial times when farmers used to live in isolated homesteads practicing individual farming. Before villagization, it was practically impossible to render effective agricultural extension services with the limited number of agricultural extension workers. In the early 1970's the ratio of agricultural extension workers to farmers for the entire country was established to be 1:2500. This situation has worsened recently in some areas after the appointment of some agricultural extension workers as Village Managers responsible for coordinating all village activities. In the coastal zone there is one agricultural extension worker for every 15-20 villages. Since, according to the Village and Ujamaa Village Act of 1975, the lower limit to the number of families per village is 250 it follows that the ratio of agricultural extension workers to farmers is now 1:3500-5000. It is true that having these farmers who formerly were scattered all over the zone now living in 15-20 villages has substantially reduced the extension workers' time and distance covered in visiting them. Nevertheless, in practical terms, villagization has not improved the situation because its effect has been neutralized by the withdrawal of KILIMO staff to work as Village Managers. Thus the situation in the coastal zone is far from an ideal one. Anything above two villages per agricultural extension worker is considered to be too

demanding of the extension worker's time and effort, considering the amount of work which he is expected to do in each village. Low levels of extension contact observed in this study between extension workers and villagers are partly explained by the shortage of manpower.

There also appears to be a substantial bias in the distribution of agricultural extension workers in Handeni and Korogwe Districts, but much less so in Morogoro District and not at all in Bagamoyo District. In the former two Districts, relatively large numbers of extension workers are concentrated in the mountains where tea and coffee are grown as compared to the lower areas. The unfair distribution of extension workers in the zone is made more acute by the fact that in addition to the general agricultural extension workers, the Tea and Coffee Authorities have their own specialized extension workers in the field. Farmers growing tea and coffee are more privileged than others in respect of the extension services they receive. Although there are Cashewnut and Cotton Authorities in the lower areas, their extension workers are thinly spread due to the large total size of the lower area compared to the mountain area where tea and coffee are grown. The uneven distribution of staff may accentuate the existing economic inequality between tea and coffee growers on the one hand and farmers of other crops on the other; and may even slow down the maximum possible adoption of agricultural innovations in lower areas. There is a need for re-examining the distribution of extension workers in the coastal zone taking into consideration

the number of villages in a particular area and the number of extension workers from various crop authorities and boards in order to avoid duplication of services rendered.

8.2.3. Availability of Transport Facilities

One of the major problems faced by village level agricultural extension workers in carrying out their duties is lack of transport. Under present conditions in the coastal zone whereby one extension worker supervises 15-20 villages, the extension worker will be relatively impotent unless he is provided with transport. The ultimate goal for the extension worker is to have as many contacts with the farmers as possible. One way of increasing the number of extension contacts between the extension worker and the farmers is by providing bicycles or motor cycles where appropriate on loan in order to insure that they are mobile. A second, long-term solution is to have one village-level agricultural extension worker per village. These two solutions should be accompanied by various allowances such as mileage or bicycle allowances paid to extension workers to motivate them to move around in villages. It is imperative in these circumstances that effective agricultural extension methods such as demonstrations and group discussion meetings are used in order to secure the maximum impact.

8.2.4. Basic Education of Prospective Extension Worker

The carefull selection of persons for training in agricultural extension work is obviously important. If the trainees have the desired attitudes to start with and an appropriate level of basic education, the training problem is made easier because the

basic educational level affects the individual's potential for further learning. The lower the level of basic education, the lower will be the aptitude for further learning.

Leonard (1977, p.102) has opposite views on this issue. He reports:

> "Contrary to the expectations of the Ministry's recruiters, the rise in the educational qualifications of agricultural extension agents has had a detrimental effect on their performance ... in every aspect of extension work the output of agents with secondary school education is inferior to that of those who have been only to primary school."

Leonard believes that extension workers with secondary school education lack motivation for effective work such as promotions and high salaries and consequently have no work satisfaction and perform more poorly than those with less education.

Research results have shown that village-level agricultural extension workers in the coastal zone, particularly those recruited during and immediately after the colonial administration have low basic educational qualifications. All except one had completed only primary school education. According to the author this deficiency accounts for a greater part of extension workers' ineffectiveness in the field. Extension workers need at least secondary school education in order to adapt recommendations made by research institutions to various local conditions. These adaptations should take into account variability in rainfall or soil fertility, possibilities of attack by insects, diseases, vermin and other factors.

The author believes that whatever degree of motivation the agricultural extension worker may have, he will never increase

his level of performance if he has nothing new (extension content) beyond what the ordinary farmer already knows. Since the Ministry of Agriculture is after the best performance from its extension workers, the author's opinion is that the more complicated the skill or knowledge, the higher the educational level at which the best performance can usually be achieved. Therefore instead of blaming secondary school graduates for their poor performance, attention should be concentrated on finding ways in which the more educated extension workers could be motivated for higher perfcrmance, because highly educated people are required in every sector in the government as well as parastatal organizations. Recruitment should be done for students who have successfully completed secondary school education preferably with high passes in relevant subjects because these students have the potentialities for advanced learning. This is necessary because of the high rate of technological change in the agricultural field.

It is true that very few will be available as extension workers per year, but it is more advantageous for the government in the long run to have few but retrainable extension workers who will also disseminate efficiently correct agricultural information than to have a large number of ineffective extension workers who cannot benefit from further training both in agriculture and in agricultural extension communication. Thus recruitment of less-qualified people for extension in respect of basic education is a retrogressive step in a country seeking to advance technologically.

The author's view is that educational paper qualification, though not the only important criterion for recruitment,

illuminates actual levels of ability and provides a reliable guide to work performance. The primary emphasis, therefore, should be given to revising the recruitment process to make it more comprehensive. It should attempt to assess the candidate's basic educational qualification and his potential ability for advanced learning, living and working contentedly and effectively in a rural area among village people. Factors such as tolerance, ability to communicate simply and effectively, and integrity should be important elements to consider.

In order to motivate agricultural extension workers who possess a secondary education, the supervisory role of the district headquarter's staff should be intensified. Supervisors should help their junior staff in their work, communicate with them effectively, involve them in planning and decision making concerning their work. When and if necessary, punitive actions should be taken against anyone who maliciously resists compliance with the Ministry's regulations. In addition, extension workers with secondary school education should be motivated by giving them incentives relative to their level of education. Incentives given should be comparable to those given in other Ministries to staff with similar educational and training levels and nature of assignment. Group-based extension methods can only be effective if they are applied by well and adequately trained extension workers.

8.2.5. Professional Training

Since colonial times, various approaches for rural development

have been adopted. The main objective [illegible] was the development of an egalitarian society [illegible] achievement of economic independence through self-reliance, co-operative and communal endeavors, and also maximum use of local resources. In all these dramatic changes the agricultural extension service, especially the methods of approach, have remained basically unchanged because the syllabus contents and emphasis on subjects taught to prospective extension workers have not changed. Villages have offered new opportunities for extension work in respect particularly of group-based methods, but the extension system has largely failed to convert these opportunities into reality. The government has defined the task of the extension staff as helping farmers to increase agricultural production through the use of modern techniques and tools.

Whether or not the extension staff in the field can meet the demands placed on it depends upon several factors. Two of the most important are: first, adequacy of the extension service organization (discussed later) and second, the extension worker's training for tasks given to him by the government. It is quite evident from study results that agricultural extension workers in the coastal zone are relatively ineffective. Ineffective performance of the extension workers is due to poor professional training not only in general agriculture but also in the methods of communicating information and advice to farmers. Yeaman et al (1972, p.17), when discussing the quality of students produced in relation to the work they were expected to do after graduation, with particular reference to curricula and staff, say

that agricultural training institutions share only a small portion of the blame for the present alleged ineffectiveness of the extension service. They continue saying that the problems and difficulties of the extension service are systemic and involve extension administration, research, training, the linkage of research and training, as well as the extension service itself. However, contrary to the above statement concerning the training given by the same agricultural institutions, Yeaman et al (1972, p.106) admit the fact of poor training by saying that:-

> Under-education in extension is probably an inherent result of the colonial period. The extension training given in the training Institutions and in the Faculty of Agriculture lacks understanding and proper emphasis. The extension training given does not produce extension workers able to communicate effectively with farmers. It is not known by the team if universally accepted methods of extension have been studied in relationship to the sociological conditions found in Tanzania.

It is true that the above report was written back in 1972. However, the situation has not changed much, particularly in the training Institutes of the Ministry of Agriculture.

The confusion of the Yeaman report arises from the fact the report was not based on empirical data from the field. Moreover the terms of reference given to the team when preparing their report included only agricultural manpower requirements and agricultural training programmes. The terms did not include the assessment of the performance of the contemporary extension workers; consequently the team was not able to assess the field effectiveness of the extension workers.

