DIRECT AND INTERACTIONAL EFFECTS OF THREE EXTENSION ORGANISATIONS ON CROP PRODUCTION AND FARMERS' EDUCATION IN NORTHERN TANZANIA

by

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DEDICATION

To those who sacrificed some of their rights for the two years of this study.

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ABSTRACT

The importance of having an efficient Agriculture Extension Service in predominantly Agricultural countries like Tanzania need no over emphasis.

In this study cotton extension service and coffee extension service were studied in comparison with the general extension service in Same and Mwanga Districts in Kilimanjaro Region. The study included 1977/78 and 1979/80 cropping seasons because individual villages began keeping separate data in 1977/78 season. The time of actual field work was between June and November 1980.

Total yields and quality in all villages were recorded for the period under study. However, the knowledge of the improved practices by the farmers was obtained by random sampling from the total villages and from each randomly picked village, 20 farmers were randomly selected.

Descriptive statistics were used in analysing yield and quality changes over the study period in each extension system. Descriptive statistics were used to analyse the distribution of respondents in various knowledge categories; and chi-square test was used to find out association of farmers' knowledge with various farmers' characteristics. Cotton and coffee respondents were dealt with separately.

The findings suggest that resident general extension agents perform better than their commodity counterparts. It was also noted that placing the two extension agents in the same village does not necessarily increase performance than where resident general extension

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The findings suggest that resident general extension agents perform better than their commodity counterparts. It was also noted that placing the two extension agents in the same village does not necessarily increase performance than where resident general extension

worker alone exists. It was found out that knowledge of improved practices did not differ significantly among the extension systems.

It was concluded that increasing the number of resident general extension agents could have improved production more than the commodity approach.

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CHAPTER I

INTRODUCTION

Agricultural extension service is described by Savile[1] as being a system of out of school education for the rural people. Its purpose is to teach the people living in the rural areas how to raise their standards of living by their own efforts, using their own resources of manpower and materials with minimum assistance from the government. Depending on the need and complexity of the situation, the agricultural extension service can be organized in various ways. Robinson[2] noted that an organization comes into being in response to a need and is influenced in its development by the larger society in which it evolves.

Chang[3] divides the organization of agricultural extension services into three types, namely:-

(i) the unified service where all the extension work is inclusive - all farm activities pertaining to crops, livestock, fisheries, sericulture and forestry;

(ii) consolidated type where extension administration is under one administration

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1 Savile, A.H. Extension in Rural Communities. London, Oxford University Press 1965, p. 2.

2 Robinson, C.K. The Organization and Administration of Agricultural Services. Mimeographed lecture notes. Department of Agricultural Extension, U.W.I., 1971.

3 Chang, C.W. Extension for Agricultural and Rural Development. F.A.O., Bangkok, 1963.

except forestry;

(iii) divided type where each technical department or organization has its own extension service.

IMPORTANCE OF AGRICULTURE IN TANZANIA

The size of Tanzania is 933,590 square kilometers. Its population, based on 1978 population census, is 18,000,000. Ninety per cent (90 %) of the total population live in villages, rural areas, and their main activity is agriculture.

Apart from providing employment to the majority of the Tanzanians, agriculture accounts for 80 per cent of Tanzania's exports and 60 per cent of the Gross Domestic Product.[1]

Agriculture is the backbone of Tanzania's economy, hence the importance of a sound agricultural extension service.

HISTORY OF TANZANIAN EXTENSION SERVICE

Tanzania is a united republic of two countries, namely Tanganyika, now referred to as Tanzania Mainland, and Zanzibar, also known as Tanzania Islands.

Tanzania mainland was first colonized by Germans in the 1880s, later by the British from 1919 to 1961. Zanzibar was colonized by the Arabs and later by the British from 1919 to 1962. The union of Tanganyika and Zanzibar was effected on 24th April, 1964.

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[1] Hyden., G. Beyond Ujamaa in Tanzania. Heinemann, London, 1980.

(i) Agricultural Extension during the Colonial Days.

During the colonial days i.e. 1900 to 1960, the extension service was focussed primarily on export production; cotton, sisal and coffee were the main cash crops. To achieve maximum production of these crops, which were in great demand in the European industries, taxation was introduced. In this manner the peasants would have no other way of raising money to pay the tax except by growing an export crop. In addition, certain laws and by-laws were legislated requiring an adult to grow a certain acreage of the required crop. It should be noted that this method of achieving agricultural production does not conform with the present definition of Agricultural Extension because emphasis was on the coercion rather than persuasion. Use of force did not bring about the desired effects. Many peasants became resistant and various ways of evading the crop production were used including frequent migration and open confrontations.

The resistance led the colonialists to abandon the forced form of extension and adopted a persuasive approach aimed at the progressive farmers, who, as it turned out to be, were usually richer with more than average farm sizes.[1] However the top-down approach and the legislation still remained.

During the colonial era, the agricultural extension organisation was a unified type, in that all farm activities like crops, livestock, fishery, forestry and sericulture were inclusive.

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[1] Raikes, P.L. and W. L. Meynen. Dependency, Differentiation and the Diffusion of Innovations. East African Social Science, Reference Paper 70. F.A.O. Nairobi 1972.

(ii) Extension during the Early Independence.

After independence 1961, the bye-laws used during the colonial days were no longer enforced. Instead a more educational approach was followed, but progressive farmers remained the focus. Diffusion theory suggested that innovations would readily permeate through innovators and early adopters to the other farmers. In addition, the extension service's emphasis was equally placed to both cash and food crops. Even at this stage the agricultural extension organization was still a unified type. All farm activities related to crops, livestock, fisheries, forestry and sericulture were under one administration.

(iii) Agricultural Extension after Arusha Declaration.

Arusha is the name of a town in Northern Tanzania. Arusha Declaration is the decree which was pronounced in Arusha on 5th February, 1967 by President Nyerere, declaring Tanzania's decision to pursue socialist ideology.

After the Arusha Declaration 1967, extension agents were required to give maximum attention to the Ujamaa villages. In this context, Ujamaa means voluntary togetherness. Thus, Ujamaa villages are those villages where its members have voluntarily accepted the principles of socialism as stipulated in the Arusha Declaration. However, agricultural extension as an institution remained almost unchanged, that is, planning was still top-down, training and recruitment still under the government and the agents remained responsible to the government.

In 1972, the agricultural extension organization was reorganized; game, fisheries and forestry divisions were detached from the Ministry of Agriculture.

All this time, despite the changes, the extension service in Tanzania has never been able to free itself from criticism almost from every quarter. The politicians regard the extension ineffectiveness as the major cause of the economic problems facing the country. In 1975, President Nyerere publicly asserted that even if all the extension agents were dismissed the agricultural production would not be affected. The truth behind this statement is debatable. As a result various reasons have been forwarded to explain the ineffectiveness. The Extension workers tend to blame farmers as being "conservative", while researchers like Cliffe et al[1] blame the agricultural extension service as being incompetent in terms of poor organization, poor planning, poor funding and poor staffing. Yet some other researchers like Nelson[2], have reported unrealistic recommendations by research stations as being equally important.

Very likely, the formation of a number of agriculture commodity authorities during the early 1970s, was aimed at increasing effectiveness of agricultural extension among other things.

FORMATION OF COTTON AUTHORITY (T.C.A.)

This authority became operational on 1st July, 1973. The main functions of the authority are: -

(a) to promote the development and improvement of cotton industry in Tanzania;

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[1] Cliffe, L., G. Helleiner, S. Mbilinyi and R. Woods. An Interim Report on the Evaluation of Agricultural Extension. Rural Development Paper 5. University of Dar es Salaam, 1968.

[2] Nelson, R.S.M. Background paper for Tanzania Research Workshop. World Bank. Nairobi 1978.

(b) to carry on, either on its own or in participation with any other person, the business of growers and producers of raw cotton, the business of ginning and crushing, processing and manufacturing of cotton seed and products thereof;

(c) to regulate and control the marketing and export of cotton;

(d) to advise the government on all matters pertaining to cotton industry.[1]

Since its inception, Tanzania Cotton Authority (T.C.A.) has established its own agricultural extension agents in a number of villages. However, the General Agricultural Extension agents are still expected to deal with cotton in their normal extension work in all villages within their area.

T.C.A. is a parastatal organization with some autonomy but it falls under the Ministry of Agriculture. T.C.A. budget is presented in the Parliament by the Minister of Agriculture and its research and training are conducted by the Ministry.

Cotton is mostly a peasant crop with farms ranging from ¼ to 1 hectare on the average. Tanzania Cotton Authority has few larger farms in other districts but not in the districts under the study. However,

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[1] Anon., Tanzania Cotton Authority. Dar es Salaam. (Undated).

cotton is a major cash crop for 27 villages, consisting of 85,895 people or 41 per cent of total population of the area under study. Total area under cotton in the study area is 2,100 hectares.[1]

FORMATION OF COFFEE AUTHORITY OF TANZANIA (CAT)

CAT was formed in 1976 but became operational in 1977. Like T.C.A., for cotton, CAT has an overall responsibility of coffee production up to the exporting stage. It also has a number of coffee extension workers in a number of villages but has not been able to cater for all villages. The General Agricultural Extension agent still has the responsibility of advising farmers on coffee within his area of work.

Coffee is mostly grown by peasants with acreages of ½ to 2 hectares but there are some government owned coffee estates especially in Kilimanjaro region. Privately owned coffee estates are very few. Coffee is a major cash crop for 63 villages whose population is 94,103 or 45.2 per cent of total population in the area under study. Total area under coffee in the study area is 4,317 hectares.[2]

Like all other agriculture commodity authorities, CAT is closely linked with the Ministry of Agriculture. All research stations and all agricultural training institutes are run by the Ministry of Agriculture. In short, all extension workers in the country are centrally trained; then the Ministry gives postings depending on which institutions are on the priority list. But each extension organisation

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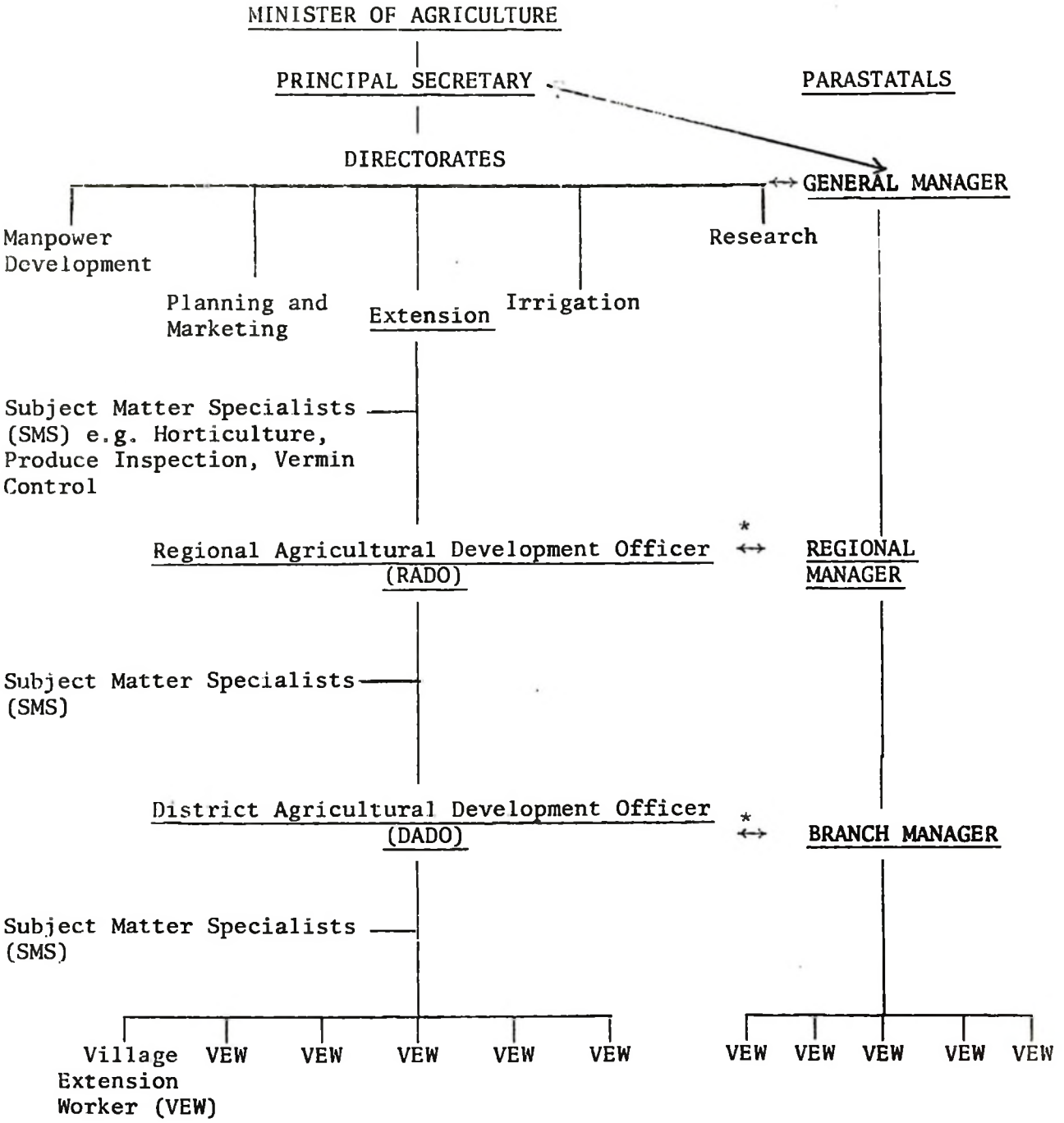
[1] Source: Same District Agricultural Annual Report of 1979.

[2] Source: District Coffee Officer - Same.

Figure 1

DIAGRAMATIC PRESENTATION OF THE ORGANIZATION
OF THE MINISTRY OF AGRICULTURE



* Two-way arrows indicate consultation and exchange of ideas.

recruits its own unqualified workers, and each of them has field staff down to the village level.

There are other crop authorities, namely cashew, tobacco and tea, which were formed in the 1970s, i.e. between 1973 and 1977. It can be noted that all the crop authorities now existing in Tanzania are export oriented.

THE EXTENSION SERVICE ORGANIZATIONS

(i) The General Extension Service

The national head of the Ministry of Agriculture is the Minister, who is a politician and does not need to have any agricultural background. The Minister is assisted by a Principal Secretary to the Ministry who is a civil service professional, (see Fig. 1). The Principal Secretary may or may not have an agricultural background but in most cases holds a postgraduate degree and has distinguished qualities in administration.