The report does give some of the fundamental characteristics of effective agricultural extension service. It states that

agricultural extension should be primarily concerned with the transfer of useful agricultural knowledge to the agricultural producer by an appropriate means, so that there will be an improvement in efficiency of production, and in rural living standards. It says that the producer should not only understand what to do, and how to do it, but also learn why the new technology and practice are superior.

Without adequate training of agricultural extension workers, particularly in extension communication, the above stated characteristics of effective agricultural extension service cannot be achieved. Research results reveal that most village-level agricultural extension workers cannot even identify the various types of extension methods, leave alone how and when to use these methods. Only one out of 14 extension workers vaguely understood what extension programme, planning, and organization meant. Yeaman et al (1972) also report that the concepts, organization, philosophy, programming, function and methods of extension are generally not understood by the entire organization from the national to the village level. These are crucial elements of the extension service whose knowledge can be acquired largely through adequate professional training.

The approach adopted in this study has shown how knowledge and proper application of effective extension methods can change the performance of the extension workers and hence the effectiveness of the extension service. The intensive short course given to 14 apparently ineffective village-level extension workers on extension methods, programmes and principles of production for

Ilonga composite maize and cotton in the survey villages (as mentioned in chapter III, section 3.1) resulted in increased levels of knowledge, adoption rates of recommended agricultural practices, and increased income per ha. This exercise emphasizes the importance of in-service or refresher courses for village-level extension workers in order to improve their effectiveness in the performance of their work.

Such on-the-job training is particularly essential for extension workers who have had low basic education and inadequate professional training. Currently, the Ministry of Agriculture tends to overemphasize the importance of initial training and underestimates in-service or refresher courses. This situation implies that the decision-makers consider basic training far more important to technical competence than in-service or refresher courses. Under the present situation of fast technological change, this is a mistake. Initial training and in-service training or refresher courses should be of approximately equal importance. In-service or refresher courses should not be limited to village-level agricultural extension workers. Provision should be made for regular updating of senior staff at the District, Regional and National headquarters. The assumption that senior officers will read the research literature and keep themselves informed, as Leonard (1977) remarks, may only be valid for the senior officers who specialise in one technical field over a period of several years. It is not supportable for the senior staff in the direct line of hierarchical authority. In-service or refresher courses, well organized and carefully planned are probably

necessary to arrest the dissemination of misinformation by the senior staff.

8.3. Influence of Exogenous System Variables on Extension Methods

The effectiveness of an agricultural extension service will be suppressed if the conditions under which it operates cannot allow full expression of its potentialities. Following are factors that affect the effectiveness of agricultural extension methods.

8.3.1. Structural Organization of Extension Service

Reaching the village farmers and helping them to increase their agricultural production has been and will remain the responsibility of the agricultural extension service. This study demonstrates that these responsibilities are not met adequately at present. Possible structural reasons deriving from the basic organisation of the extension service include:-

i) Deployment of agricultural extension workers,

ii) The length of the transmittal system,

iii) Supervision of village-level workers.

i) Deployment of agricultural extension workers - An effective extension worker must be skillful and dilligent in receiving, understanding, using, and communicating technical information. Essentially, his role is that of a linking mechanism. Ideally, his classic function is to link agricultural research centres and farmers, transmitting new technologies to the farmers and current

farming problems to researchers. The village-level agricultural extension worker is an important person because he forms the last link of the transmittal system. Results from this study show that in the present structural organization, the least trained extension workers with low technical competence are posted at ward and village levels. It appears that the higher the professional training, the further away the extension worker is posted from the place where he could utilize his expertise directly.

It is at the village level where the battlefield is, where the actual work is done and the technical know-how mostly required. Villagers need competent day-to-day technical advice and information on agricultural production which should be conveyed to them using the most effective methods in order that they may understand them. Under the present structural organization this technical advice cannot be provided effectively because village-level extension workers are not adequately equipped with these skills and also the methods of communicating them. Leonard (1977, p.15) gives an example of an Agricultural Assistant extension worker who knew little of his work and, because of his little knowledge, concentrated on visiting poor farmers and his friends. After drinking a cup of the farmer's tea he either praised his farming or turned to a non-agricultural subject. Similar practices are likely to take place with the present village-level extension workers in the coastal zone. Such types of extension workers are not of much use to the farmer.

When long experienced village-level extension workers get promoted to higher posts, they are transferred from the area of actual implementation (ward or village) and are given administrative duties at the district or regional headquarters just like the highly qualified or trained agricultural personnel. There is a constant drain of long experienced personnel from the field to District or Regional headquarters.

ii) The length of the transmittal system - The transmittal system as applied in the coastal zone shows that the village-level extension worker (Agricultural Field Assistant) forms the last link of a rather long transmittal system between research institutions and the farmer. The long transmittal system has a detrimental effect on the message that the village-level agricultural extension worker passes over to the farmers. It should be expected that as the number of communication links increases the quality and quantity of information as compared to the original information changes and deteriorates.

The transmittal system now used shows multiple-stage communication. In his organization theory, Leonard (1977) advocates that in multiple-stage human communication the delay between acts of receiving and transmitting information is a major determinant of the quality of the system. Long delays lead to substantial information losses. This is typically so in the Coast zone. Information passes through four stages before it reaches the village-level extension worker, who forms the fifth stage before passing over the information to the farmer. The shorter the

system the more likely will be improved quality and quantity and timely delivery of the information.

iii) Supervision of village-level workers - Research findings indicate that field staff are poorly supervised by the district senior staff. Reasons given are lack of transport, too many meetings, and too much administrative work at the district headquarters. The same situation and reasons were also noted by Cliffe et al (1968) when conducting an evaluation of agricultural extension.

It also appears that there is often no clear purpose or direction in the whole of the extension service. It is true that the extension service tries to respond to the problems of farmers, but its role is intended to be more than just passive consultancy. The village-level agricultural extension worker is virtually left on his own, deciding which particular improvement to push on the basis of his own poor training and experience. Effective supervision of village-level extension workers is not possible without adequate planning, objectives, and goals. When personnel at all levels generally set their own workloads under some vague national goal, supervision has no yardstick or standards to measure with or against. One cannot supervise when one does not know specifically the job to be supervised.

Lack of an adequate supervisory system not only fails to keep village-level extension workers at work but alienates them as well, lowering effort further and smothering feedback and innovativeness. This is so because the transmittal system of information emphasizes

downward flow of information, so the village-level extension worker has no chance of contributing his ideas from his work experience in the field.

3.3.2. Economic and Social Disparity Between Villagers and Extension Workers

Under present conditions of service, all agricultural extension workers at Ward and village levels are government employees. They are employer (government) oriented instead of client (villager) oriented. This situation has a profound influence on their effectiveness. These workers are not only assured of their monthly salaries irrespective of whether they are effective or not but are also viewed as privileged and economically better off individuals. In many cases they are not socially accepted as members of the coastal society. This situation applied mostly to those extension workers coming from outside the coastal zone, who are often called "watu wa bara," meaning that these are "up-country people" bearing the connotation that they neither possess or understand the admirable sophistication of coastal Swahili culture. It is true that these extension workers far away from their home Districts or Regions will not understand the traditions, culture, taboos and dialect of the local people. Such a situation poses a serious communication barrier, especially when it involves the use of group methods such as discussion meetings and demonstrations.

Agricultural extension workers are not members of the villages and thus not deeply committed and responsible to the

success or failure of the agricultural enterprises of the villages. Their tenure of office and salaries do not depend on the success of the village agricultural enterprises. On the whole, villagers may not have confidence in their proposals for change because villagers may think that these extension workers might come up with proposals that entail higher risks than what the villagers can take, since these workers would not suffer the consequences in case of failure of the proposals.

8.4. Possible Causes for Low or Negative Correlations

Research results show a good number of low and even some significant negative coefficients between variables. These results which are contrary to theoretical expectations could be attributed to a number of factors operating singly or in various combinations. The following include some potential causes.

8.4.1. Rainfall Variability

Rainfall is one of the most critical factors in farming in the coastal zone. This is because of its variation in intensity from one season to another, and its uneven distribution by months and geographical location over the coastal zone. These characteristics of coastal zone rainfall has tremendous effect on crop rotation. As noted, this zone experienced a serious shortage of rainfall for two years during the study period. Although the study period was spread over four years in order to minimize or average out such effects the design did not eliminate completely such a major influence when 2 out of 4 years were unusually poor.

Due to uneven distribution, some villages received more rainfall than others. A similar situation applies to its intensity. Those villages that received an optimum amount and intensity of rainfall had a greater chance of getting higher crop yields and consequently high income than others. Some villages that were expected to get an increase in crop production and hence an increase in income because effective extension methods were applied in them did not get them simply because of rainfall shortage or surplus.

8.4.2. Vermin Attacks on Crops

The degree of seriousness of vermin attacks on crops varied from one village to another and from one group of villages to another. Some village crops were not attacked by vermin at all. Other factors being equal, villages with heavy vermin attacks experienced a reduction in crop yields and consequently a reduction in income.