At the National level there are five directors heading divisions, i.e. Irrigation, Research, Manpower Development, Planning and Marketing, and Extension. The Directors are normally postgraduates and specialists in their respective fields. In each Directorate, there are a number of subject matter specialists.

The Nation is divided into 21 administrative divisions called Regions.

At the Regional level, extension is headed by a Regional Agricultural Development Officer (RADO). He is usually a university graduate with some long experience in Agricultural Extension or Administration. There are a number of subject matter specialists under

him like horticulture, vermin control, land planning, mechanisation, produce inspection, irrigation and publicity.

Each region is subdivided into a number of administrative districts.

At the District level, the extension is headed by a District Agricultural Development Officer (DADO) who is usually a university graduate with several years of experience in Extension or Administration. There are a number of subject matter specialists under him as is the case in the regional level, but the number will depend on the district situation. For example, districts where vermin is not a problem will have no vermin control specialists.

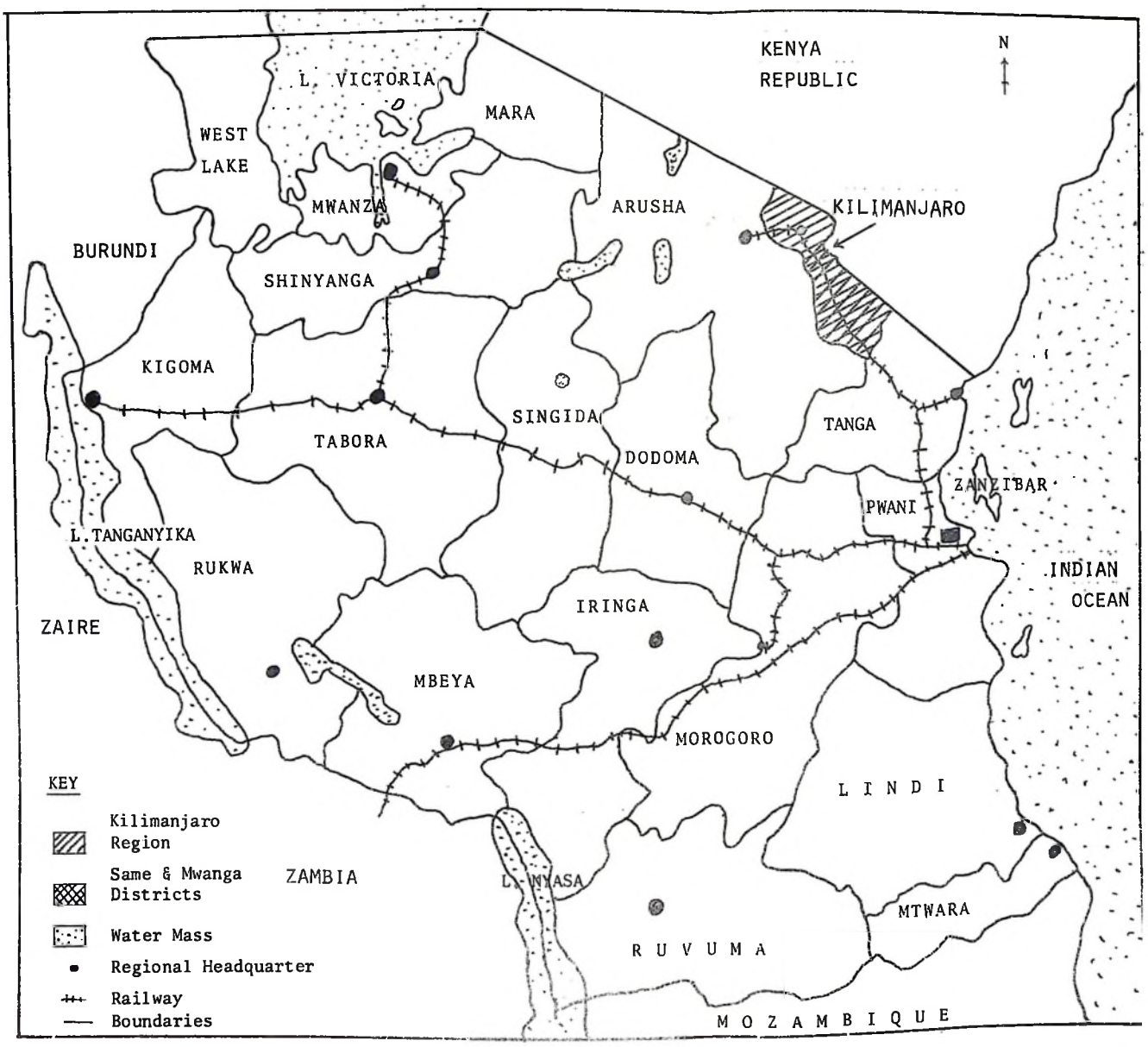
Each district is divided into a number of villages. Each registered village is a government of its own. It is allowed to secure loans for its development, make its own bye-laws, plan for its development, and it can sue or be sued in court.

At the village level, there are village extension workers who are also known as front line workers. The present official qualification for a village extension worker is "Ordinary Level education" (secondary school education) plus two years agricultural training in an Agricultural Institute. However, there are a few older village extension workers who had only 8 years of primary education. Some of these primary education holders received two years agricultural training but others got no training at all.

The general extension agents are required to cover all crops in their area of work. Livestock extension is dealt with by a different division falling under the Ministry of Livestock.

The area under study is Same and Mwanga Districts in Kilimanjaro

Figure 2: MAP OF TANZANIA - ADMINISTRATIVE REGIONS



region, (see Fig. 2). The districts have 103 registered villages but the number of village extension workers is only 37, an average of 3 villages per extension worker. The government target is one (1) village extension worker per village.

(ii) The Commodity Extension Service.

There are 5 commodity extension services in Tanzania at present, namely coffee, cotton, cashew, tea and tobacco.

The national head of each commodity extension service is the General Manager who is usually a postgraduate or a university graduate with long experience and distinguished qualities in administration. The head of agricultural commodity extension in a region and district is Regional Manager and Branch Manager respectively. Their qualifications compare well with those of the corresponding general extension workers. But the commodity village extension workers start with a slightly higher salary than the general extension workers because they have different terms of service.

In Same and Mwanga Districts, there are only two types of the Commodity Extension services, i.e. Cotton and Coffee. Coffee is grown in the mountainous parts of these districts while cotton is grown in the lowland areas. Thus the two crops are grown in two distinctly different altitudes.

Coffee Authority has 23 village extension workers in these two districts. These coffee village extension workers are posted in areas depending on the coffee hectarage, that is, one extension worker can cover three villages if these villages have few hectares under coffee. On the

average, the coffee village extension workers cover only 200 hectares of coffee, but where the village has fewer hectares than 200, the extension worker is given the neighbouring village or villages to make up the average hectares required. The total number of villages growing coffee in these two districts in 63, (See Table 1).

Cotton Authority has 6 village extension workers in the two districts. Usually the extension workers are posted each in one village specifically and advises cotton production only, but may be required to advise the nearby village when time allows. There are 27 villages growing cotton in these districts.

In the final analysis the commodity village extension workers work on single crops and fewer villages.

From the farmers point of view, the idea of having two different advisors may seem uncalled for. Farmers in Same and Mwanga Districts grow a number of crops other than cotton or coffee. In some cases farmers intercrop coffee and cotton with other crops. It makes no sense to a farmer when an extension worker, who in most cases is rarely seen, decides to differentiate crops. For example, a general extension worker paying a visit to a farmer who intercrops coffee and bananas, then the general extension worker decides to advise the farmer how to control banana weevils but refuses to advise him on how to prune his coffee just because there is a coffee extension worker who is supposed to service the village. The situation becomes even worse if the two extension workers advise the same farmer contradictory practices on the same crop.

Table 1: LIST OF VILLAGES UNDER VARIOUS EXTENSION SYSTEMS

Crops	EXTENSION SYSTEMS					Total
	General Ext. only but non-resident	General & Commodity Ext. servicing but both non-resident	General Ext. servicing & resident	Commodity Ext. & resident	Both Ext. servicing & both resident	
	1	2	3	4	5	
Coffee	-	Mamba, Mruma, simbomu, Lambo, Mangio, Vuchama, Mang'a, Goha, Bwambo, Sambweni, Mwapapa, Idaru, Gwang'a, Marieni, Tae, Mbore, Kighare, Kirongaya, Vuagha, Lomwe, Kiriche, Ndorwe, Sofe, Mbole, Chanjale, Ngujuni, Songoa, Mbakweni, Vumari, Kwizu, Marindi, Gonjan-a, Mtii, Mafingiro, Kanza, Myombo, Mvango, Ntenga, Raa	Masumbeni, Vuje, Mshena, Mhero, Bombo, Vunta, Mfinga/ Ndambwe Lugulu	Vugwama, Mwaniko, Kisanjuni Shighatini Songoa Mtunguija Ndanda Kilaweni Kirangare	Kambeni Malindi Manka Mpinji Msindo Kilomeni Msangeni	
Total	0	39	8	9	7	63
Cotton	Bangalala Mabirioni Jiungeni Kirya Maore Kihurio	Mgwasi, Kiruru, Kivisini, Kigonigoui, Njoro, Toloha, Kisangara, Jipe	Kisiwani Mwembe Hedaru Mvure/Kongei Mferejini Kileo	Bendera Kifaru Kwakoa	Same Mwanga Makanya Lambeni	
Total	6	8	6	3	4	27

From Table 1 above, the following situation has been identified:

(i) There are those villages which are being serviced by the general extension worker only and the extension worker is not resident. This will from now on be referred to as extension system 1.

(ii) There are those villages being serviced by both the general extension worker and the commodity extension worker, but both extension workers are non resident, to be referred to later as extension system 2.

(iii) There are those villages being serviced by a resident general extension worker only. This will be referred to as extension system 3 in future.

(iv) There are those villages which are being serviced by the commodity extension worker, and only the commodity extension worker is resident. This will be referred to, in future, as extension system 4.

(v) There are those villages being serviced by both the general extension worker and the commodity extension worker and both extension workers are resident.

This will be referred to, in future, as extension system 5.

STATEMENT OF THE PROBLEM

The 1970s were the years when all the commodity extension services were formed. All of them are aimed at improving and increasing production and marketing of their respective crops. This aim is basically one of the aims of the general extension service.

The creation of these Commodity Authorities meant formation of new job opportunities. Most of the staff who filled and who are still filling the new jobs were already civil servants and mostly came from the Ministry of Agriculture under which the general extension services fall. Further, even now, young graduates from the University and Agricultural Training Institutes are being shared between the general extension service and the commodity authorities, (see Table 2).

In view of this deployment of staff from the general extension service, there is profound and urgent need to study the relative influence of these commodity extension services when compared with the general extension service and in particular, whether the contribution to production by the commodity extension services is measurably different from that of the general extension services.

OBJECTIVES

The general objective of this study is to find out the impact of Cotton Authority, Coffee Authority and the General Extension Services on village crop output, crop quality and farmers' knowledge of improved practices.

Table 2: MANPOWER ALLOCATION IN THE MINISTRY OF AGRICULTURE*

Year	Qualification	To Regions (General Extension Services)	To Parastatals (Commodity Authorities, cotton, coffee, tea, tobacco and cashew)	To other Institutions (Research, Irrigation, planning seed farm Agri. Institutes)	Total
1976	University	16	16	23	55
1977	Graduates	37	43	60	140
1978		15	8	25	48
1979		11	3	29	43
	Total	79	70	137	286
1976	Diploma	78	56	92	226
1977		122	21	52	195
1978		150	34	54	238
1979		152	89	85	326
	Total	502	200	283	985
1976	Certificate	245	78	87	410
1977		416	106	69	591
1978		350	22	61	433
1979		341	31	48	420
	Total	1352	237	265	1854

* Source: Ministry of Agriculture Headquarters, Manpower Development Division, Dar es Salaam.

The years included in the study were chosen because villages began to keep individual records in 1977. Previously, records were kept on the basis of buying posts.

Specific Objectives

1. To find out the extension system under which villages gave highest coffee output increases in kg. over years 1977 to 1979.
2. To find out the extension system under which villages gave

highest cotton output increases in kg. over years 1977 to 1979.

3. To find out the extension system under which villages gave the highest coffee grade increases over the years 1977 to 1979.
4. To find out the extension system under which villages gave highest cotton grade increases over the years 1977 to 1979.
5. To find out the extension system under which farmers are most knowledgeable of recommended improved coffee practices.
6. To find out the extension system under which farmers are most knowledgeable of recommended improved cotton practices.
7. To suggest the possible reasons for any differences in village crop output, quality and farmers' knowledge of recommended improved practices among the extension systems.

SIGNIFICANCE OF THE STUDY

It is expected that the study will reveal information on the performance of the extension services in these districts. The findings could be useful to the extension organisations for making the necessary adjustments within their capacity, so that their work could be more effective.

At the same time this study could be a useful basis for more systematic studies of the whole commodity approach in Tanzania.

CHAPTER II

THEORETICAL FRAMEWORK

For convenience, it has been necessary to deal with various topics in turn as follows:-

(a) Crops,
   i coffee output and coffee quality,
   ii cotton output and cotton quality.

(b) Farmers' knowledge of improved practices.

(c) Agricultural Extension,
   i organization,
   ii the agent,
   iii the farmer.

COFFEE

Coffee Output

The main components of coffee yield are:

(i) number of trees in a given area;

(ii) number of healthy and mature berries per plant and

(iii) weight of the individual dry beans.

Normally the dry moisture content acceptable in Tanzania is 10%.[1]

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[1] Robinson, J.B.D. A Handbook on Arabica Coffee in Tanganyika. Moshi: Tanganyika Coffee Board 1964, p. XLI.

Under the same climatic conditions and agronomic practices, difference in variety could bring about difference in yield. But the area under study uses predominantly one variety (Kent). Hence any variation in yield should most likely be due to agronomic practices. Haarer[1] noted that average yield in coffee plantations in East Africa is 1,000 to 1,250 kilograms per hectare. No data are available to suggest change in this yield.

The following factors are known to influence variation of yields in a given area:-

(i) Weather - It is known that too much rain (floods), too little rain (drought) or frost affects the plant physiology and hence may result in decrease in coffee yields. For coffee, weather has remained optimum in the area under study and period under study.

(ii) Change in Prices - Farmers are conscious of economic returns. An upward change in price will encourage farmers to take more care of their fields and may also attract new farmers to come into coffee cultivation. In Tanzania, over the period of this study,

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[1] Haarer, A.E. Coffee Growing. London, Oxford University Press, 1963, p. 45.

the prices of coffee to farmers have been relatively high due to frost disaster that destroyed Brazil Coffee in the mid 1970s. Therefore very likely most farmers were attracted by these high prices and hence improved their husbandry to a level higher than if the prices were lower, see Table 3 below.

Table 3: PRICE OF COFFEE PER KILOGRAM OF PARCHMENT I GRADE DURING THE PERIOD UNDER STUDY IN TANZANIA SHILLINGS[1]

Season	Price/kg.
1976/77	5.00
1977/78	12.00
1978/79	12.00
1979/80	9.00

(iii) Availability of inputs - Farmers efforts go to a certain limit, beyond which the government has to assist. When inputs are not available, for instance pesticides, a farmer will have no other alternative except concentrating on other ventures which are more remunerative. The availability

[1] Source: Kwamwenda Buying Post.

of inputs in the area of study has been a problem for quite a long time. It is therefore known that diseases like Coffee Berry Disease (CBD) have resulted in a considerable reduction of coffee yield because chemicals were not available in sufficient quantities to curb the disease. The area of study has been considerably affected by CBD, but no data for its extent are available.

(iv) Competition with an alternative crop - Coffee has been competing with cardamon, another cash crop, which earns higher prices than coffee. However coffee has an advantage because it is compatible with bananas when intercropped. Most farmers intercrop coffee with bananas, which serves as a food crop. When coffee prices fall to extremes, many farmers opt to grow cardamon. In the study area, coffee enjoyed preference because the coffee prices were relatively high,(see Table 3).

(v) Manpower Availability - Coffee is a labour intensive crop. Hence a change in man-power availability will result in lower

level of coffee husbandry and ultimately lower coffee output, unless some substitute of labour arises, for example, mechanization.

(vi) Age of Trees - Coffee trees have been known to live up to 90 years. However, very young trees (3 to 8 years) bear less berries per tree and very old trees also bear less berries per tree. So depending on the age of the plants, changes in coffee yields can be expected. For example, if the plants are changing from young to middle age plants, the yields should increase. Alternatively, if the plants are growing too old, the yields decrease.

The area of study consisted of young and middle age plants but mostly middle-age.

Except for weather and age of the plants, the whole question of possible changes in yield of coffee is centred on the adequacy of improved agronomic practices.

Quality of Coffee

Nutrient status of the soil, pests and diseases, and amount of pruning have been shown to affect quality of coffee.[1] But in most cases method of processing (that is whether dry processed or wet processed) has a more obvious effect on raw coffee quality. The dry method of processing coffee gives rise to hard coffee which fetches low prices.

The wet method is the most commonly used in the area under study. It involves picking the berry when it is red ripe, pulp it as soon as possible after picking, fermenting the beans, washing after two days to remove the mucilage, and proper drying. The result of wet method of coffee processing is mild coffee which fetches higher prices in the world market.

However, storage of coffee near smelly materials like fish, kerosine, earth or cardamon has been shown to lower the grade of coffee because the coffee acquires the unfavourable smell.[2]

Grading of coffee is done at three different stages:-[3]

(i) Raw Stage: In the raw stage, things like size of the beans, colour of the beans, whether the parchment or skin of the bean is intact and whether the beans are dry to the required standard of 10% moisture content.

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1 Planter. Quality of Coffee. Kenya Coffee. Nov. 1962, p. 445.

2 Robinson, J.D.B. Op. cit. p. 111.

3 Robinson, J.D.B. Op. cit. pp. 86-140.

Grading at the raw stage is done at the buying posts. The buying grades are special grade, parchment I and parchment II. Most farmers sell their coffee at the parchment I grade.

(ii) Roast Stage: This grade is done at the liquoring unit. From the buying post, the coffee is transported to the curing works. The coffee is dehusked and regraded in terms of size, colour, shape and weight or density. Then a small sample of the coffee is roasted for each size thus obtained. Quality grading is based on colour of the whole bean after roast and colour of the centre cut after roast.

(iii) Liquor: A small sample of each of the grades obtained from the roast stage is ground and hot water added to it and then tasted by the specialists known as liquorers. They are interested in things like acidity, body and flavour.

In the end the coffee from each buying post is given a class depending on the roast and liquoring qualities. For each size of beans (there are ten (10) different size categories) there are 17 classes. So coffee quality is a very complicated process.

Buying posts could have bought the coffee from farmers at a higher grade but the liquorers could lower its grades after the various tests. Farmers get paid some advance prices as they sell their coffee at the buying posts and expect to get their backpay when the liquorers have graded their coffee. Usually a certain amount of dissatisfaction among farmers is expressed when they hear that backpay is not coming because their coffee was of lower grade. Unfortunately the grading is not done for each farmer's crop but for the whole buying post. A brilliant effort by majority of farmers to improve the quality of their crop could be masked by a few careless farmers as far as quality is concerned. None of the individual farmers is big enough to demand his coffee to be graded separate from the others.

The major factor which can induce farmers to improve the quality of their coffee is a sufficiently favourable difference in prices between the various grades to warrant the extra effort involved in producing the higher grade.

COTTON

Cotton Output

The components of cotton yield are:-

(i) number of plants in a given area,

(ii) number of healthy mature bolls per plant and

(iii) weight of individual bolls at harvest.

Number of bolls and weight of bolls are genetical but are greatly influenced by agronomic practices and conditions to which the plants have been subjected. The area under study grow one variety (I166) which is distributed by the Cotton Authority each year.

The following factors have been known to affect cotton output:

(i) Weather: This includes droughts and floods. The area under study experiences both droughts and floods at times. But over the years under study, only drought has been prominent especially during the last two seasons, 1978/79 and 1979/80.

(ii) Change of prices: Cotton prices have been considered too low by farmers when compared with crops like peas, beans and green grams, all of which can thrive well in areas suitable for cotton cultivation.[1] Cotton has a longer gestation period and at the same time it is more labour and capital intensive. Furthermore, unlike the pulses, cotton is purely for market, a farmer can not decide to eat it in case of food shortages, see Table 4.

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[1] Same Agricultural Office report to a Conference held at Same in July, 1979, to boost Agricultural Production in the district.

Table 4: PRICES OF COTTON AND BEANS PER KILOGRAM[1]

Seasons	Price: Tanzania Shillings		
	Cotton		Beans
	AR	BR	"A" Grade
1976/77	2.00	0.90	2.00
1977/78	2.40	1.20	3.00
1978/79	3.00	1.30	3.50
1979/80	3.40	1.70	3.50

(iii) Husbandry: Cotton is labour intensive, it requires about 3 weedings, 8 sprays, two fertilizer applications, and repeated harvesting since the bolls do not all open at the same time. Further, even after harvesting seed cotton has to be graded. When these operations are not carried out satisfactorily, the yields are usually low.

Quality of Cotton.

There are two grades, AR and BR. The AR is a higher quality consisting of white, well opened cotton. It fetches higher prices in the market. The BR is of an inferior type consisting of stained, dirty cotton. Usually a farmer who has followed the recommended spraying regime ends up with a better cotton because most of the staining seen in

[1] Source: Same District Office.

cotton is caused by various insects and diseases. Grading of cotton at the ginnery involves things like lint length, strength and fineness.[1]

Here again farmers get motivated to put extra effort to increase the cotton quality when there is big enough difference in price between the various grades. In the 1978/79 season, the price of AR was 3.00 Tanzania shillings per kilogram and that of BR was 1.30 Tanzania shillings per kilogram.

FARMERS' KNOWLEDGE OF IMPROVED PRACTICES

A farmer can be regarded as being knowledgeable when apart from knowing the existence of a recommended practice, he can explain how the practice is actually done. Wiltshire[2] reported a positive relationship between working knowledge and adoption of innovations in Trinidad coffee farmers and Andrews[3] reported positive association between knowledge and adoption of innovation by Trinidad foodcrop farmers. However, Rogers[4] suggests that lack of knowledge about an innovation may not cause delay in adoption.

In this study, knowledge of improved practices will include those farmers who have already made their mind not to adopt, those who know the practices and have adopted and those who have just known the practice

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1 Prentice, A.N. Cotton: With Special Reference to Africa. London, Longman 1971, pp. 106-108.

2 Wiltshire, F.D. Factors which motivate farmers to adopt new practices. Unpublished M.Sc. Thesis, U.W.I. 1976, p. 174.

3 Andrews, J.P. Factors Related to the Adoption Behaviour of Foodcrop Farmers in Trinidad. Unpublished M.Sc. Thesis, U.W.I. 1975.

4 Rogers, E. Diffusion of Innovations. New York: Free Press of Glen, 1962, p. 312.

and are on their decision making stage. In no way should a high knowledge score be taken for a high adoption. In other words knowledge and adoption are two different things.

The limitations of using knowledge of improved practices as a measure of effectiveness of extension are appreciated. Nevertheless, this criterion should be able to show the extent to which the agricultural extension has been able to disseminate the knowledge to the clientele or otherwise.

AGRICULTURAL EXTENSION ORGANISATIONS

Every extension organisation has a sponsor. Among the common sponsors of extension organisations are:-

(i) The Governments. This is done through Ministries like Ministry of Agriculture, Ministry of Education and Ministry of Community Development.

(ii) Farmers' organisations or Labour organisations.

(iii) The University.

(iv) International Organisations.

Axinn[1] suggests that, regardless of the type and origin, all extension systems have common features which are inherent in the functions of extension education:

Axinn, G.H. and Thorat, S. Modernizing World Agriculture: A Comparative Study of Agricultural Systems. New York, Praeger, 1972, p. 4.

An impact assessment of the Training for Rural Development (TRD) project at the village level in Tanzania

by

Vedasto Rutachokozibwa

An Abstract of

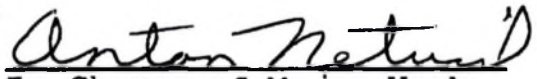
A Dissertation Submitted to the

Graduate Faculty in Partial Fulfillment of the

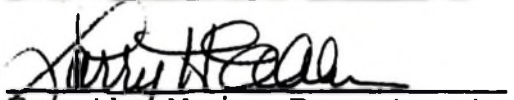
Requirements for the Degree of

DOCTOR OF PHILOSOPHY

Approved:



In Charge of Major Work



For the Major Departments

For the Graduate College

Iowa State University
Ames, Iowa

1985

An impact assessment of the Training for Rural Development (TRD) project at the village level in Tanzania

Vedasto Rutachokozibwa

Under the supervision of David L. Williams from the Department of Agricultural Education and Anton J. Netusil From the Department of Professional Studies in Education Iowa State University

The thrust of this research was to determine the magnitude of the training program effectiveness and applicability of the TRD project for village development in agriculture and other rural aspects as perceived by villagers. The project espouses people's participation as a basis for developing training programs.

The research was conducted in the 1979 TRD pilot regions in Southern Tanzania. Adult village members from 15 villages comprised the population of the study. Data were collected during July and August 1984 through personal interviews with a three-part questionnaire from 331 randomly selected TRD-trained and non-TRD-trained village residents.

The validity and reliability of the interview instrument were established. Descriptive and inferential statistical procedures were used in the data analysis.

It was found that: (1) the training program was perceived important and effective in increasing villagers' technical and managerial abilities to conduct village develop-

ment programs; (2) most of the concepts learned through the training program were applied by participants in village development; however, there were a few concepts which were not applied; (3) five major problems pertaining to the training and implementation of the TRD concepts in villages were identified; (4) the TRD-trained villagers extended the knowledge from the training centers to other members of their villages through demonstrations, discussions, and other informal mechanisms; and (5) women were not adequately involved in the training programs.

Based on the findings, it was recommended that: (1) the needs assessment process as a basis for developing training programs be a continuous process so as to make training programs reflect the current felt needs of recipients, and also increase the relevance of training to local conditions; (2) avenues of village access to development facilitating resources be incorporated into the project development process; (3) strategies of including more women in the TRD training programs be developed in order to increase women representation in village development decision making.

An impact assessment of the Training for Rural Development (TRD) project at the village level in Tanzania

by

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A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of the
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Departments: Agricultural Education
Professional Studies in Education
Co-majors: Agricultural Education
Education (Research and Evaluation)

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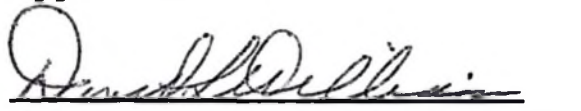

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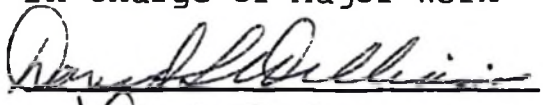

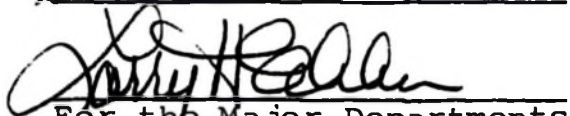

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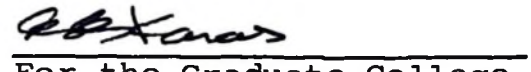

For the Graduate College

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1985

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DEDICATION

To my Family

INTRODUCTION

The economic growth and development of Tanzania depends upon agriculture. Agriculture is the major labor market (employs around 85 percent of the nation's total labor force), the major foreign earner (contributes about 80 percent of the total export earnings), contributes about 40 percent of the nation's Gross National Product (GNP), and provides food and fiber for the in-country's consumption (supports about 90 percent of the population and provides raw materials for secondary industries (Hannah, 1966; Chambers, 1974; The Economist, 1983). However, with a population of about 20 million people (a majority, about 90 percent living and earning their living in rural areas), the country is basically agrarian with a predominant reliance on subsistence farming (USAID, 1981). This, together with other factors (both endogenous and exogenous) have contributed to the low agricultural productivity with consequent effects on declining exports, nutrition, health and overall economic growth and development.

Since agriculture is the linchpin of the nation's economy, the development of the Tanzanian society must, inevitably, address the improvement and transformation of agriculture (agrarian transformation) which, in turn, is the development of rural areas. Smith (1966) contends that in an economy which is predominantly dependent on agriculture

(such as Tanzania), any development effort that does not include agriculture will exclude, at least initially, most of the country's citizens. Therefore, agricultural and rural development strategies must, at large, stress the processes which comprehensively and systematically permit broad involvement of the people living in those areas to increase their participation in decision-making processes so as to achieve a set of defined goals (Hagen, 1962; Chambers, 1974; Ariffin, 1975; Vail, 1975; Holdcroft, 1977; Lema, 1977; Mohammed, 1977; Nyerere, 1979; Johnston and Clark, 1982). Thus, participation by all the people involved in increased production, rural economy diversification, better nutrition and health programs, etc. should be both the means and the end of development itself (Owens and Shaw, 1974; Warren, 1974).