8.4.3. Part Time Employment

Observations from this study show that villages near sisal estates, towns or those that are themselves minor settlements or trading centres had great number of villagers with part-time employment or who were engaged in other commercial activities. This situation reduced the number of people engaged full-time in agricultural production. These villages experienced reduction in crop yields and hence incomes as compared to other villages whose members were engaged in full-time agricultural production.

Moreover villages with a high concentration of the Wakwavi (Baraguyu) whose occupation is cattle raising had less crop yields

in relation to their total population compared to other villages.

8.4.4. Poor Empirical Indicators

Various types of indicators were used in determining the effectiveness of the extension methods applied. All these indicators are not equally good. For example, results show an unexpected "r" between rate of adoption and level of knowledge of recommended farming practices. The unexpectedly low correlation may have been obtained because the rate of adoption measured the use of a number of recommended farming practices reflecting both knowledge of these factors and the financial ability to adopt them. A second example is the unexpectedly low correlation between rate of adoption of recommended farming practices and income per ha. The reason for this may be that some major factors that affect effectiveness of the adopted practices were not measured. Even if fertilizers and insecticides are applied in optimum amounts and time, inadequate rainfall would still cause reduction in crop yields and hence income per ha. Finally, the unexpectedly significant negative correlation between village development increase and rate of adoption might have been caused by the fact that indicators for village development increase were not necessarily those that have a direct relationship to the adopted practices. For instance, having adopted timely planting or early and proper weeding does not necessarily lead directly to an acquisition of a health centre, primary school, or piped-in water by the villagers (some of the indicators for village development increase).

8.4.5. Effect of Pooled Data

The unit of analysis used in this study was the village. In order to get data for final analysis, data from individual farmers in the village were pooled together and averages were taken to form the village data. It is likely that effects of some variables in certain villages were missed, minimized or masked by the pooling effect. A study by Ponjee (1979) of the effectiveness of extension methods based on data for individual farmers gave high multiple correlation coefficients and many statistically significant regression coefficients with correct signs.

8.4.6. Location of Villages

As already noted in the previous discussions, location of villages in relation to sisal estates, towns and minor settlements has some effects on production due to private interests of village members. Differences in the location of the villages also affected the mobility of the people, the extension worker, and the transportation of produce to market centres.

8.4.7. Reliability of Respondents' Replies to Questions

Quantitative information gathered through questionnaires from farmers may not have been correct, particularly for information regarding yields. This is so partly because most farmers do not keep records and partly because they did not want to reveal their incomes (for reasons discussed in chapter III). The importance of this likely varied between villages.

8.4.8. Differences Among Tribes Within the Study Area

As already discussed in previous chapters, there are marked differences among the tribes occupying the area under study. We saw that this area is occupied by the Wakwavi (Baraguyu), Wazigua, Wakamba, Waluguru, Wadigo, Wazaramo and Wakwere. These tribes differ significantly in cultural traits, leadership patterns, inheritance procedures, work norms, traditions, customs, taboos, and occupation. Such differences likely had varying degrees of effect on individual villages both socially and economically and hence influenced the study results.

8.4.9. Differences in Village Characteristics

The degree of social homogeneity or heterogeneity and commitment to communal activities varies from one village to another. There are also differences among villages in their length of establishment, as to whether the village evolved from a traditional village or whether it was a newly-established village, and the age composition of village members. As previously noted, all these have a profound effect on work organization, production, and leadership. It is likely that these also affected data collected in various villages and the end results of the analysis.

8.5. Possible Causes for the Differences in Performance Between Individual and Communal Farming Systems Among Villages

Survey results show marked differences in economic performance between individual and communal farming systems under the same type of extension methods, with the individual plots giving higher

incomes per ha and per man-day than for communal plots. There are several possible causes for this state of affairs.

8.5.1. The Notion of State Farms

Most villages during establishment received most of the implements for cultivation, seeds, insecticides, and fertilizers from the government. If ploughing by tractor was used, it was done at the Government's expense. Villagers had only to look after the fields. They were not involved in deciding on the size of the fields, or when and how to cultivate them. This brought the notion that these fields were a "State Farm". The feeling that the fields were not theirs aggravated the villagers' lack of concern for communal fields. With no sense of commitment to the fields, villagers felt that they had little to lose. These were comments from some outspoken villagers. In some villages in the initial years, little or nothing was harvested from communal fields. It was disheartening to see that nobody among villagers felt that their efforts, although little, had been wasted. The village leaders were not seriously concerned with the loss of their effort in the fields, except that they had failed to make the villagers cultivate communal fields which they could have boasted about to their leaders at the District and Regional levels.

8.5.2. Lack of Participation in Decision Making

Communal activities were also hampered in some villages by the fact that decision making on major economic issues was bureaucratic in the early days of village formation. Village leaders carried out the function of passing on orders from above.

They attended divisional or District meetings which briefed them on the development directives for the next period, then they sat and decided for the villagers. When mass public meetings (the same as present Village Assemblies) were called, they were attended by few villagers as evidenced by the author's observations and by questionnaire responses. Refusal to attend public meetings aggravated the above mentioned problem of alienation and disinvolvement of villagers from communal activities, since they did not take part in the decision-making. They saw the village plans and the encouragement of communal activities as being ordered from above. Mwalimu Nyerere (1969) had already made it clear that solutions to the complexities of socialist development in the rural areas must be democratically arrived at by the villagers who are most directly concerned, supported and guided by the Government and the Party. The author feels that not only is this essential in order to guarantee the whole-hearted participation of rural producers in the ensuing struggle for agricultural revolution (and thus to ensure its success), it is also necessary in order to determine the proper solutions themselves.

8.5.3. Lack of Political Consciousness

Despite vigorous and on-going campaigns of political education there was an absence of political consciousness among both village leaders and villagers. Political education campaigns were not adequately carried out during this critical period. Villagers found themselves in a declared "Ujamaa Village" but were left ignorant of the meaning to give to "Ujamaa". The period of

transition from getting peasants together in one community and declaring the community as an "Ujamaa Village" was far too short. Problems arose where villages had been pressed into starting higher on the ladder to Ujamaa (communal production) than the farmers would have chosen of their own free will, or where the villages had started with so little communal activities that they could obtain none of the social or economic advantages of living and working together.

Villagers did not understand why they should cooperate to produce communally. Since they did not know the gains from this cooperation, enthusiasm was something they did not have. If villagers have little understanding of the Ujamaa policy, low demand, and little knowledge of modern material techniques of communal agricultural production, they will not only refuse but also react in the opposite direction from communal activities and will greatly hinder the development of cohesion in the village. Some villages had made little change from their previous individualism, though these were the exceptions rather than the rule. The recommendations now being made are that villages should start introducing a degree of communalism which extends to the full but does not overtax their organizational powers and mutual trust, and that they should proceed step-by-step as experience increases. In other words it is the organic development towards complete socialism that is the main aim.

Poor and uncommitted leadership in villages contributed to poor participation of villagers in communal activities. Freyhold

et al (1972) cite an instance of poor and uncommitted leadership. In the course of their study in Handeni District, in one village they came across an authoritarian village leader with no interest in Ujamaa whatsoever. This leader had a rule passed by the village exempting him (and by tacit agreement his wives also) from communal work "so that he may always look neat and ready to receive visitors." Villagers were discouraged in many villages and the normal practice then was to have two to five acres of private fields and regard communal fields as an additional task to what one was supposed to be doing.

Labour competition between communal and individual activities was and in some villages still is a serious problem in the coastal zone. In the absence of political awareness, individual production is seen as the basic means of survival of villagers. Unfortunately during the time when villagers were preparing their individual fields and sowing them, that was also the time when communal fields had to be prepared and sown. From then onwards both individual and communal fields had to be attended to. Villagers spent most of their time attending to their individual fields and so had little time to attend to the communal fields. The author believes that without political awareness it is almost impossible to make villagers give priority to communal fields. Also, as noted in previous chapters, some villagers had part-time employment on sisal estates or in towns or indulged in trade or commercial activities or took jobs with lorry owners; all this reduced the village labour force. It follows that the most

pressing task of the Party and Government in implementing rural development is to assist the majority of the rural producers to understand through practical work and study that communal production is the best way, indeed the only way for them to achieve higher incomes and greater economic and social security; and to help them through material assistance so that this is in fact what happens.

Ujamaa policy implementation was started with pledges, from leaders at Regional and District levels and then from local leaders, that formation of villages would mean free provision of services such as water, schools, dispensaries, shelter and tractor services. These pledges were not bad in themselves, since the government had targets for bringing these services to rural areas which could be more easily and cheaply achieved if the farmers were grouped in villages. Unfortunately these pledges or promises created an attitude of dependence which encouraged unrealistic expectations. This attitude of dependence and lack of self-reliance which arose from pledges and the notion that villages are "government villages" contributed greatly to the lack of interest and commitment for communal economic activities such as communal farming.