However, for such significant results to be evident, rural people must be conscious of themselves and be able to articulate programs for their development. People must have the power and the means to do so. Perhaps, the most important catalyst or key to increase people's awareness is education (Mosher, 1966). Emphasizing the importance of educating people for awareness, Lema (1977, p. 10) commented that:

> ...education has an important role to play in helping people to identify their basic needs. Its task is, first and foremost, to transmit ideas of value; to build up an awareness in people so that they intelligibly know who they are, where they are and what to do with their lives.... Appropriate education for the

> masses would provide ideas that would make their world or situation and their own lives more intelligible to them and create in them a sense of participation in the development of their society. If the ideas and values transmitted through education are to be of any importance, they have first to be internalized by the recipients. They have to become the instruments through which the people themselves look at, interpret and experience the world in which they live.

For rural people to keep abreast with the technological innovations in agriculture and rural development, they must have access to knowledge in a comprehensible manner. However, various schools of thought have argued that educational systems for rural people have been unfit, and many agricultural and rural development programs have been planned and carried out with very little, if any, consideration of the bulk of the peasant farmers. Development strategies have, in most cases, been a one-track, trickle-down kind of communication from the planners (government and agencies) to the rural people. For example, Chambers (1974) asserts that early development programs in Tanzania (and indeed in most of the developing countries) have been in many forms and concepts ranging from encouraging private sectors through incentives or contracts, adding new functions to existing government organizations, creating parastatals, or establishing an entirely new department or ministry. Frequently, such precedings took place in the nation's capitol city with the conviction that innovations and services carried out would defuse and be adopted in targeted rural areas.

To aid the dissemination and utilization of new programs in rural areas, extension services were established. Evidently, such services served the administrative machinery, although they were ostensibly used to develop, for example, agriculture. For instance, in the early 20th century, the Germans' development strategy in Tanzania was by statutory laws and ordinances which coerced farmers to grow cash crops, mainly for export. In other words, the theory of development was "program oriented", branding peasant farmers as a problem. Ruthernberg (1964) commented that the main problem of agricultural development in Tanzania was that peasants had negative attitudes towards economic efforts, think in static terms, and want to have money without working for it; therefore, to get things done, "the African must be compelled to help himself" (p. 50). Other negative comments about peasant farmers in developing countries were alluded by Shultz (1964), Moris (1967), Clifton (1976), Rogers (1976), Brokensha et al. (1980), Whyte (1982). The British who succeeded the Germans in Tanzania sustained and perpetuated the development through compulsion policy until the 1950s when the so-called coherent agricultural development policy was established. The policy emphasized improving peasant farms through persistent persuasion by extension services (Ruthernberg, 1964). However, as Chambers (1977) argued, results of such approaches were short of expectations as the spread effect

did not go beyond the innovation nose (capitol city), and in fact, they have been ascertained to be costly and ineffective in achieving the intended goals.

After independence (1961), the Tanzanian government underwent a series of changes in structure and function. New strategies for agriculture and rural development were tried out. Two major endeavors which brought some impact were the "transformation" and "progressive farmer" approaches (Vail, 1975; USAID, 1981). As the ensuing information will show, none of the programs had client participatory education involvement incorporated, notwithstanding the lessons from the previous top-down colonial development approaches.

The first attempt, the "progressive farmer" or "improvement" approach, emphasized progressive farmers as agents and key links whose assistance was necessary to accelerate the diffusion and utilization of innovations in rural areas (Moris, 1981). Basically, the approach provided extension and agricultural inputs to "rich farmers" in the event that "poor farmers" would follow the progressive farmers' practices and improve their husbandry practices. During this time (1960s), similar and/or other forms of development were being implemented in other parts of the developing world. For example, community development was changed to "animation rurale" in Francophone countries in Africa, and similar approaches were being used extensively in Asia (India, Pakistan,

Korea) and Africa (Eicher and Baker, 1982). Although the theory of research on the diffusion of innovations provides support for the progressive farmer with the assumption that information will trickle down to other farmers, it nevertheless stratifies, increases the gap, and innovation remains unevenly distributed among farmers (Brown, 1970; Monu, 1980; Johnston and Clark, 1982). It was evident in Tanzania that the adoption rate by the "poor farmers" was very low and, in retrospect, it resulted into a lop-sided flow of income, stratified rural people and had failed to improve the technical and management skills among farmers as planned (Chambers, 1977; USAID, 1981). In Kenya, it was found (Ascroft et al., 1973) that the adoption rate averaged 3.7 innovations and 0.1 innovation for the progressive and the least progressive farmers, respectively. In Tanzania, the approach was abandoned in 1966.

The "transformation" approach centering on establishing village settlement schemes and block farms was initiated as an alternative to the progressive farmer approach. Recommended by the World Bank Mission to Tanzania, the fundamental framework of the approach was to develop rural areas by collecting people into villages for communal and modern ways of life. The theme for development was outright industrialization emphasizing mechanized farming with high technical standards (Moris, 1981). The project relied heavily on capital

and tended to attract many people. However, as it was proved later, the project was poorly planned initially, was severely plagued by inadequate management, and probably recruited unsuitable and unmotivated settlers (Kjekshus, 1977). Moreover, the educational levels of the settlers were not raised to the required knowledge and skills of introduced innovations, the extension methods employed were at variance with the nation's development strategies, and had dubious social and political implications (Chambers, 1977; USAID, 1981).

Another development strategy which emerged in the 1970s was the Integrated Rural Development (IRD). According to Eicher and Baker (1982), IRD was established to substitute for the failures of the Green Revolution (and other development approaches such as the settlements schemes and block farms in Tanzania) in the 1960s, and it was based on the assumption that a critical minimum effort was necessary to cause an impact. Although IRD still functions today in many parts of the world, its impact on development still remains to be seen as the implementation is heavily stifled by lack of infrastructure, particularly trained personnel (Lele, 1975; Richter, 1978), and by the failure on the part of the project to educate and involve recipients in program development phases.

The preceding narrative supports the hypothesis that early rural development programs, both national and inter-

national, did not take into consideration peasant farmer conditions, local institutional environment, educational levels of farmers, and other factors which facilitate rapid and ubiquitous development. They nevertheless have left much to learn from, as they established a fundamental base towards appropriate strategies for agriculture and rural development.

Perhaps the most rigorous participatory approach to agriculture and rural development in Tanzania was initiated in 1967 with the advent of the Arusha Declaration. The articulation of the Declaration provided the impetus for new strategies of development which, at least conceptually, focuses on human resources development through increased education and participation of the people involved; for development means the development of the people themselves, their lives and environment (Nyerere, 1979). Kjekshus (1977) added that the policy provided a new strategy of development which is eminently democratic, relying on self-reliance, and self-improvement of rural people. This approach demanded some policy changes to provide power to the people to make development decisions. Therefore, decentralization and villagization were established in the early to mid 1970s to meet the needs.

Decentralization of power from the nation's capitol to regions was viewed as a logical follow-up of the development strategy expressed in the Arusha Declaration. However, there emerged the problem of decentralization without authority

compounded further by unintended effects of internal bureaucracies causing lengthened decision review processes (Leonard et al., 1975; Moris, 1981). And villagezation enacted by the Villagezation Act of 1975 intended to mobilize people to live in permanent settlements. The Act established an organization structure at the village level that reflects a grassroot participation in the development process, more so a two-way process integrating the strength of bottom-up or participatory ideology and top-down or penetration ideology (Moris, 1981). It is extensively advocated by many development agencies that the success of rural development programs is a function of integrating elements of top-down coordination and commitment and bottom-up participation and control of the decision-making process (Davies, 1980; Fortmann, 1980; Moris, 1981; USAID, 1981). However, theory and practices of these policies have remained apart in almost every part of the world. According to Byrant (1980), it was not until 1973 that new directions emphasizing participation of the recipients in planning, designing and implementing projects were executed; participation has thereafter been accepted as an ideal and a fact by development agencies and teams.

Literature attributes the failure of many developments programs in Tanzania to shortage of manpower both in quality and quantity, especially in the managerial and technical skills. For example, the study by Fraser-Smith (Smith, 1966)

indicated that one of the failures of settlement schemes was shortage of suitable qualified and experienced staff, both in planning and management. The introduction of decentralization and villagezation exacerbated the shortage by creating organizational structures which required quantity and quality of trained personnel (USAID, 1981; Maeda, 1982). Moland's (1981) study of TRD Phase 1 in Tanzania identified training to improve performance as a requirement to village development.

Rationale and Statement of the Research Problem

Despite national and international efforts to develop agriculture and rural areas, satisfactory results have not always been evident. The volume of agriculture both in food and fiber production has, in fact, been falling. For instance, in Tanzania, cotton-lint has fallen from 67,100 tons in 1976/77 to about 45,000 tons in 1981/82, sisal from 133,000 tons to 73,000 tons, and cashew nuts from 97,000 tons to about 42,000 tons in the same period (Daily News, 1982); and food production has fallen in volume from 2.3 percent per year to about 1.3 percent per year (Keya, 1982). This phenomenon has severely affected farmers' development which, according to Münker (1978), has deteriorated rather than improved rural development.

One of the major constraints of development efforts in Tanzania (and other development countries) has been inappro-

priate educational systems which have tended to underscore the development of rural human resources. Fafunwa (1974) concluded that, if education is the aggregate of all the processes through which persons develop abilities, attitudes and other forms of behavior that are positive and meaningful to the development of the societies in which they live, and if that system is based on certain philosophical assumptions and seeks to justify its usefulness in its practices and results, then most of the educational systems in Africa may fail the test. Although for many decades extension services have been given the responsibility of teaching farmers improved husbandry practices, and is probably the dominant strategy of farmer education today (Coombs and Ahmed, 1974), the messages have not adequately reached farmers. Recently, there has been a great concern of finding more effective ways of educating rural people (Mamat, 1982), the most fundamental of which has been nonformal institutionalization of education through farmers' training centers and other village-based training programs. In Tanzania, for instance, effective nonformal training programs started in the 1960s through the Farmers' Training Centers (FTCs) under the management of the Ministry of Agriculture. The training was to emphasize technical agriculture. In the 1970s, the FTCs were combined with District Training Centers (DTCs) to form Rural Training Centers (RTCs) under the auspices of the Ministry of National

Education. The purpose of RTCs was to integrate, diversify and provide holistic training to rural people (Gonsalves, 1984). In the mid 1970s, the RTCs were changed to Folk Development Colleges (FDCs), but the structure and functions remained almost unchanged. Today, there are at least 70 training institutions in the country providing agricultural and rural development services to the farmers (Gonsalves, 1984). Although the selection of farmers to be trained may have been a participatory activity, the content has been developed from the centers' and policy makers' objectives with little, if any, input from the participants.

Perhaps, the training network which has tried to incorporate people's participation in design and implementation is the Training for Rural Development (TRD) project. The TRD was established in 1979 as a joint project between the Tanzania Government and the United States Agency for International Development (USAID). It was conceived and developed in the context of assisting Tanzania to develop a rural training system to increase and strengthen the managerial and technical capabilities for village development (USAID, 1981). The project includes, among other things, training in leadership, management, organization and technical skills at the village, district and regional levels.

Since the thrust of this study is on training at the village level, only that portion will be covered in detail.

The village training process involves (a) two-week systematic village surveys by the training teams to conduct needs assessment for determining and developing the training curriculum. This is followed by (b) a one-month "residential" (management) and "technical" (agriculture and others) training at the TRD training centers, and finally, (c) the training teams conduct follow-up visits in participating villages to identify training implemetation problems and provide training where necessary. Inasmuch as the training programs are developed and conducted from the articulated village needs and comprehensively cover many rural development programs, an investigation as to how well TRD is training villagers in managerial and technical skills to carry out village development programs appears warranted.

Origin of the Study

This study has been partly a result of the researcher's prior exposure and some work with the TRD project in Tanzania. It has also partly been due to the advice and encouragement by the USAID project director in Tanzania (Dr. Janet Poley) to identify a research area within the project; and last, but not least, it has been a product of the researcher's long-time interest in rural training programs.

The study was made possible by the World Food Institute of Iowa State University, which funded the investi-

gator's round-trip air travel from Iowa to Tanzania and coverage of various supplies, and the TRD project organization and the Sokoine University of Agriculture, both in Tanzania, which facilitated the itinerary travel and collection of data in the country.

Purpose of the Study

The major thrust of this study was to contribute to the body of knowledge concerning the usefulness of training programs for developing managerial and technical skills in agriculture and other rural development activities at the village level. The following specific objectives and hypotheses were developed:

Objectives

1. To identify and analyze demographic characteristics of respondents.
2. To determine and analyze the TRD-trained respondents' perceived importance of the training program for village development.
3. To assess and compare the TRD-trained respondents' perceived effectiveness of the training program in developing their abilities for village development.
4. To document changes made in villages since the establishment of the TRD project in the following areas:

a. Adoption of improved farming and management practices for village development.

b. Practical use of concepts learned from centers in villages.

c. Increased leadership abilities of the TRD-trained respondents.

d. Increased rate in the use of farming and management practices for village development.

5. To identify and analyze problems encountered by the TRD-trained respondents during and after the training sessions.

Hypotheses

1. There is no significant difference in the respondents' perceptions of the importance of the TRD training program when grouped by regions.
2. There is no significant difference between TRD-trained village leaders and nonleaders in their perceived importance of the training program.
3. Village function (leader or nonleader), educational background, gender, and age of respondents do not contribute to the prediction of respondents' perceived effectiveness of the training program.
4. There is no significant difference in the respondents' perceptions of the effectiveness of the TRD training program when grouped by regions.

5. TRD-trained respondents have a higher rate of use of farming and management practices than their village counterparts who did not attend the TRD training.
6. Adoption of improved farming and management practices is independent of the location (region) of respondents.
7. Identified TRD contributions to village development are independent of gender of respondents.
8. Leaders and nonleaders who attended the TRD training are not significantly different in their perceived increased leadership abilities in conducting village programs.
9. The problems identified are independent of gender, age, educational background and location of respondents.

Limitations and Strength of the Study

This study was initiated after the TRD had been established in the country. Therefore, it was limited to four pilot regions which started with the project in 1979. Thus, random sampling of the study groups (regions) was not possible. In view of this point, Howell et al. (1979) noted that, in evaluation studies such as this one, it is frequently not feasible to apply true experimental design where random

assignments of objects to treatments and control groups are made. Manipulation of independent variables is not possible, and this failure makes generalizations of findings to larger populations rather questionable because of lack of control of extenuating variables. However, respondents were randomly sampled from the target population, and with the assumption that the pattern of life in most parts of Tanzania is almost homogeneous, generalization of findings would be possible.

The second limitation is that the project has been in operation for about 5-6 years. As many schools of thought contend, some educational programs may take a longer time to show significant impacts; however, there are, at times, immediate tangible impacts where changes would be noticed.

Thirdly, there was no pre-program (before the TRD) evaluation to ascertain management and technical skills of villagers. Asking people to recall situations they were in about six years ago may not get valid information because of "memory decay". This limitation makes one wonder whether improvements made were the results of TRD interventions, and/or other factors. However, it is largely supported by literature that shortage of trained personnel in Tanzania is a rampant phenomenon.

Fourthly, in survey researches such as this one, it becomes virtually impossible to identify the causes and effects of the variables, for relationships among variables

does not necessarily mean causation (Borg and Gall, 1983; Kline 1980). However, through the process of utilizing a combination of methods ("triangulation"), statistics, and theories, such inadequacies of unexplained variables can be minimized. This study employed the survey and observation research methods to increase chances of obtaining accurate information.

Lastly, it is rather impossible to measure attitudes directly because attitudes are constructs, and also, the volatility of attitudes may, at any time, affect the reliability of the instrument (Henerson et al., 1978). However, inferences to attitudes can be made by studying people's behaviors, beliefs, feelings, and perceptions of concepts (Henerson et al., 1978).

Significance of the Study

Since the development of agriculture and consequently rural areas in Tanzania requires qualified (trained) manpower, evaluation of the TRD program will indicate the extent to which training programs of that kind increase the management and technical abilities of rural people to conduct development programs. As pointed out by Knox (1980), Boyle (1981), and Kantner (1982), understanding how learners perceive educational programs could assist policy makers and educators improve existing training programs and/or plan

better future programs. Similarly, the study will help to make recommendations for improving teaching of rural people. The information provided would be the base-line data on which further studies of such programs could be based, compared, and contrasted.

An Overview of the TRD

As explained in the introductory part above, the establishment of decentralization and villagezation in Tanzania to increase people's participation in development aggrevated the already prevailing acute shortage of trained manpower in managerial and technical skills in almost all levels of organization. The TRD project was thus conceived as the result of this trained manpower shortage phenomenon. Being a joint Tanzania Government and the USAID project, its purpose was stated in the "blue book" as to assist Tanzania to:

> ...develop a model for rural training system focused on increased agricultural production and income levels in villages in five high potential regions in Tanzania (see Figure 1, shaded areas), (so as) ...to strengthen the managerial and technical capacities of decentralized rural development institutions to contribute to agricultural growth, expanded rural services, and enhanced self-help activities by individual farmers and village cooperatives (USAID, 1981, p. 1).

At the time of conducting this research, the project was in its second phase. Phase I (a two-year project) was initiated in July 1979 and Phase II (a six-year project) in September 1982. Training includes short-term and long-term

(degree) training in the United States, and in-country training for "trainers". It also includes in-country "residential" and "technical" training for villagers at the TRD training centers[1] and village-based training through interventions and follow-up visits by training teams in participating villages. The in-country training is conducted by a multidisciplinary team of Tanzanian trainers supported by USAID technical experts. Phase I included 16 villages from four regions (Iringa, Mbeya, Rukwa, and Ruvuma) and Phase II envisions catering to 350 villages in five regions (Arusha region was included in Phase II). This study deals only with 15 of the 16 villages which started with the project in 1979.

The project is coordinated by the Ministry of Manpower Development in the Prime Minister's office. Policies of the project are determined by the National Coordinating Committee which is comprised of representatives from each of the participating ministries and departments[2], and representatives from the regions involved (Gonsalves, 1984). The project keeps a minimum of expatriate staff as only two United States specialists were on long-term assignments with the project in Tanzania.

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[1]In 1985, there were three TRD training centers, namely: Ruaha-Iringa, Uyole-Mbeya, and Mlali-Ruvuma.

[2]Ministry of Agriculture, Ministry of National Resources, Department of Cooperatives, and Department of Community Development.

As mentioned in the statement of the problem above, the training process involves three phases, that is, village interventions, residential training, and follow-up of trainees by training teams.

Definition of Terms

Village: A rural community as established by the 1975 Villagezation Act.

Region: Second largest to the country, politically defined area with boundaries as determined by the government.

Operational definitions:

Leaders: Includes elected members of the village councils, teachers, and village technicians working under the capacity as government employees.

Nonleaders: Those not functioning as leaders in any capacity at the village level.

TRD-trained: Those village residents who attended the TRD training at any of the three training centers (Ruaha, Uyole, and Mlali).

Non-TRD-trained: Those who at the time of conducting this study had not attended any training conducted by the TRD project at the centers.

Young: Those adults who were 29 years of age and under.

Middle-age: Those adults between 30 years and 49 years of age.

Old: Those adults who were 50 years old and over.

Formal education: Includes those who had formal schooling from four years to post secondary.

Nonformal education: Refers to all those who did not go to formal schools at all; this includes those who had less than four years of formal schooling and those who have attended adult literacy education programs.

"Management" training: Includes training categories of leadership and communication, project planning and management, and farm management.

"Technical" training: Involves training categories of crop production and livestock production.

Explanation of the Dissertation Format

The first portion of this dissertation covered the introduction, rationale and statement of the research problem, origin, purpose and objectives, limitations and significance of the study, definition of terms, and an overview of the TRD program in Tanzania. The second and third sections are a review of literature and methods of study and procedures, respectively.

The findings and discussions of the study are presented in two sections. Section I aims at determining the importance and effectiveness of the TRD project as perceived by villagers. Included in this section is the analysis of the training problems identified by TRD program participants. Section II explores the practicality of the TRD training activities and other TRD project contributions to village development.

The last section of this research presents a summary of the findings and their implications for participatory village training programs. Presented also are recommendations for further research pertaining to village training.

The Iowa State University Committee on the Use of Human Subjects in Research reviewed the proposal for this study and concluded that the rights and welfare of human subjects were adequately protected, that risks were outweighed by the potential benefits and expected value of the knowledge sought, that confidentiality of data was assured, and that informed consent was obtained by appropriate procedures. In addition, the Research and Publications Committee of the Sokoine University of Agriculture, Morogoro, on behalf of the Tanzania government, and the TRD project management approved this study to be conducted in Tanzania.

REVIEW OF LITERATURE

In search for pertinent information relating to the training of rural people in developing countries, literature focusing on popular writing and studies done on the subject in question, especially in Africa and Tanzania in particular, was reviewed.

The importance of investment in human resource for the development of a country has been conceived, at least theoretically, important since the early civilization of mankind. Literature indicates that ways and means of providing needed training for development have been developed and tried for many decades. Perhaps, the most dominant training programs for farmers have been through extension services and farmers' training institutions or centers, which began in Europe and the United States of America in the 18th and 19th centuries, respectively (Jessup, 1972; Paulston, 1980; Nash, 1981). In developing countries, the concept of farmers' training centers as a potent educational tool for training farmers emerged in the mid-20th century, probably from the European and American residential training models (Sheffield and Diejomaoh, 1972; Coombs and Ahmed, 1974; Phocus, 1976; Eicher and Baker, 1982).

However, extension services have been a dominant factor in trying to bring about behavioral changes among farmers towards agricultural innovations. Thus, for the most part

of the 20th century, training emphases have been on formal education to increase the agricultural development staff, who, in turn, were to advise and educate farmers about better farming practices. However, the process of behavioral change among farmers has been slow, far from expectations. According to Rhodes (1980), there are about 80 percent of the people in developing countries still living in abject poverty, people who still need assistance in self-sufficiency, social and economic development and growth but cannot get much of the needed help. Discussing the plight of small farmers, the then President of the World Bank, Robert McNamara, stressed in Nairobi, Kenya that:

> The small farmer needs credit and water, but he needs technical information as well, and he is not getting nearly enough of it. The projected number of trained personnel who graduate annually from existing agricultural education institutions can at best satisfy less than half the total needs of the developing world.... In (almost all) developing countries, the average ratio of government agricultural agents to farm families is about 1 to 8,000. And only a fraction of these limited services is available to the small farmer (Rhodes, 1980, p. 148).

The reasons for inadequacy of extension services are many and varied. Whereas some are organizational and structural, others are environmental, motivational and psychological, and so forth. For example, there is abundant literature which supports the argument that extension service communication and linkage systems have not been adequate (Rogers, 1976; Brokensha et al., 1980; Singh, 1981), that teaching methods for

farmers have been inadequate such that theory and practice do not interface (Lele, 1975; Heyer and Waweru, 1976; Stevens, 1981), and that there is low morale among extension agents (Moris, 1981; Turray, 1982). There is also a great concern that extension services in developing countries are of a conventional type (McKillop, 1981) such that there is almost no integration of development activities among the parties concerned for rural development, and that bureaucratization accompanied by frequent changes in extension policies and staff transfers have hampered the effectiveness of extension services (Coombs and Ahmed, 1974; Lele, 1975; FAO, 1980; Moris, 1981; Nagel and Schubert, 1981; Stevens, 1981; Adams, 1982; Keya, 1982).

Perhaps the most controversial problem affecting the success of rural development has been lack of people's involvement in the education and extension program planning and development processes. Most development programs have been top-down with almost no input into plans and policies at the implementation level (village level). Thus, formal educational programs have not been effective in serving peasants; and according to Nagel and Schubert (1981), it is almost banal to claim that increased training efforts are needed in order to meet the needs of the developing world in qualified agricultural development staff.

The slow and frustrating phenomenon of extension services

may have given rise to the establishment of farmers' training institutions or centers. It was believed that the establishment of residential farmers' training institutions would supplement extension services by providing a more systematic training of farmers for effective changes in agricultural and rural development (Coombs and Ahmed, 1974). Since the 1960s, training emphasis of farmers has shifted from formal to nonformal educational strategies. The advocates of nonformal education believe that it is through such programs that people's creativity could be unleased, become conscious of their efforts, and participate in organizing for self-help, self-reliance and development (Ahmed, 1980; Gibbons and Schroeder, 1983; Gajanayake, 1984).

The impact of residential training programs has not been as evident, however. Curricula of farmers' training programs have been developed from the same theories and principles of pedagogy (Mulusa, 1983). Participatory education has not been adequately implemented as farmers have, more often than not, been told to abandon their traditional methods and adopt the so-called modern technology. Gibbons and Schroeder (1983) asserted that such actions have denied farmers the choice of what they want to learn and have failed to tackle their eminent needs and tap their accumulated experiences of their environment. This lack of participation by the intended beneficiaries and the dominant clout of status

quo among some policy makers and development agencies has thwarted the role of nonformal education in development (Simmons, 1979). Quite often, farmers have been blamed to lack capabilities and prior experiences in program participation. Rural development planners and trainers, also, have assumed that farmers are not aware of the alternatives available and are probably in remote positions to contribute to their training processes. However, Whyte (1975) disagreed with these ideas by pointing out that the main problem confronting agricultural development is not the ignorance of farmers but a conviction of the agricultural experts that farmers are ignorant and cannot contribute intelligently to their development endeavors.

It is largely conceived that women's participation in development has been more affected than men. Around the world, women play a significant role in development. They have been found to spend more hours (about 60-80%) in agriculture, primarily food production, than men (Haswell, 1963; Boserup, 1970; Lele, 1975; Vail, 1975; Storgaard, 1976; Fortmann, 1977; Ssenkoloto, 1980). For example, studies of women in Tanzania have found that women work approximately 8-10 hours per day in agriculture and other domestic activities (Lele, 1975). Another study by Storgaard (1976) in Kagera region, Tanzania, found women to spend about 3,067 hours per year versus 1,629 hours per year spent by men in agriculture

and domestic activities. However, women have not been adequately involved in development process decisions, and benefits, even in villages where women outnumber men (Sender, 1974; Lele, 1975; Boulding, 1976; Fortmann, 1977). Literature also indicates that women lag behind in the access to agricultural services, technical information and education in general (Magagula, 1978; World Bank, 1979; Fortmann, 1981). If women get information at all, they get secondary information (mostly from their husbands), but it is information which has already been distorted through the process of transmission (Fortmann, 1977; Staudt, 1979). A study in Tanzania by Fortmann (1977) found that there were divergent information levels between husbands and wives in households reached by extension agents. This might be attributed to the fact that, in most communities, men talk to men and women to women, but almost all extension personnel are men (Staudt, 1975). As pointed out by Chaney et al. (1979), to involve women in participatory development is not solving women's problems, but it is solving development problems. To achieve this process, Ssenkoloto (1980) contends that a new training order is needed.

The establishment of the Policy of "Ujamaa" and Self-Reliance in Tanzania in 1967 may have provided a new approach to the development process. The policy provided ways and means of people's participation in their development programs. More

importantly, the policy has been found to increase women's role in village development programs, which in turn, would increase their agricultural productivity and sharing of development benefits. Educational strategies, particularly nonformal participatory education, have become increasingly important since the 1970s, as was found by Hall's (1976) study. However, Kokuhirwa (1982) found that the strategy of nonformal education has not been able to meet the needs of rural women, suggesting that implementation of nonformal participatory education in developing countries has not contributed significantly to people's development. Today, most programs for training of farmers are still top-down oriented, and the argument by Moris (1967) that farmers' training centers have failed in getting across the agricultural message is still valid. In fact, the study of FDCs in Tanzania (Mosha, 1982) found that training programs are not planned according to villages' needs. Moreover, the shortage of trained personnel to manage rural development programs does not seem to abate.

The preceding information shows that, although a great deal has been written about the needs and importance of farmers' participatory education, very few studies have been conducted to assess and demonstrate the impact of nonformal participatory training programs. It appears that training programs for rural people continue to be planned and pursued in the same way as if the problem did not exist (Heyer, 1981).