8.5.4. Lack of Work Organization Planning and Incentives

One of the problems encountered in many of the coastal zone villages in relation to communal production is the lack of an effective system of work-leadership and division of labour. This lack included poor supervision, as well as a lack of standards and

well known measurements for allocating work to individual members and for determining the value of that work when completed. This seriously reduced communal labour productivity in the villages. Elaborate planning procedures are required, because village production is based on communal means of production. Where people must work together if they are to do it well, they must do it systematically. That is, they must have common production goals which everyone understands and accepts. Without planning, communalism becomes ineffective.

In addition to the failure to organize villages to insure that everyone works and works hard and well, villagers also lacked a method that could be used in computing exactly the work output of each individual member in the communal enterprise. This made the division of returns or net profits a serious problem in villages. There was serious unfairness in the distribution of net profits from communal enterprises because there were no reliable or correct measures of intensity and quality of work performed, and hence no correct basis for remuneration or distribution of net profit. This situation also discouraged village members from participating in communal enterprises.

The above situation was aggravated by a single net profit distribution per year. Communal enterprise in most villages was based on crop farming. This meant that for a whole season the members do not know exactly what they will get from their communal work. They are therefore uncertain whether better performance of work will pay in the end. Moreover, although the number of work

units achieved by a member in the course of the year depends on his individual performance, the value of the work-day unit depends on the work performance of all other members and factors. In general, the members were interested in saving as much of their work capacity as possible for their individual farms, while it was expected that they also contribute as much as possible of their work capacity to the communal farm. Village members were discouraged by the meager net profit received at the end of the year after waiting for so long and consequently reduced their participation in communal enterprises.

8.5.5. Uneconomic Agricultural Recommendations

One technical drawback of agricultural production in the villages was the uneconomic agricultural recommendations from either the District or Regional headquarters. Not all recommendations were economically sound. But since they came from above, they had to be implemented, and since villages felt that the final loss would not be incurred by them individually, they did not reject the recommendations. Recommendations or advice which might have been rejected on individual fields as being economically unsound were accepted and put into practice. The end result was the failue and extremely low net returns of various communal farming enterprises.

8.6. Research Priorities for Future Improvement of Agricultural Extension Communication

Issues of personnel technical inadequacy and problems of performance in agricultural extension information communication

suggest that there is an urgent need to conducting research on the following topics, as a basis for the future improvement of the agricultural extension service:

(i) Exploration of the processes by which agricultural students and staff are recruited;

(ii) Careful appraisal of the contents, methods, and behavioural objectives needed in pre- and in-service educational and professional training programmes;

(iii) An inquiry as to what extent the agricultural extension service organization itself constitutes an obstacle to the communication and adoption of agricultural innovations by the farmer.

(iv) Investigation of the measurement of the effectiveness of the agricultural extension service under various environmental, social, and economic conditions.

CHAPTER IX. SUMMARY AND CONCLUSIONS

9.1. Summary of Research Results

Previous research work and also results from this study show that agricultural production both per unit of land and per unit of labour in villages is low relative to what likely could be obtained based on modern inputs and good husbandry standards. Agricultural productivity is affected by a multitude of complex factors which are economic, social, political, physical, environmental, administrative and technical in nature. These factors operate in various combinations with varying degrees of effectiveness depending upon the area under investigation.

The historical background of the agricultural extension service of the crop improvement division shows that the extension service has been under-staffed, under-educated and under-trained. During the early 1950's, coercive extension methods were used, conditions which are alleged to have been the initial cause of the ineffectiveness of agricultural extension workers. The structural organization has been and still looks like a pyramid. A few highly trained and experienced personnel at District, Regional and National Agricultural Headquarters use a long, hiearchical, and bureaucratic transmittal system to communicate agricultural information and advice to farmers.

The present study makes a critical comparison of the effectiveness of three group-based agricultural extension methods under the new rural environment created by the villagization programme. The focus was on technical factors because of

repeated research findings and criticisms that the agricultural extension service is ineffective and that it has failed not only in bridging the gap between researchers and farmers but also in educating and mobilizing the peasantry for increased agricultural production. The three extension methods compared include: i) demonstrations together with formal scheduled group discussion meetings, ii) formal scheduled group discussion meetings only, and iii) informal unscheduled meetings or general contacts.

The study was conducted in 24 villages in Bagamoyo, Handeni, Korogwe and Morogoro Districts. It aimed at: first, identifying the most effective group-based extension methods that will help extension workers to increase their communicative effectiveness and the factors that influence the effectiveness of extension methods in general; second, identifying bottlenecks in the use of group-based extension methods, and giving recommendations for increased agricultural production in the villages. Group-based extension methods were chosen for study because they conform to the government and party policy for villagization and also the current social and economic conditions of the farmers and the government. Agricultural production levels were measured in income per ha and per man-day, while the level of knowledge, the rate of adoption of recommended farming practices, and village development increase were also used to measure the effectiveness of the methods tested.

The procedure of analysis used in this study includes: the analysis of variance (ANOVA) and simple and multiple correlation and regression analysis, using the computer

and testing of curvilinear relationships using scatter diagrams for selected individual farmers.

Overall results show that of the three group-based agricultural extension methods studied, demonstrations together with formal scheduled group discussion meetings proved to be the most effective. Formal scheduled group discussion meetings only were second. Informal and unscheduled group meetings or general contacts were the least effective extension methods. These methods were more effective under individual farming system than under communal farming. The overall results concur with the hypotheses tested.

Results of the analysis of variance show that there is no significant difference between the three group-based extension methods in respect of level of knowledge, rate of adoption of recommended farming practices, and village development increase for both communal and individual farming systems. There is a significant difference between demonstrations together with formal scheduled group discussion meetings and informal unscheduled group meetings or contacts in respect of average income per ha under individual farming systems only. Demonstrations together with formal scheduled group discussion meetings were also significantly higher than informal unscheduled meetings or contacts in respect of the average per ha for combined communal and individual farming systems. Demonstrations together with formal scheduled group discussion meetings were significantly higher than both formal scheduled group discussion meetings only and informal unscheduled

group meetings or contacts in respect of income per man-day under communal farming systems only. A similarly significant difference exists between the same methods as above in respect of the average income per man-day for combined communal and individual farming systems.

Group-based extension methods were somewhat influenced by the Districts in which villages were located. Causes for the differences have been discussed in chapter VII. Results of the analyses of variance under individual farming systems show that Handeni District is significantly lower than Morogoro District for demonstrations together with formal scheduled group discussion meetings in respect of income per ha. Morogoro District is significantly lower than the other three Districts for formal scheduled group discussion meetings in respect of income per man-day.

Under communal fields, Korogwe District is significantly higher than each of the other three Districts for demonstrations together with formal scheduled group discussion meetings in respect of income per ha. Morogoro District is significantly lower than each of the other three Districts for demonstrations and meetings in respect of income per man-day. Korogwe District is significantly lower than the other three Districts for informal unscheduled meetings or general contacts in respect of both income per ha and per man-day.

There is no significant difference between Districts for methods in respect of rate of adoption. However Korogwe District is significantly lower than Bagamoyo and Handeni Districts for

demonstrations together with formal scheduled group discussion meetings have a statistically significant effect on these dependent variables.

With the exception of the low R^2s, these results agree with the hypotheses and contain the details wanted and confirm that regression analysis was a useful analytical tool because such results would have been difficult if not impossible to achieve by simpler methods of analysis.

The multiple regression equations for communal farming systems show that the value of R^2 are all 0.44 or less. When District variables are excluded in the equations the highest R^2 is 0.34. None of the four analyses for which demonstrations together with formal scheduled group discussion meetings entered with a positive sign had coefficients that were statistically significant. Of all other variables considered, only 4 entered with expected positive signs. These were adoption for income per ha, percent literacy, contacts, and adoption for income per man-day. None of these variables were statistically significant. These results confirm that there were exogenous factors operating in the coastal zone villages which are beyond this study.

Simple correlation coefficient results for individual farming systems show that there is only one significant positive r for demonstrations together with formal scheduled group discussion meetings. The adoption rate, demonstrations together with formal scheduled group discussion meetings, and formal scheduled group discussion meetings only were equally effective as extension

demonstrations together with formal scheduled group discussion meetings have a statistically significant effect on these dependent variables.

With the exception of the low R's, these results agree with the hypotheses and contain the details wanted and confirm that regression analysis was a useful analytical tool because such results would have been difficult if not impossible to achieve by simpler methods of analysis.

The multiple regression equations for communal farming systems show that the value of R^2 are all 0.44 or less. When District variables are excluded in the equations the highest R^2 is 0.34. None of the four analyses for which demonstrations together with formal scheduled group discussion meetings entered with a positive sign had coefficients that were statistically significant. Of all other variables considered, only 4 entered with expected positive signs. These were adoption for income per ha, percent literacy, contacts, and adoption for income per man-day. None of these variables were statistically significant. These results confirm that there were exogenous factors operating in the coastal zone villages which are beyond this study.