Perhaps the earliest attempts to analyze farmers' training institutions in Africa were in the 1960s and 1970s. However, as the ensuing literature will demonstrate, most of these and other subsequent studies dealt with structural and organizational aspects of farmers' training programs. There are very few studies that included studying opinions of farmers about the programs planned for them. For example, Markham (1967) reported on the uniqueness and similarity of farmers' training programs in Ghana, Kenya, Nigeria, Sudan, and Uganda. Similarly, Barwell's (1975) studies in Botswana, Ethiopia, Kenya, Lesotho, Malawi, Swatzland, Tanzania, and Zambia observed that training was being provided to small-scale farmers according to the prevailing circumstances of each country. He found that, while in some countries such as Ethiopia, mobile training programs were appropriate, other countries stressed residential training of farmers.

Two of the studies cited in East Africa which incorporated follow-up of farmers after training programs were those by Ascroft et al. (1973) and Mbugua et al. (1975). According to Ascroft et al.'s (1973) follow-up study in the Tetu, Kenya experiment, 100 percent of the trainees had adopted hybrid maize innovations, and they were considered in general to be resource persons by their neighbors. They further found that, although the below average, less innovative farmers were the target group, the selection process of trainees did not

conform to the criteria set as most of the farmers selected to attend training were already progressive. The Kisii, Kenya experiment which centered on average farmers was studied by Mbugua et al. (1975). They ascertained that a group of farmers which had a two-week institutional training supplemented with extension services exhibited a higher rate of adoption of innovations than a control group of farmers which was served by the regular extension agents.

The strategy of determining farmers' training programs from the needs assessment is not at all a new concept in Tanzania. The concept was first experimented by Francke (1974) in the 1960s. Linking her work with the Nordic Tanganyika Project, which established the now Kibaha Education Center, she designed a survey study to determine the living conditions of the farmers around the coast. The information gathered would have been the basis for developing training programs for farmers at the center. However, her follow-up study in 1968 found that the information she surveyed and provided was not used by the center to develop training programs. Her findings can be supported by Sudad's (1980) study which ascertained in Jordan, Malaysia, and Tanzania that there were almost no organized procedures which involved participation of farmers in making decisions about training activities. Also, the nationwide study conducted by the Ministry of National Education in Tanzania to determine the

progress and impact of Folk Development Colleges found that training programs were not developed according to the needs of villages (Mosha, 1982). The problems of lack of farmers' involvement in planning education programs are not limited to Tanzania. For example, in a study on rural life, Birimani (1981) found that, although the training program improved the literacy rate of rural people, the process neglected peoples' varied backgrounds and needs, and did not provide them the basic knowledge to improve agricultural husbandry and family incomes. In Kenya, Ngesa (1985) found that, although the purpose of Farmers' Training Centers was to cause behavioral changes among participating farmers in agricultural innovations, farmers' participation in the training programs was very minimal. He contends that most of the recruitment is done by extension agents, and that the training content is developed at the training centers, such that farmers get training which does not reflect their needs. However, follow-up activities of trained farmers to assess developments made were being carried out primarily by extension agents and other training personnel.

Another program in Tanzania which was reported to develop training programs from the needs assessment was the Buhare Home Economics Training Center in the northern part of the country. Ritchie (1977) reported that most of the training was developed from needs assessment and follow-up of farm

families from villages surrounding the training center. Although the success of these programs has not been studied, there is evidence from studies in other parts of the world which supports the notion that farmers' participation in projects enhances success. For example, 36 studies conducted in Latin America and Africa by the Development Alternative Inc. (1976) comparing successful and unsuccessful projects concluded that local involvement (action) by small farmers in the programs accounted for 49 percent of the variance towards the overall success of those programs. Another study in Iran by Ashraf (1978) found that successful projects were those which had community involvement and which provided content that is relevant to the participants. Also, the study by Hess (1980) in Mahastra Village, India, indicated that training of farmers according to their needs enabled them to triple their incomes in a very short time. It was further found that income increased the supply of consumer items and reversed the rural-urban migration of labor. The philosophy of involvement is further supported by Young (1980) that the success of managing rural development programs should be based on the needs and local resources of small farmers.

In Thailand, Fremerey (1979) assessed a training process which involved farmers and village foremen as motivators or "animators" to inspire changes in villages through education and motivation and concluded that the method was very effective

in innovation transfer and inspired a setting of self-help groups among other farmers. Also, in evaluating the impact of the animation rurale in Francophone African countries, Charlick (1980) ascertained that the success in promoting mass participation in rural development was contingent upon conducive political, nation-wide competition. He further noted that results in improving technical abilities varied from country to country depending on the degree of simulated demand for services, the degree to which widespread adoption was required, and the degree to which benefits would be monopolized by groups at the village level.

In determining village problems and training needs of the TRD participating villages in Tanzania, Moland (1981) ascertained that villages showed differences in the problems identified. He concluded that this difference should be put in mind when developing training programs for the farmers. He also found that training was conceived as an important aspect in conducting various village development programs. He recommended continuous needs assessment of farmers for the purpose of updating the training content. However, Gonsalves's (1984) study identified some burnout among data collectors and interviewees when such protracted activities are carried out. Another needs assessment carried out by Onuoha (1978) in Nigeria concluded that subsistence farmers in Imo State needed education in farm management, crops and farm equipment.

In his study, Wilson (1977) identified that the training which is required to promote rapid agriculture and rural development should be in technological and problem-solving skills. He further pointed out that these two approaches were complementary, but cautioned that there is a tendency among training organizations to make the technical aspect rely heavily on formal type of education, a tendency which may overlook the needs of trainees and may create problems of training programs not being understood.

Two studies cited which have tried to include training institutional organization analysis and farmers' achievements from training received from those institutions are by Mamat (1982) and Gonsalves (1984). Mamat's study used four case studies in Malaysia, Philippines, and Sri Lanka to explore strategies for educating peasants in residential training institutions and village-based organizations. He found that the relevance of training increased greatly in those institutions which involved trainees and trainers in the process of learning needs assessment. His findings also support the ever-popular contention that learning by doing and participative learning are effective training techniques. Also, the finding of his study that farmers wanted training in various areas supports the idea that training which is effective for rural development is the one which is comprehensive covering both agricultural and nonagricultural concepts. From his

study, he concluded that post-training programs for farmers should be encouraged because more often training from a one-shot residential training center has a tendency of being forgotten if it is not supplemented with other training. He also concluded that the success of rural development programs depends on the interactions of village-based organizations, residential training centers, and development agencies. He recommended a three-way interaction of these organizations.

Gonsalves (1984) studied four farmers' training programs in Tanzania. His ground-based research aimed at assessing the process of village level training, identifying critical elements of training, and problems which affect the effectiveness of training programs. Some of his findings were, first, that the use of needs assessment as a basis for designing farmers' training was found to be followed by two programs, namely, the Training for Rural Development (TRD) project and the Farmer Training and Production Project (FTPP). However, he identified a time lag between the collection of data and the return of the findings to the respective institutions. The main reason for the delay was that most of the data collected were taken outside of the country to be analyzed. In view of this point, he asserted that since training teams and trainees are involved in data collection only, participation program development is not complete. Second, he found that joint decision making by trainers and trainees was preferred by those

interviewed by about a one-to-one ratio (27.5% of trainees and 29.7% of the trainers). Third, trainees' educational background was not a significant factor in determining the response of villagers to training opportunities, especially in short duration courses. Fourth, he found that village-based training was preferred by many villagers. His fifth finding was that follow-up activities of village trainees were stronger with the TRD than other training programs. Sixth, he found out that implementation of training was plagued by a number of problems, such as trainees "re-entry" in their villages after training, lack of facilities to use in villages, lack of opportunities to practice some concepts, lack of support from fellow villagers, etc.

Summary of the Review of Literature

There is a plethora of literature about the importance of participatory education programs for farmers' development. Ways and means of how nonformal education programs should be conducted are also abundant. However, it seems that there is insufficient empirical evidence about the effectiveness of rural training programs based on perceptions of participating farmers. However, it is highly probable that the author may not have obtained, and thus not reported, other completed studies in this area.

Those studies which have been completed, more often than

not, delved into the organizational structure and management of training centers, or have tended to verify the success of farmers' training programs by studying administrators or extension agents as respondents. However, those completed studies on farmers themselves have demonstrated the success of programs that incorporate participation of beneficiaries into their program processes.

METHODS AND PROCEDURES

This section describes the research design and the rationale of selecting the design. Described also are the procedures for population and sample selection, the instrumentation, the procedures for data collection, and the data analysis.

Research Design

The study featured a cross-sectional, descriptive design. A triangulation procedure of a survey and nonsurvey (mainly observations) methods was employed. A sample survey method using a follow-up approach was used because, according to Van Dalen (1979), survey studies are one of the primary means of conducting descriptive research. Also, Wentling (1980), Kline (1980), and Borg (1981) pointed out that survey studies gather opinions, preferences, perceptions, etc. from study groups by employing questionnaires and interviews. A follow-up of village level TRD-trained and non-TRD-trained from the 1979 TRD participating villages was employed as a tool for gathering data. According to Wentling (1980), follow-up techniques attempt to evaluate the strengths and weaknesses of a program by obtaining information from the program participants who may be in the best position to provide such information. This concept was supported by Murphy (1980) who agrees that persons who are closely associated with the

program would be the most appropriate sources of information for descriptive studies.

Since in interviews and questionnaires, individuals tend to offer biased information about themselves (Borg and Gall, 1983), observations were used in a triangulation process to provide supporting evidence on the TRD information obtained by surveys. The purpose of triangulation was explained by, for example, Bailey (1978), Denzin (1978), and Jick (1979) as a process which tries to establish a strong case of relationships and correct information among variables by comparing the data of two or more methods. This study used the triangulation of survey and observation techniques. However, observations were limited to certain sections of the investigations where it was possible to be done. For example, observations were made in farming activities, people's behaviors in meetings and other activities, and on other development activities in the villages.

Evidently, follow-up studies of farmers who have attended some training in training institutions in Tanzania have not been very common. Only two studies were found which have tried to employ follow-up techniques. The first study was by Francke (1974) who used a follow-up method in 1968 to study about the farmers training syllabus at the Kibaha Education Center. Another study was by Gonsalves (1984). His study included portions which looked at perceptions of training

programs by farmers who had participated in those training programs.

Similarly, observation studies pertaining to evaluating the impact of training programs for farmers have not been done extensively in Tanzania. However, there are studies which indicate that the method is not uncommon. The studies by Storgaard (1976), and Kokuhirwa (1982) used observation methods to collect information about rural women. Keregero (1981) observed critical incidences, but his study was limited to extension agents. Gonsalves (1984) observed farmers' training institutions behaviors and patterns to complement his interviews.

Perhaps the most popular method for gathering information from farmers in Tanzania is through structured and unstructured personal interviews. However, most of these studies did not interview farmers about their opinions on any training program they may have received. Studies by Fortmann (1981), Oomen-Myin (1981), and Gonsalves (1984) are but a few examples which indicate that interviews have been used more often to collect data in the country.

Interviews seem to be preferred for collecting data in Tanzania because up to the late 1970s literacy rate among farmers in Tanzania was very low. Even today when literacy rate is considered to be high (about 85 to 90%), the comprehension level of farmers has not reached the stage of reading

and responding with accuracy to most of the questions asked by researchers. Secondly, it is important to note that the infrastructure in the country is not adequately developed to facilitate the use of mailed questionnaires. Interviews, therefore, become a viable alternative in data collection.

Although there is a paucity of literature about research done in Tanzania using follow-up and observation techniques, the combination of follow-up with interviews supplemented with observations was deemed appropriate for data collection for this study.

Population

For the purpose of this study, the population consisted of the residents of the fifteen 1979 TRD pilot villages. These villages are located in Iringa (four villages), Mbeya (four villages), Rukwa (three villages), and Ruvuma (four villages) regions (Figure 1). The estimated population in the fifteen villages was 3,750 families (250 familier per village as estimated by the 1975 Villagezation Act). However, the sampling frame consisted of all registered adults in the villages regardless of whether two or more respondents came from the same family or not. Thus, each individual respondent served as the sampling unit.