Simple correlation coefficient results for individual farming systems show that there is only one significant positive r for demonstrations together with formal scheduled group discussion meetings. The adoption rate, demonstrations together with formal scheduled group discussion meetings, and formal scheduled group discussion meetings only were equally effective as extension

methods when assessed in this way. Adjusting for other factors, as done in multiple regression, is required to bring out the true relations. Initial village development is positively related to both extension contacts and potential village development. This suggests that village-level extension workers work more with developed villages which is contrary to socialist development which the country is pursuing.

Simple correlation coefficient results for communal farming systems show that there are significant negative relations between adoption and demonstrations together with formal scheduled group discussion meetings and also formal scheduled group discussion meetings only. These can be ignored because both of them entered with positive signs for income per man-day in the multiple regression equation. Initial village development is again positively related to both contacts and potential village development.

Graphic analyses to test for curvilinearity for relations of selected variables in selected villages by farmers show that there are strong relationships between income per ha and number of adoptions of recommended farming practices, and also between income per ha and knowledge of recommended farming practices. These results suggest that the larger the number of contacts the extension worker makes with particular villages, the more likely will be villagers' level of knowledge of recommended farming practices. The higher the level of knowledge of farming practices the more likely will be the higher the rate of adoption of these practices. But evidence of curvilinearity per se was weak.

With reference to village distribution among dependent variables in relation to the extension programmes used, 80 percent of villages with high knowledge scores of recommended farming practices were exposed either to demonstrations together with formal scheduled group discussion meetings or to formal scheduled group discussion meetings only. The results confirm further that extension methods used in these villages were more effective than those applied in the rest of the villages. These villages are located along the main road, and so the village-level agricultural extension workers had easy access to these villages. More than 50 percent of these villages had extension workers living within them. Results show that these villages had the highest scores of extension contacts with extension workers. These 15 villages have on average a slightly higher literacy percentage rate than the rest of the villages.

Survey results show that villages with high adoption rates of recommended farming practices are the same villages discussed in the above paragraph which were exposed to either formal scheduled group discussion meetings only or demonstrations together with formal scheduled group discussion meetings. The majority of household heads in these villages are between 40 and 60 years old. Over 70 percent of these villages were established or evolved from traditional villages. All this had favourable effects on these villages as discussed in the text. These villages with high income per ha have also high adoption rates and high knowledge of recommended farming practices. [illegible] because of their

favourable financial position are capable of adopting more of the recommended farming practices.

Out of 24 villages surveyed, 12 experienced some increase in development within the period of four years. Out of the 12 villages that experienced increased development, Mkata in Morogoro District and Kiloza in Korogwe District experienced the largest increase. Segera in Handeni District and Mauzeni in Morogoro District experienced a slight decrease in development. Reasons have been discussed in chapter VII.

Effects of aid given to villages on adoption was not as great as expected because this aid was given mainly in the form of materials and a little in the form of cash. Aid given to villages had great effects on village development increase because these materials were often for the purpose of construction of village facilities.

There is a great difference between villages in respect of the relationship between knowledge level and adoption rate of recommended farming practices. The difference is most marked in four villages which adopted less than half of the known recommended farming practices. The observed situation shows that villages with high knowledge scores would not necessarily have corresponding high adoption rate because of the many factors that affect the adoption of the recommended farming practices.

An analysis of residuals for multiple regressions relating to income shows that certain villages are consistently above or below the level expected based on factors in the regression

equations. Rational explanation for these deviations were found to be on other factors than those contained in the analyses.

Several exogenous and endogenous factors were observed in this study to be responsible for ineffectiveness of extension methods and consequently accounted for poor performance of agricultural extension workers in the field. Agricultural extension methods do not operate in a vacuum. These methods were applied in villages and among farmers with varying degrees of economic and social development, and under heterogeneous physical environments. All this had some effects on the applicability of methods and hence on their effectiveness. The following are some of the factors observed in the course of the study that determined the effectiveness of various agricultural extension methods: low basic education and professional trainning of extension workers; poor financial position of farmers; weak government financial resources; inadequate number of extension workers; geographical location of villages in relation to towns, minor settlements, distance from major roads and sisal estates; soil type and its suitability for farming; structural organization of the extension service; the availability and timely supply of agricultural inputs; and level of literacy among farmers.

9.3. Conclusions:

In spite of the number of uncontrolled factors such as: levels of production, biased respondents' replies, location of villages and the integrity of enumerators that might limit the reliability of the analytical results, general conclusion can be made from this study in respect of the coastal zone villages. The study has shown that effectiveness of agricultural extension workers and extension service in general can be improved if certain conditions are fulfilled.

1. There are differences in effectiveness of the three group-based agricultural extension programmes studied as shown in tables 7.1, 7.2 and 7.4. Some of these differences are statistically significant, others are not. Of the three group-based agricultural extension programmes studied, demonstrations together with formal scheduled group discussion meetings are most effective in disseminating recommended farming practices in the coastal zone.

Formal scheduled group discussion meetings were next in effectiveness and informal unscheduled general meetings or contacts were last in effectiveness. This is again supported by the tables mentioned above. This situation implies that agricultural extension workers can definitely increase their communication effectiveness to a certain extent by making optimum uses of demonstrations together with formal scheduled group discussion meetings and also formal scheduled group discussion meetings. Group-based extension methods complement and supplement each other, and it is the use of these methods in proper combinations that makes the greatest impact on villages. It is the cumulative effect on people through exposure to an idea repeated over time that results in action. It is the constant "drip", not the "flood", that wears the stone away. This effect is accomplished through skillful manipulation of appropriate extension teaching methods. Under the present country's villagization policy and economic development, group-based agricultural extension programmes would be among the most appropriate strategies for agricultural development because large groups of families are living together and some are farming collectively and so would be more easily and economically contacted by the agricultural extension worker than the same number of families living and working in isolation as was the case before.

2. Demonstrations together with formal group discussion meetings have positive statistically significant effects on knowledge and adoption of recommended farming practices and also on income per ha and per man-day (Table 7.5 and Appendix A-6). This situation means that under present conditions in the coastal zone villages optimum application of demonstrations together with formal scheduled group discussion meetings as extension methods will likely lead to an increase in the level of knowledge and rate of adoption of recommended farming practices and will also lead to an increase in income per ha and per man-day particularly on individual plots. Similarly, formal scheduled group discussion meetings have significant effects on knowledge of recommended farming practices and on general development of a village in the coastal zone villages (Table 7.5 and Appendix A-6). This means that proper use of these methods will likely lead to an increase in the level of farmers' knowledge of recommended farming practices and also to an increase in general village development. This situation is again more likely to happen on individual plots than on communal plots due to many factors currently affecting communal activities in the villages.

3. Demonstrations together with formal scheduled group discussion meetings are significantly correlated to income per ha and per man-day, and to adoption of recommended farming practices (Tables 7.7 and 7.9). Formal scheduled group discussion meetings are also significantly correlated to adoption of recommended farming practices (Table 7.7). The implications of both cases on income, adoption and knowledge have been covered above. Percent literacy and adoptions appear to be negatively correlated to village development increase (Table 7.7). This could have arisen by chance when the true correlation is equal to zero. In a study such as this it is also possible that the situation might have been caused by factors not investigated in this study (exogenous factors). This also applies to any other such negative correlations to be encountered in this study.

4. Mass media in form of the written word is not effective as an extension method in the coastal zone villages in part because of a high percentage of illiteracy (pp. 169-170). Schooling is a means of increasing knowledge about new farming technology. The assumption is that literacy facilitates learning, which in turn is presumed to instill a favourable attitude towards the use of improved practices. Literacy, then, ought to create a favourable mental atmosphere for the acceptance of new farming practices.

5. The transmittal system of the agricultural extension service as applied in the coastal zone (Figure 6.1) shows that the village-level extension workers form the last link of a rather long transmittal system between research institutions and the farmer. The long transmittal system has a detrimental effect on the message that the village-level extension worker passes over to the farmers. The length of the transmittal system delays the communication of information and reduces the quality and quantity of information. The shorter the system the more likely will be improved quality, quantity and timely delivery of the information.

6. There are differences among villages in the degree of social homogeneity or heterogeneity; commitment to communal activities; their length of establishment; as to whether the village evolved from a traditional village or whether it was a newly-established village; and the age composition of village members. All these have an indirect but profound effect on the effectiveness of extension methods because they directly affect work organization, production, and leadership in the village.

7. Some agricultural recommendations on farming practices from either Regional or District headquarters to villages are not economically sound because they are often not based on thoroughly tested application rates from farmer trials in the area of concern. Moreover, recommended farming practices based on additional inputs must be reflected in more than corresponding income to the farmers. Additional inputs imply additional expenditure and labour, which, if not translated into adequate extra income, will mean no amount of extension effort will motivate the farmers to adopt new techniques.