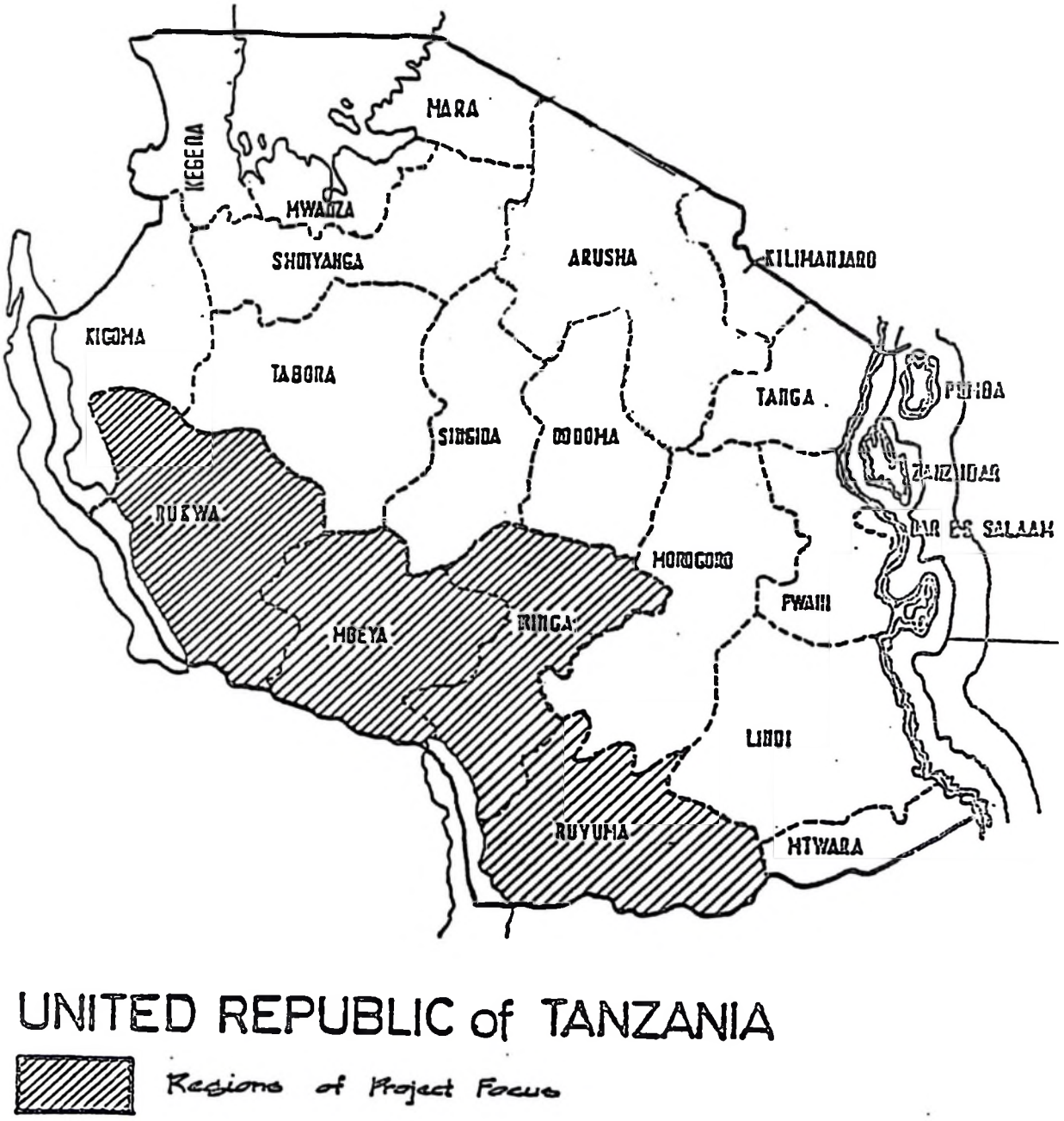

Figure 1. 1979 TRD project area

Sampling Procedures

A four-region stratification procedure was employed to determine the sample size. Since the number of villages in each stratum (region) was predetermined, it was estimated that a total sample of 375 cases from fifteen villages, or 25 respondents from each village, would constitute the study sample. It was assumed that the variability among the stratum means was not significantly different, and that the cost of collecting information was the same; therefore, a stratified random sampling with optimal allocation procedure (Scheaffer et al., 1979) was used. Therefore, from each stratum (region), a subsample of cases according to the number of villages in the project was obtained. From Iringa, Mbeya, and Ruvuma, a total of 100 respondents was to be obtained from each region, whereas 75 respondents were selected from the Rukwa region. The 25 potential respondents from each village were further subdivided into four subgroups of (a) the TRD-trained leaders, (b) the TRD-trained nonleaders, (c) the TRD-untrained leaders, and (d) the TRD-untrained nonleaders. Subjects from each village were then randomly selected from lists according to these four subgroups.

The units of measurement were individual respondents and groups according to the objectives of the study.

Interviews conducted with 375 potential sampling units

from the fifteen villages yielded 331 usable questionnaires, which represented 88.27 percent of the targeted sample size. The distribution of the study groups by region and subgroups of function (leader and nonleader) and trained or untrained are represented by the data in Table 1.

Table 1. Sample size by region and function

	Function				
	Leaders		Nonleaders		
Region	TRD-trained	Non-TRD-trained	TRD-trained	Non-TRD-trained	Total
Iringa	25	21	11	33	90
Mbeya	17	8	32	28	85
Rukwa	20	14	17	19	70
Ruvuma	13	24	19	30	86
Total	75	67	79	110	331

From the information given in Figure 2, it was ascertained that totals of 238 males (113 TRD-trained, 34.1%, and 125 TRD-untrained, 37.76%) and 93 females (41 TRD-trained, 12.39%, and 52 TRD-untrained, 15.71%) were sampled. Further study of the data in Table 1 and Figure 2 indicates that 154 interviewees were TRD-trained and 177 respondents were non-TRD-trained.

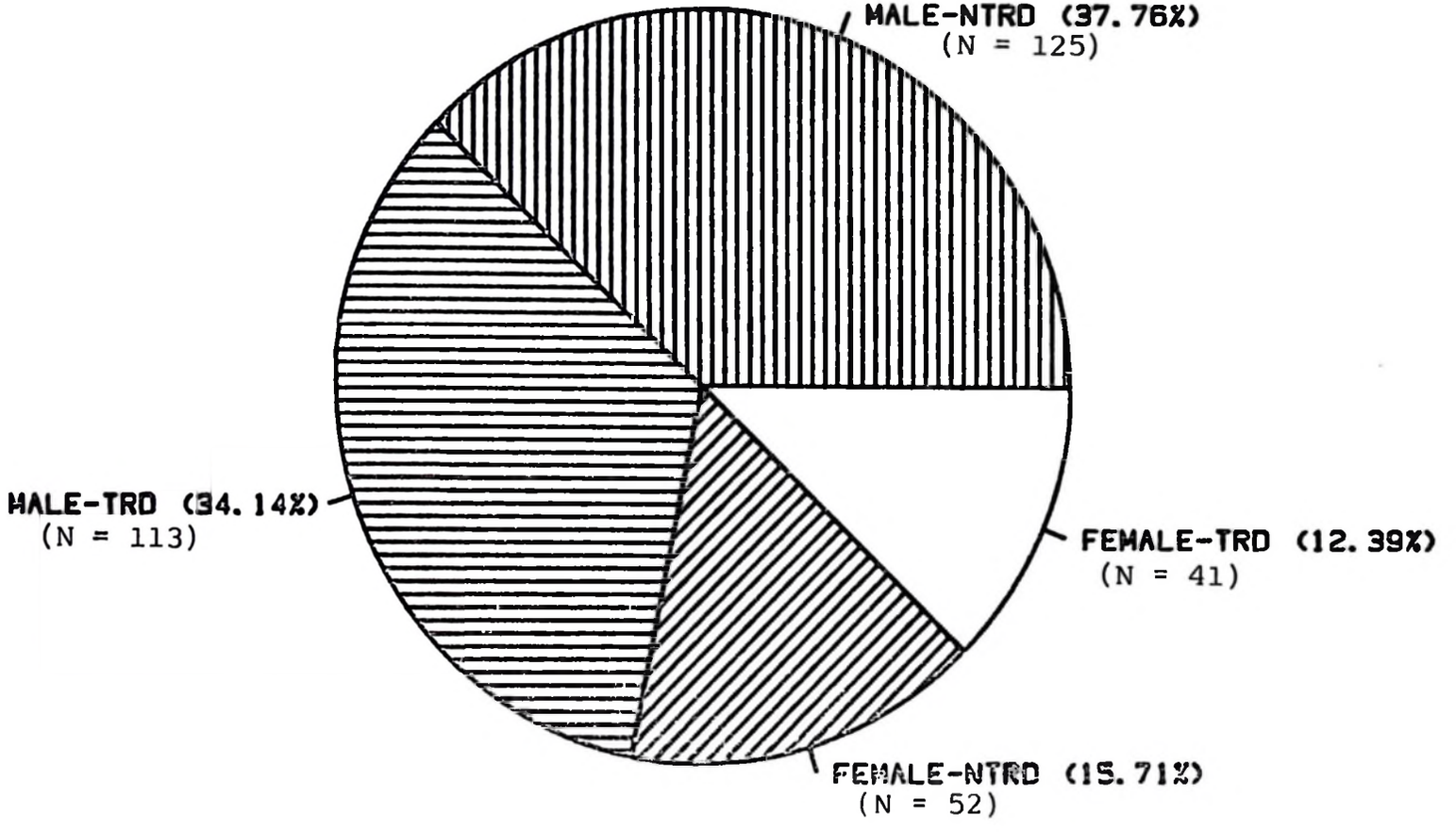

Figure 2. Respondents by gender and the TRD training category (NTRD = non-TRD-trained, TRD = TRD-trained)

Instrumentation

Data were collected using semistructured interviews with a questionnaire. In some cases, however, observations were made to collect additional information to supplement interviews. Since, according to Fowler (1984), the first step in increasing interviewer consistency was to give them standardized questions, a big part of the questionnaire used consisted of structured items which aimed at exploring specific quantitative information. Open-ended questions were added to probe deeper for additional insights into the information collected.

The questionnaire was comprised of three sections. Section 1 gathered demographic information from respondents. The intent of section 2 was to determine the TRD training program participants' perceptions about the importance and effectiveness of the training program. To determine this, 55 items developed from the TRD training syllabus were identified and grouped into five training categories, namely: (1) leadership and communication, (2) project planning and management, (3) crop production (horticulture), (4) livestock production (poultry), and (5) farm management. Two parts, that is, the "perceived importance", and "perceived effectiveness" were identified. A five-point scale ranging from 1 for "no importance" to 5 for "very high importance" was developed for "perceived importance". Another five-point scale ranging

from 1 for "not effective" to 5 for "very highly effective" was also developed for perceived effectiveness (Appendix).

Section 3 was divided into seven parts, all of which intended to probe into the practicality and problems of the TRD program at the village level. Part 1 had open-ended questions asking trainees to list concepts that they learned from the centers and applied them for village development. Part 2 looked into those concepts which, although learned from centers, were not practiced in villages. Part 3 looked into the problems which TRD trainees encountered during and after training sessions. Part 4 solicited the TRD trainees' responses on the value of TRD in developing leadership abilities. A five-point scale from 1 for "drastically decreased" to 5 for "strongly increased" was used to gather their responses. Part 5 asked them to identify three things they thought the TRD project had contributed to their village development. Part 6 intended to determine whether the 18 selected farming and management practices were "never practiced" or "practiced before TRD". It was also intended to determine whether those who had adopted the activities had increased or decreased the use rate after the TRD. A four-point scale with 1 for "no increase", 2 for "slight increase", 3 for "moderate increase", and 4 for "high increase" was used (Appendix). Finally, part 7 intended to find out whether participants were in favor of the establishment of such a program in other parts of the country.

A short scale of 1 to 5 was preferred to longer scales because, first, it enhances the chances of getting correct responses from interviewees with relatively minimum understanding. Second, the author tends to concur with Wentling (1980) who pointed out that each of the points on the continuum should have its own specific descriptor phrase without overlapping points on a scale; also with the views of Van Dalen (1979, p. 144) that, "too few categories tends to produce crude measures that have little meaning, and too many categories makes it difficult for the rater to discriminate between one step and the next on a scale."

The questionnaire was translated by the researcher into "Swahili", the Tanzania national language. Upon arrival in the country, a team of about seven TRD in-country trainers, together with the researcher, reviewed the English and the Swahili questionnaires to verify the consistency and representativeness of the contents and the translation. With some modifications, the Swahili version questionnaire was used to collect the data.

The overall validity of the instrument was established through the review of the literature, individuals at Iowa State University, the TRD project consultants and training teams in Tanzania, and individuals at the Sokoine University of Agriculture, Morogoro, Tanzania. A post-hoc reliability test was computed at the Iowa State University Computer Center

to establish reliability. Cronbach's Alpha Reliability test was used to test reliability. The reliability coefficients for the various measures are reported in Tables 2 and 3.

Table 2. Reliability coefficients, Section I

Source	Number of items	Alpha importance	Alpha effectiveness
Total	55	.97	.98
Village leadership and communication	7	.89	.90
Project planning and management	9	.88	.91
Crop production	16	.93	.97
Livestock production	11	.95	.96
Farm management	12	.94	.95

Table 3. Reliability coefficients, Section II

Source	Number of items	Alpha
Rate of increase in farming and management practices	19	.90
Increase in leadership abilities	15	.92

Data Collection

Data were collected during July and August 1984 by the researcher and a team of about 13 trained and experienced in-country TRD trainers.

A group of interviewers comprised of the TRD trainers in the country was used. To obtain uniformity in interviewing and reduce interviewer bias, an interviewer's guide or manual was developed. According to Patton (1980), an interviewer's guide enhances chances of asking each respondent the same set of questions and also reduces variations and possible biases from having different interviewers for different people.

On arrival in the research area, the interviewer's guide was used to conduct brief training sessions for the interviewers. The interviewers were experienced in conducting personal interviews and were quite familiar with the villages and the project. Therefore, only limited instruction was necessary. The interviewers did not experience difficulty in village entry and establishing rapport.

During the interviews, respondents were asked to indicate their perceptions of the importance and effectiveness of the training program on a five-point scale on 55 items grouped in five training categories. Other questions asked them to indicate their farming practices, leadership abilities and training problems. The researcher and other interviewers also recorded things observed in areas where observations

were necessary to add to the information obtained by interviews. The observations were mainly in farming activities, yields, behaviors, and other socioeconomic activities that could be observed.

Analysis of Data

Data coding and analysis were completed at Iowa State University. According to Nie et al. (1975), the purpose of data analysis is to condense collected information into a form which can be easily comprehended and integrated. Coding of data from interview schedules was done by the researcher. Keypunching and verification was done by the Iowa State University Computer Center personnel.

In analyzing the data, descriptive and inferential statistical procedures of subprograms from the Statistical Package for the Social Sciences (SPSSx) were used according to the objectives and hypotheses of this study. For further reading about statistical tests, refer to Hinkle et al. (1979) and Ott (1977). For descriptive analysis, SPSSx subprograms FREQUENCIES, to determine means, ranks and standard deviations, and CROSSTABS, to give cell numbers and percentages, were computed to summarize the research variables.

In the inferential analysis, the following SPSSx subprograms were performed:

1. T-TEST to determine if significant differences

existed between:

a. Village leaders and nonleaders in their perceived importance of the TRD training program (objective 2, hypothesis 2).

b. The TRD-trained and non-TRD-trained farmers in their rate of increase in the use of farming and management practices (objective 4, hypothesis 5).

c. The TRD-trained village leaders and nonleaders in their average increase in leadership abilities (objective 4, hypothesis 8).

2. ONEWAY ANOVA to determine if significant differences existed among the four regions in the TRD-trained respondents' perceptions of the degree of importance and degree of effectiveness of the training program (objective 2, hypothesis 1, and objective 3, hypothesis 4).

3. CROSSTABS to determine the independence of:

a. Regions in adoption of improved farming and management practices (objective 4, hypothesis 6).

b. Sex in identifying specific contributions of the TRD to village development (objective 4, hypothesis 7).

c. Sex, age, educational background, and region in the TRD problems identified (objective 5, hypothesis 9).

4. REGRESSION analysis to find out perceived effectiveness predictor variables in "management" and "technical" training among the TRD-trained respondents (objective 3, hypothesis 3).

Summary of Research Procedures

This descriptive, cross-sectional study was conducted in the TRD project area in Tanzania to determine the impact of that project in raising farmers' abilities to increase production and conduct village development programs. The TRD-trained and non-TRD-trained at the village level represented the subjects for the study. A survey and an observation method were employed.

Data were collected during July and August 1984 by personal interviews with a questionnaire. The questionnaire was designed to elicit perceived importance and effectiveness of the TRD training program, the contributions by the TRD to village development, and the training problems encountered. Observations were recorded during and after interviews. The collected data were statistically analyzed by using the Iowa State University Computer Center facilities.