8. Coastal zone Districts vary in levels of committment between communal and invididual activities particularly farming (Table 7.3). Consequently this variation affects income per ha and per man-day in favour of individual activities. This situation is by and large due to low levels of understanding, acceptance, and commitment to communal activities or villagization and Ujamaa policy in general.

9. Aid given to villages have significant effects on income per ha and per man-day particularly on individual plots (Table 7.5 and Appendix A-6). This means that financial aid as means of acquiring agricultural inputs and also material aids in form of production inputs and supplies, if properly used, will likely raise income per ha and per man-day in the coastal zone villages.

10. Agricultural extension contacts have also significant effect on village development (Table 7.5 and Appendix A-6). The higher the rate of contacts between the extension worker and the villagers the more likely will be an increase in the village development. Extension contacts can be increased by having the extension worker stationed in the village, or by optimum utilization of group-based extension methods particularly demonstrations and finally by providing means of transport and other incentives to extension workers to make them mobile. The larger the number of contacts the extension worker makes with particular villages the higher will be villagers' level of knowledge of recommended farming practices from those villages. Also, the higher the level of knowledge of these practices, the more likely will be a high rate of adoption of these practices and consequently a high income per ha and per man-day which will likely lead to an increase in village development (pp. 200-207).

11. Initial village development is positively and significantly related to both extension contacts and potential for village development (Tables 7.8 and 7.10). It can therefore be concluded that village level agricultural extension workers work more with developed villages. A high initial village development means a greater likelihood of potential for development of the village and vice versa, and also a greater likelihood of concentration of extension service in terms of number of extension contacts in that village. There appears to be a slow but continuous reversion in the agricultural extension approach from a village approach to a "progressive village approach" which is similar to the adandoned "progressive farmer approach", which should also be discouraged because it is contrary to socialist development.

12. The initiation of the learning process and creation of an urge to change in the adoption process of recommended farming practices which result from the use of appropriate and effective extension methods are hardly sufficient by themselves. They must be accompanied by favourable infrastructural services. Unfortunately the infrastructural services which exist are not satisfactory. These include: timely supply of economically viable inputs based on thoroughly tested application rates from farmer trials in the area concerned; adequate credit facilities; announcements of prices well in advance of planting; timely purchase of products after harvesting at the village or local market level; grades that the farmer understands; prompt payments; favourable ration between well-trained extension workers and villages; and finally the availability of transport for extension workers.

13.(a) The major constraints and inadequacies in the use of group-based agricultural extension methods are caused by inadequate training of agricultural extension workers in the use of these methods (pp.50-53) and lack of on-the-job training opportunities or refresher courses for extension workers. The Ministry of Agriculture tends to overemphasize the importance of initial training. The importance of refresher courses can be realized from the results of this study in which the effectiveness of the apparently ineffective village-level extension workers was appreciably improved after they had undergone an intensive short course on extension methods, programmes and planning, and principles of production for Ilonga composite maize and cotton (pp.235-236) before the beginning of this study. All agricultural training institutions at all levels should look into possibilities for modifying the syllabus so that group-based extension methods may receive due emphasis in their training programmes. It is important also to have or to recruit staff who through their adequate basic education should be able to benefit from further training. The present village-level extension workers have low basic education (p.41).

(b) There is no effective supervision of village-level extension workers (pp.44). It appears that lack of effective supervision is partly cause by lack of adequate planing, objectives and goals and partly by lack of means of transport for supervisors and heavy administrative duties which require their personal attention.

14. All 14 extension workers involved in this study are government employees. They are assured of their monthly salaries irrespective of whether they are effective or not. This situation contributes to their ineffectiveness. Employment of village-level extension workers by villages would help to secure their loyality to the villages they serve and commitment to the development of their villages through increased agricultural production.

15. The structural organization of the extension service is such that the least trained extension workers with low technical competence are posted at ward and village levels. It appears that the higher the professional training, the further away the extension worker is posted from the place where he could utilize his expertise directly. It is at the village level where the battlefield is, where the actual work is done and the technical know-how mostly is required. Villagers need competent day-to-day technical advice and information on agricultural production which should be conveyed to them using the most effective methods in order that they may understand them. Under the present structural organization this technical advice cannot be provided effectively because village-level extension workers are not adequately equipped with these skills and also the methods of communicating them.

16. There were marked differences in economic performance between individual and communal farming systems under the same type of extension methods with the individual plots giving higher incomes per ha and per man-day than for communal plots. The ideology of why some one should forego his individual interests and work together with his colleagues for their common good is lacking in most villages of the coastal zone. To change from invididual production to communal production with communal ownership, intensive politicization is needed by villagers. An intensified political educational compaign could be launched in villages. Such an educational campaign would need from the beginning to involve actual changes in the economic and social life of the people in the direction of Ujamaa, changes which they themselves introduce, partly to test what they are being asked to believe, and partly to affirm confidence in it. The success of the government commitment to

introduce a democratic communal revolution in the rural areas depends upon the enlightenment of the Tanzanian masses to the meaning, demands, and relevance of socialism in their own context.

In order to improve the effectiveness of the agricultural extension approach and the extension service as a whole there is a strong and urgent need to re-examine all aspects of extension service including: its general role, the linkage with the research service, structural organization, the development of a planning cadre, government financial constraints, situational factors of farmers, and most important extension methods and training programmes. This exercise should aim at making the agricultural extension service a better tool for village agricultural development. It is imperative for the agricultural extension worker to know his subject and his farmers, to have available innovations that have been proved through village demonstrations to be economically sound in relation to other aspects of the farming system as practiced by villagers, to select the right extension methods or approaches, and then to present the measage in the best possible way taking into account social, economic, and political conditions. If any one of these links in the communications' chain is not properly welded, the chain will break and the message will not get through.

APPENDIX TABLES

Appendix A-1. Sample villages: Average for alternative dependent variables per village by type of extension programme

Village	Income				Adoptions 1/	Knowledge 1/	Development increase 2/
	Per ha		Per man-day				
	Individual plots	Communal plots	Individual plots	Communal plots			
	T.Shs.				No.		
	Demonstrations together with formal scheduled group discussion meetings						
Lunga	1197	480	8.1	3.8	5	7	1
Isata	739	336	6.3	4.6	5	10	0
Ikata	714	404	4.4	.6	6	11	1
Segera	627	355	4.6	11.6	6	4	0
Kiloza	898	749	6.6	3.4	6	8	0
Kwamsisi	915	867	6.9	6.6	8	9	0
Kauzeni	1388	302	10.5	2.0	6	10	0
Kizinga	905	364	6.8	2.8	8	11	0
	Formal scheduled group discussion meetings only						
Bwilingu	474	188	3.1	2.3	5	11	0
Mboga	833	915	6.2	6.3	5	9	1
Komkonga	686	271	4.9	1.4	5	11	2
Manga	747	406	5.6	3.0	6	10	0
Chekelei	936	147	6.0	1.0	3	7	0
Kiluwani	835	525	7.3	3.9	6	5	0
Kikundi	807	431	2.7	2.7	4	3	1
Sinya Ulime	476	256	.9	.9	3	5	2
	Informal unscheduled general meetings or contacts only						
Malivundo	483	543	3.7	3.9	6	4	0
Mdaula	502	128	3.8	.4	3	2	0
Kitumbi	539	259	3.3	1.8	5	8	2
Mazingara	902	378	7.3	2.9	5	7	1
Magamba	299	117	3.2	.7	6	5	1
Mlembule	1045	252	7.8	1.2	8	4	1
Lukobe	364	494	2.7	3.7	6	9	0
Ikata (H)	1028	419	6.1	3.3	5	8	0

Source: Research results.
1/ Of specified husbandry recommendations.
2/ Increase over 4 years in village amenities.

Appendix A-2. Districts: Average for alternative dependent variables per village by type of extension programmes

Districts	Income				Adoptions 1/	Knowledge 1/	Development increase 2/
	Per ha		Per Man-day				
	Individual plots	Communal plots	Individual plots	Communal plots			
	T.Shs.				No.		
	Demonstrations together with formal scheduled group discussion meetings						
Bagamoyo	968	408	7.2	4.2	5.0	8.5	0.5
Handeni	671	380	5.4	6.0	6.0	7.5	.0
Korogwe	907	808	6.8	5.0	7.0	10.5	1.0
Morogoro	1147	333	8.7	2.4	7.0	8.5	.5
Average	923.25	482.25	7.0	4.4	6.3	8.8	.5
	Formal scheduled group discussion meetings only						
Bagamoyo	654	552	4.7	4.3	5.0	10.0	.5
Handeni	717	338	5.3	2.2	5.5	10.5	1.0
Korogwe	886	336	6.6	2.5	3.5	4.0	1.0
Morogoro	641	343	1.8	1.8	4.5	6.0	.0
Average	274.50	402.25	4.6	2.7	4.6	7.6	.6
	Informal unscheduled general meetings or contacts only						
Bagamoyo	493	335	3.8	2.2	4.5	3.0	.0
Handeni	721	317	5.3	2.4	5.0	7.5	.5
Korogwe	672	185	6.5	1.0	5.5	6.5	.0
Morogoro	696	457	4.3	3.5	7.0	4.5	1.5
Average	645.50	327	5	2.3	5.5	5.4	.5

Source: Research results.
Notes: Same as for table A-1.

Appendix A-3. Villages by Districts: Average income per ha per village by extension program and nature of farming system by years 1/

Extension method 2/	Farming system	Village	1971/72	1972/73	1973/74	1974/75	Average: By village	Average: Average over replications
			T.Shs.					
			Bagamoyo					
(A)	Communal	Misata	401	159	-	447	336	321
		Lunga	170	188	95	771	306	
	Individual	Misata	974	385	759	836	739	698
		Lunga	890	1154	1201	1614	1197	
(B)	Communal	Mboga	187	726	1634	1112	915	549
		Bwilingu	176	188	-	-	182	
	Individual	Mboga	897	974	589	872	833	612
		Bwilingu	284	459	139	673	390	
(C)	Communal	Malivundo	376	413	693	693	543	335
		Mdaula	263	59	-	61	128	
	Individual	Malivundo	237	285	523	787	483	492
		Mdaula	298	285	441	983	502	
			Handeni					
(A)	Communal	Segera	80	-	-	-	80	175
		Mkata	134	-	404	-	269	
	Individual	Segera	643	696	55	542	484	530
		Mkata	162	422	1188	533	576	
(B)	Communal	Komkonga	188	27	264	523	250	328
		Manga	115	66	717	726	406	
	Individual	Komkonga	788	778	593	585	686	716
		Manga	653	552	631	1153	747	
(C)	Communal	Kitumbi	380	133	-	-	256	317
		Mazingara	104	655	375	-	378	
	Individual	Kitumbi	725	135	205	687	438	670
		Mazingara	241	294	1222	1850	902	

(Cont.)

Appendix A-3. (cont.)

Extension method 2/	Farming system	Village	1971/72	1972/73	1973/74	1974/75	Average by village	Average over replications
			T.Shs.					
			Korogwe					
(A)	Communal	Kiloza	49	547	628	1071	574	721
		Kwamsisi	689	1071	932	778	867	
	Individual	Kiloza	361	1113	1261	855	898	906
		Kwamsisi	654	779	1297	928	915	
(B)	Communal	Kiluwani	292	158	-	1125	525	329
		Chekelei	118	147	-	-	132	
	Individual	Kiluwani	298	553	1129	1134	936	885
		Chekelei	775	1327	716	522	835	
(C)	Communal	Mlembule	302	74	92	380	212	151
		Magamba	57	117	64	121	90	
	Individual	Mlembule	922	1657	789	812	1045	654
		Magamba	349	270	159	277	264	
			Morogoro					
(A)	Communal	Kauzeni	475	116	216	317	281	322
		Kizinga	290	280	578	300	364	
	Individual	Kauzeni	566	1144	640	3201	1388	1146
		Kizinga	-	-	899	910	905	
(B)	Communal	Kikundi	455	335	106	502	349	223
		Sinya						
		Ulime	166	28	-	-	97	
	Individual	Kikundi	788	853	761	69	618	547
		Sinya						
		Ulime	274	766	364	502	476	
(C)	Communal	Lukobe	-	435	413	636	494	422
		Mkata	298	246	713	143	350	
	Individual	Lukobe	306	471	458	221	364	580
		Mkata	217	142	107	1385	799	

Source: Research results.

1/ Dashes indicate no communal programme for the year.

2/ (A) - Demonstrations together with formal scheduled group discussion meetings.
(B) - Formal scheduled group discussion meetings only.
(C) - Informal unscheduled general meetings or contacts only.

Appendix A-4. Villages by Districts: Average income per man-day per village by extension program and nature of farming system by years 1/

Extension method 2/	Farming system	Village	1971/72	1972/73	1973/74	1974/75	Average: By village	Average: Average over replications
			T.Shs.					
			Bagamoyo					
(A)	Communal	Msata	9	1	-	3	4	4
		Lunga	1	1	7	6	4	
	Individual	Msata	7	3	3	6	5	7
		Lunga	6	8	9	9	8	
(B)	Communal	Mboga	1	3	13	8	6	4
		Bwilingu	2	1	-	-	2	
	Individual	Mboga	7	7	4	7	6	4
		Bwilingu	2	4	2	5	2	
(C)	Communal	Malivundo	2	3	5	5	4	2
		Mdaula	0	0	-	0	0	
	Individual	Malivundo	2	2	5	6	4	4
		Mdaula	2	2	3	7	4	
			Handeni					
(A)	Communal	Segera	0	-	-	-	0	1
		Mkata	0	-	2	-	1	
	Individual	Segera	5	5	4	4	5	5
		Mkata	1	3	9	4	4	
(B)	Communal	Komkonga	0	0	2	3	1	2
		Manga	0	0	5	5	3	
	Individual	Komkonga	6	5	4	4	5	6
		Manga	5	4	5	9	6	
(C)	Communal	Kitumbi	3	1	-	-	2	3
		Mazingara	1	5	3	-	3	
	Individual	Kitumbi	5	1	2	5	3	5
		Mazingara	5	2	9	13	7	

(Cont.)

Appendix A-4. (cont.)

Extension method 2/	Farming system	Village	1971/72	1972/73	1973/74	1974/75	Average by village	Average over replications
			T.Shs.					
			Morogoro					
(A)	Communal	Kauzeni	3	1	2	2	2	3
		Kizinga	2	2	4	2	3	
	Individual	Kauzeni	4	9	5	24	11	9
		Kizinga	-	-	7	7	7	
(B)	Communal	Kikundi	4	3	1	4	3	2
		Sinya Ulime	1	1	-	-	1	
	Individual	Kikundi	6	7	6	5	6	5
		Sinya Ulime	2	4	3	4	3	
(C)	Communal	Dukobe	-	3	3	5	4	4
		Ikata	5	2	6	1	4	
	Individual	Dukobe	2	4	2	2	3	5
		Ikata	2	11	1	10	6	

Source: Research results.

1/ Average for those years for which some production took place.

2/ Same as for Appendix A-3.

Appendix A-5. Villages by Districts: Average area cultivated individually and communally per village by years[1]/

District	Village	1971/72		1972/73		1973/74		1974/75		Average		Grand average
		Com.	Indiv.	Com.	Indiv.	Com.	Indiv.	Com.	Indiv.	Com.	Indiv.	
						Ha						
Bagamoyo	Msata	28	21	44	41	0	23	11	21	21	27	37
	Lunga	38	22	6	29	3	16	237	42	71	27	
	Fuga	24	28	21	75	6	46	70	44	30	48	28
	Kwilingu	16	20	0	41	0	18	0	40	4	30	
	Kalivundo	20	45	20	58	56	18	10	65	27	42	37
	Kaula	2	19	3	21	0	48	200	15	51	26	
Kandeni	Segera	102	27	0	44	0	15	0	37	26	31	29
	Msata	18	60	0	67	27	45	0	13	11	46	
	Komkonga	7	23	0	16	71	16	32	82	28	34	29
	Manga	36	27	17	41	3	67	8	17	16	38	
	Kitumbi	15	30	13	36	0	40	0	45	7	38	28
	Kazingara	44	82	0	57	15	32	0	40	15	53	
Morogwe	Kiloza	29	74	2	67	3	39	3	58	9	40	28
	Kwansisi	22	43	10	69	4	37	45	21	20	43	
	Kiluwani	3	34	4	40	0	21	2	36	2	33	17
	Chekelei	10	38	5	33	0	15	0	27	4	28	
	Mlembule	34	20	55	15	86	30	82	13	64	20	44
	Magamba	7	57	45	49	88	43	32	50	43	50	
Morogoro	Kauzeni	40	12	30	27	28	7	47	36	36	21	26
	Kizinga	35	0	34	0	28	17	40	36	34	13	

Appendix A-5. (cont.)

District	Village	1971/72		1972/73		1973/74		1974/75		Average		Grand Average
		Com.	Indiv.	Com.	Indiv.	Com.	Indiv.	Com.	Indiv.	Com.	Indiv.	
						Ha						
Morogoro (cont.)	Mikundi	26	12	13	8	28	13	48	24	29	14	18
	Sinya Ulime	9	40	6	11	0	29	0	13	4	23	
	Lukobe	0	3	0	23	16	6	10	12	7	11	21
	Ukata	44	13	84	17	12	30	48	13	47	18	

Source: Research results.
1/ Com = Communal plots; Indiv = Individual plots.

Appendix A-6. Individual plots: Simple correlation coefficients between all variables and multiple regression equations for specified dependent variables[1]

Simple Correlations

	INDEV	CONTA	PODEV	DEVIN	MIDEV	ADOPT	KNOW	DEME	MONLY	INCHA	INCMD	AID
POINT	0.224	0.034	0.134	-0.423	0.029	0.316	0.246	0.168	-0.029	0.063	0.080	-0.060
INDEV		.545*	.416*	- .026	.395	-.050	.012	.373	- .169	-.136	-.137	- .107
CONTA			.065	.375	.286	.002	-.063	.180	- .181	-.140	-.130	- .022
PODEV				.166	.372	-.252	.258	.227	.186	-.141	-.156	- .006
DEVIN					.225	-.445*	.039	-.283	.328	-.206	-.238	.127
MIDEV						-.315	.066	.207	.081	-.008	-.049	.394
ADOPT							.284	.421*	.457*	.249	.267	- .170
KNOW								.356	.148	.129	.144	- .156
DEME									- .514*	.431*	.424*	.050
MONLY										-.109	-.116	- .074
INCHA											-.137	.400
INCMD												.343

Multiple Regression Equations

Equation	R^2	F	s	D.F.
INCHA = 587.2 + 274.0 DEME* + 94.57 MONLY + 0.07028 AID* (111.6) (108.64) (.03190)	0.35*	3.81*	223	21
= 559.2 + 273.3 DEME* + 99.11 MONLY + 0.08491 AID* - (113.9) (111.15) (.05706)				
58.3 BACAM - 12.0 MORO + 135.7 MORO (128.8) (138.3) (127.6)	.42	2.19	228	18

(Cont.)

Appendix A-6. (cont.)

Equation	R^2	F	s	D.F.
CONTR = 2.4 + 0.05954 PCLIT + 1.124 DEED* (.04446) (.560)	.23*	3.46*	1.3	22
= 1.9 + 0.07720 PCLIT + 1.102 DEED* + 1.1 BAGAM - (.04924) (.546) (.8)				
0.3 MORO + 0.3 KORO (.7) (.7)	.38	2.32	1.3	19
KNOW = 2.1 + 0.07562 PCLIT + 3.176 DEED** + 2.441 MONLY* (.08455) (1.242) (1.191)	.30	3.03	2.4	21
= 0.3 + 0.1508 PCLIT + 2.979 DEED* + 2.209 MONLY* - (.0941) (1.217) (1.167)				
2.1 BAGAM - 1.0 MORO - 2.7 KORO* (1.4) (1.3) (1.4)	.43	2.28	2.4	18
DEED = 4.506 + 2.016 DEED* + 0.5416 MONLY + 0.0004513 AID* (.875) (.8512) (.0002499)	.30	3.03	1.8	21
= 4.049 + 1.837 DEED + 0.5462 MONLY + 0.0005784 AID* + 0.05097 KNOW - (1.105) (.9947) (.0003142) (.17658)				
0.486 BAGAM - 0.144 MORO + 0.941 KORO (1.053) (1.128) (1.107)	.36	1.39	1.8	17
DAVID = -0.9 + 0.1377 CONTR* + 0.07044 PCDEV + 0.6423 MONLY* + 0.0000896 AID (.0573) (.21147) (.2980) (.0000982)	.33	2.50	.7	20

(Cont.)

Appendix A-6. (cont.)

Equation	R^2	F	s	D.F.
DEVIN = -0.5 + 0.1327 CONTA* + 0.07358 POPDEV + 0.5940 MONLY* + 0.0000601 AID - (.0571) (.27537) (.2926) (.0001092) 0.6 BAGAM - 0.1 MORO - 0.6 KORO (.4) (.5) (.4)	.47	2.11	.7	17

Source: Research results.

1/ A single asterisk indicates statistical significance at P = 0.05 and a double asterisk at P = 0.01. A 1-tailed test was used for the partial regression coefficients since the sign was specified in advance. Only variables with positive regression coefficients were retained in the multiple regression analyses except for those that relate to the individual Districts. Analyses are shown both with and without the District 0-1 variables. See section 7.3.1., p.187 for code names for variables.

Appendix A-6. (cont.)

Equation	R^2	F	s	D.F.
DEVIN = -0.5 + 0.1327 CONTA* + 0.07358 PONDEV + 0.5940 PONLY* + 0.0000601 AID - (.0571) (.27537) (.2926) (.0001092) 0.6 BAGAM - 0.1 MORO - 0.6 KORO (.4) (.5) (.4)	.47	2.11	.7	17

Source: Research results.

1/ A single asterisk indicates statistical significance at P = 0.05 and a double asterisk at P = 0.01. A 1-tailed test was used for the partial regression coefficients since the sign was specified in advance. Only variables with positive regression coefficients were retained in the multiple regression analyses except for those that relate to the individual Districts. Analyses are shown both with and without the District 0-1 variables. See section 7.3.1., p.187 for code names for variables.

Appendix A-7. Communal plots: Simple correlation coefficients between all variables and multiple regression equations for specified dependent variables[1/]

Simple Correlation

	INDEV	CONTA	PODEV	DEVIN	PIDEV	ADOPT	KNOW	DEME	MONLY	INCHA	INCMD	AID
PCLIT	0.224	0.034	0.134	-0.324	0.238	0.260	0.304	0.168	-0.029	0.103	0.169	-0.056
INDEV		.543**	.416*	.063	.533**	-.100	.058	.373	- .169	-.283	.182	- .107
CONTA			.065	.344	.187	.033	-.090	.180	- .181	-.193	.214	- .022
PODEV				.203	.402	-.275	.261	.227	.186	-.061	.279	- .006
DEVIN					.125	-.375	.069	-.265	.276	-.126	-.121	.044
PIDEV						-.197	.178	.265	- .042	.004	.020	.239
ADOPT							.292	.418*	- .436*	.358	.301	- .128
KNOW								.363	.104	.171	.257	- .197
DEME									- .514*	.266	.524**	- .051
MONLY										.003	-.149	- .074
INCHA											.542**	.114
INCMD												.003

Multiple Regression Equations

Equation	R^2	F	s	D.F.
INCHA = 4.0 + 58.14 ADOPT + 114.8 DEME + 129.0 MONLY (34.01) (101.7) (99.8)	0.21	1.84	197	21
= 90.0 + 67.43 ADOPT + 107.8 DEME + 141.5 MONLY + 112.6 BAGAM + 24.9 MORO + 33.8 KORO (39.14) (107.6) (106.2) (116.8) (115.8) (118.1)	.25	.99	207	18
INCMD = -0.925 + 0.01542 PCLIT + 0.1453 CONTA + 0.2815 ADOPT + 2.728 DEME + 1.114 MONLY (.07847) (.1842) (.3932) (1.152) (1.135)	.34	1.92	2.2	19

(Cont.)

Appendix A-7. (cont.)

Equation	R^2	F	s	D.F.
INCD = -0.315 + 0.032 PCLIT + 0.09278 CONTA + 0.3633 ADOPT + (.9246) (.19062) (.449) 2.653 DENE + 1.009 HONLY - 0.894 BAGM - 1.562 MORO - (1.164) (1.170) (1.442) (1.272) 2.053 KORO (1.306)	.44	1.56	2.2	16

Source: Research results.
1/ Same as for Appendix A-6.

Appendix A-8. ANOVA results[1/]

Income per ha

Source of variation	Degrees of freedom	Mean square	F-ratio
		1,000 Shs.	
Between Districts	3	26	0.494
Between replications	1	55	1.038
Between methods	2	197	3.742*
Between activities	1	1,595	30.280**
Error	40	53	-

Income per man-day

Source of variation	Degrees of freedom	Mean square	F-ratio
		Shs.	
Between Districts	3	0.8	0.199
Between replications	1	1.3	.299
Between methods	2	28.6	6.747**
Between activities	1	52.0	12.264**
Error	40	4.2	-

Knowledge of recommended farming practices

Source of variation	Degrees of freedom	Mean square	F-ratio
		No.	
Between Districts	3	4.9	0.648
Between replications	1	.7	.087
Between methods	2	23.6	3.095
Error	17	7.6	-

Adoption of recommended farming practices

Source of variation	Degrees of freedom	Mean square	F-ratio
		No.	
Between Districts	3	1.8	1.151
Between replications	1	1.0	.659
Between methods	2	5.3	3.347
Error	17	1.6	-

(Cont.)

Appendix A-3. (Cont.)

Development increase of the village

Source of variation	Degrees of freedom	Mean square	F-ratio
		No.	
Between Districts	3	0.8	1.526
Between replications	1	.0	.000
Between methods	2	.5	.981
Error	17	.5	-

1/ No interaction terms were significant for these analyses. Hence the sums of squares and degrees of freedom, respectively, were added to those for the initial error term and a new mean square error was computed.

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