SECTION I. THE IMPORTANCE AND EFFECTIVENESS OF THE TRAINING FOR RURAL DEVELOPMENT (TRD) PROJECT AS PERCEIVED BY VILLAGE RESIDENTS IN TANZANIA

Introduction

The fact that education promotes development in a country is widely recognized. For example, Lindley (1975) contends that there is a relationship between the level of education and the degree of development found within a country. However, the education process itself is contingent upon how development is defined (Simmons, 1980). In developing countries, many people are peasants in rural areas. Also, the economic growth and development of most of the developing nations depends upon agriculture. Therefore, development means building the capabilities of those people to identify and undertake the technological changes in agriculture for increased productivity of food and fiber. Thus, investment in human resources is considered to be the most important and prerequisite factor in agriculture and rural development (Savary, 1979). It is through appropriate education that people become conscious of themselves and acquire power to articulate programs for their development. This philosophy was emphasized by Lema (1977, p. 10):

> Appropriate education for the masses would provide ideas that would make their world or situation and their own lives more intelligible to them and create in them a sense of participation in the development of their society. If the ideas and values transmitted through education are to be of any importance, they have first

> to be internalized by the recipients. They have to become instruments through which the people themselves look at, interpret and experience the world in which they live.

Despite this tenet being conceived by many educators, past educational systems for rural people, most of which have been formal, have done very little to help the peasants (Nagel and Schubert, 1981). Up to the mid-20th century, training emphasis had been on formal education to increase the agricultural development staff, whose roles were to educate farmers about improved farming practices. However, there is a plethora of information arguing that the vast majority of peasants in developing countries may not have benefited much from the extension service. For example, extension services to farmers have been plagued by inadequate extension communication and linkage systems (Rogers, 1976; Brokensha et al., 1980; Singh, 1981), inadequate extension teaching methods (Lele, 1975; Heyer and Waweru, 1976; Stevens, 1981), low morale among extension agents (Moris, 1981; Turray, 1982), and lack of transport relative to large service areas (FAO, 1980; Rhodes, 1980; Stevens, 1981; Keya, 1982). Consequently, the envisaged spread effect of agricultural knowledge to farmers has been slow and frustrating.

In recent decades, there has been a shift from formal to nonformal education programs for adults (Coombs and Ahmed, 1974). It has been conceived that nonformal adult education programs would supplement extension services and increase the abilities of rural people to participate in their development

efforts. In Tanzania, for example, rural development policies have emphasized people's involvement in the development process, making nonformal adult education the central theme. Training of farmers has been through residential farmers' training centers, and other institutionalized and village-based training programs.

However, the impact of many such training programs is not evident. The advocated policy of participatory education has not been adequately implemented in many training programs. Most training curricula for farmers have been developed and conducted in a duplica of pedagogical theories and principles, although the theory of adult education stresses client needs assessment as a fundamental base for developing training programs (Mulusa, 1983). For example, studies in Tanzania by Sudad (1980), Ministry of National Education, reported by Mosha (1982), and Gonsalves (1984), indicate that there were almost no procedures which involved participation of farmers in making decisions regarding training activities. These limitations in the educational system have resulted in a shortage of trained personnel both in management and technical skills at almost all levels (USAID, 1981). The consequences of this deficit, at the peasant level, have resulted in the stagnation of many rural development programs with adverse effects on the quality and quantity of food and fiber production, nutrition, health, and overall economic growth and development. Today, the question of who should be

trained and how still stands tall among the concerned.

The Training for Rural Development (TRD) project in Tanzania has been conceived as a sound, practical example which develops and conducts training based on the articulated needs of farmers. The purpose of the training program was to increase farmers' abilities in conducting village development programs. This participatory training process involves three phases, namely: (a) two-week systematic village surveys by the project training teams to conduct needs assessment for determining and developing the training content; (b) a one-month residential training in "management" and "technical" areas at the TRD training centers; and (c) follow-up visits to participating villages to assess the progress made, identify implementation problems, and provide training when necessary. The project includes training in the following categories: leadership and communication, project planning and management, crop production, livestock production, and farm management.

Objectives and Hypotheses

The fact that the TRD has a unique approach to rural people training in Tanzania warrants an investigation of the effectiveness of the program as perceived by participating farmers. Therefore, the purpose of this study was to determine the farmers' perceived importance and effectiveness of

the training program for village development. The specific objectives were:

1. To identify and analyze demographic characteristics of respondents.
2. To determine and analyze the TRD-trained respondents' perceived importance of the training program for village development.
3. To assess and compare the TRD-trained respondents' perceived effectiveness of the training program in developing their abilities for village development.
4. To identify and analyze problems encountered by the TRD-trained respondents during and after the training sessions.

The hypotheses tested were:

1. There is no significant difference in the respondents' perceptions of the importance of the TRD training program when grouped by regions.
2. There is no significant difference between TRD-trained village leaders and nonleaders in their perceived importance of the training program.
3. Village function (leader or nonleader), educational background, gender, and age of respondents do not contribute to the prediction of respondents' perceived effectiveness of the training program.

4. There is no significant difference in the respondents' perceptions of the effectiveness of the TRD training program when grouped by regions.
5. The problems identified are independent of gender, age, educational background, and location of respondents.

Methods and Procedures

This field survey study featured a cross-sectional, descriptive design. A sample survey method with a follow-up was employed to collect information. According to Van Dalen (1979), Kline (1980), and Borg (1981), survey methods are procedures commonly used when conducting descriptive research. A follow-up technique was used because it gathers program participants' views about the strengths and weaknesses of the program being studied (Murphy, 1980; Wentling, 1980).

A four-region stratification procedure with optimal allocation was employed to obtain a random sample of 154 TRD-trained villagers from 15 villages[1]. Personal interviews that utilized a three-part semistructured questionnaire were conducted by the author and trained interviewers from TRD trainers. Data were collected during July and August

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[1]Sixteen villages in four regions (Iringa, Mbeya, Rukwa, and Ruvuma) started with the project in 1979.

1984. Interviews were conducted in Swahili, the Tanzanian national language. Respondents' perceptions of the importance and effectiveness of the TRD training program and problems they encountered during and after training sessions were recorded. All 154 questionnaires were usable.

The interview questionnaire and procedures were validated through the review of the literature, individuals at Iowa State University, Sokoine University of Agriculture, Morogoro, Tanzania, the TRD consultants and the training teams, also in Tanzania. The internal consistency of the instrument was .97 and .98 for the perceived importance measure and the perceived effectiveness measure, respectively. The Cronbach's alpha reliability test was executed to determine these coefficients.

Results and Discussion

Data were first analyzed to describe selected socio-demographic variables. According to the information in Figure 1, out of a total of 154 respondents, 36 (23.38%) were from the Iringa region, 49 (31.81%) from the Mbeya region, 37 (24.03%) from the Rukwa region, and 32 (20.78%) from the Ruvuma region. Figure 2 reveals that male respondents outnumbered female respondents by a ratio of three-to-one (73.38%:26.62%, respectively). An examination of respondents by gender and age (Figure 3) shows that the

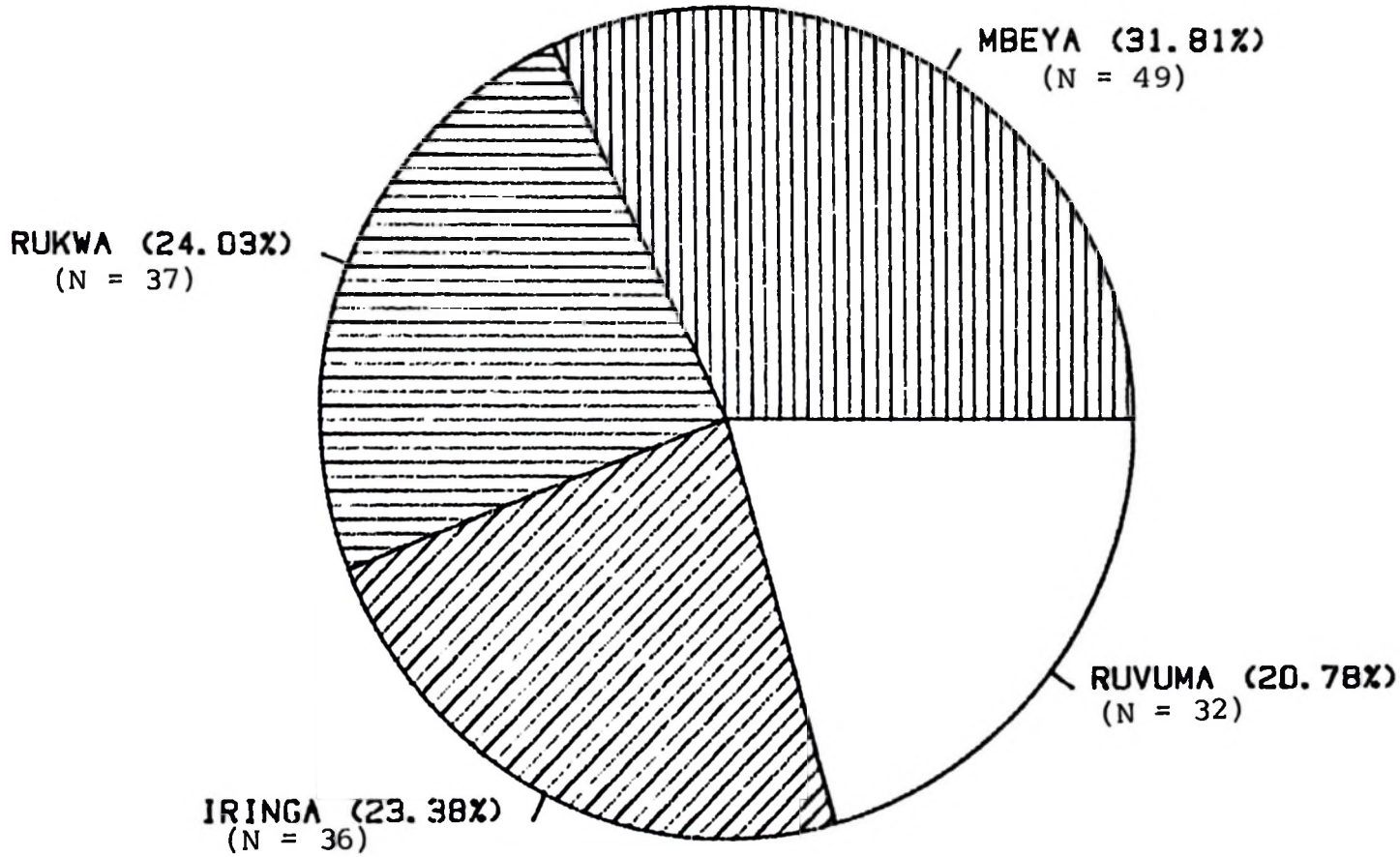


Figure 1. Region of residence of TRD-trained respondents

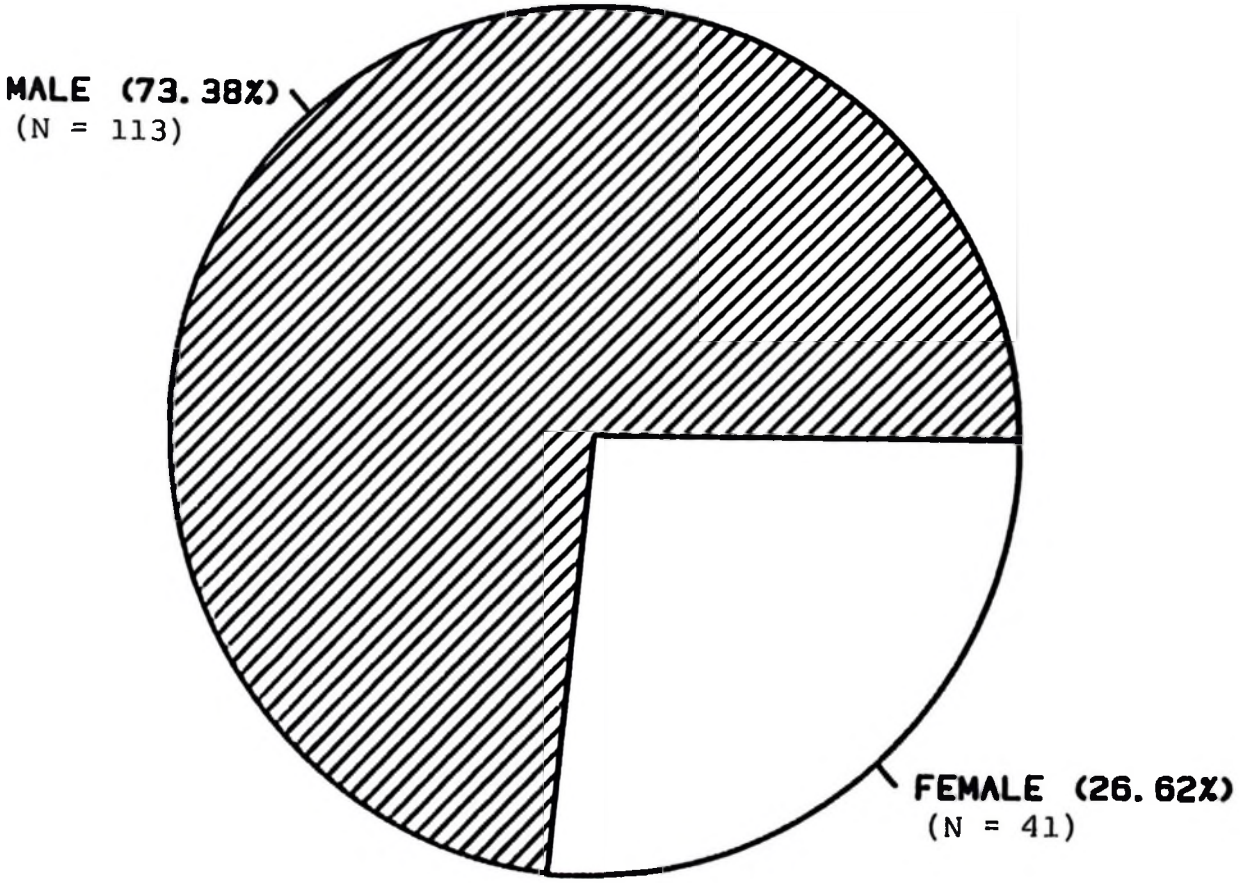


Figure 2. Gender of TRD-trained respondents

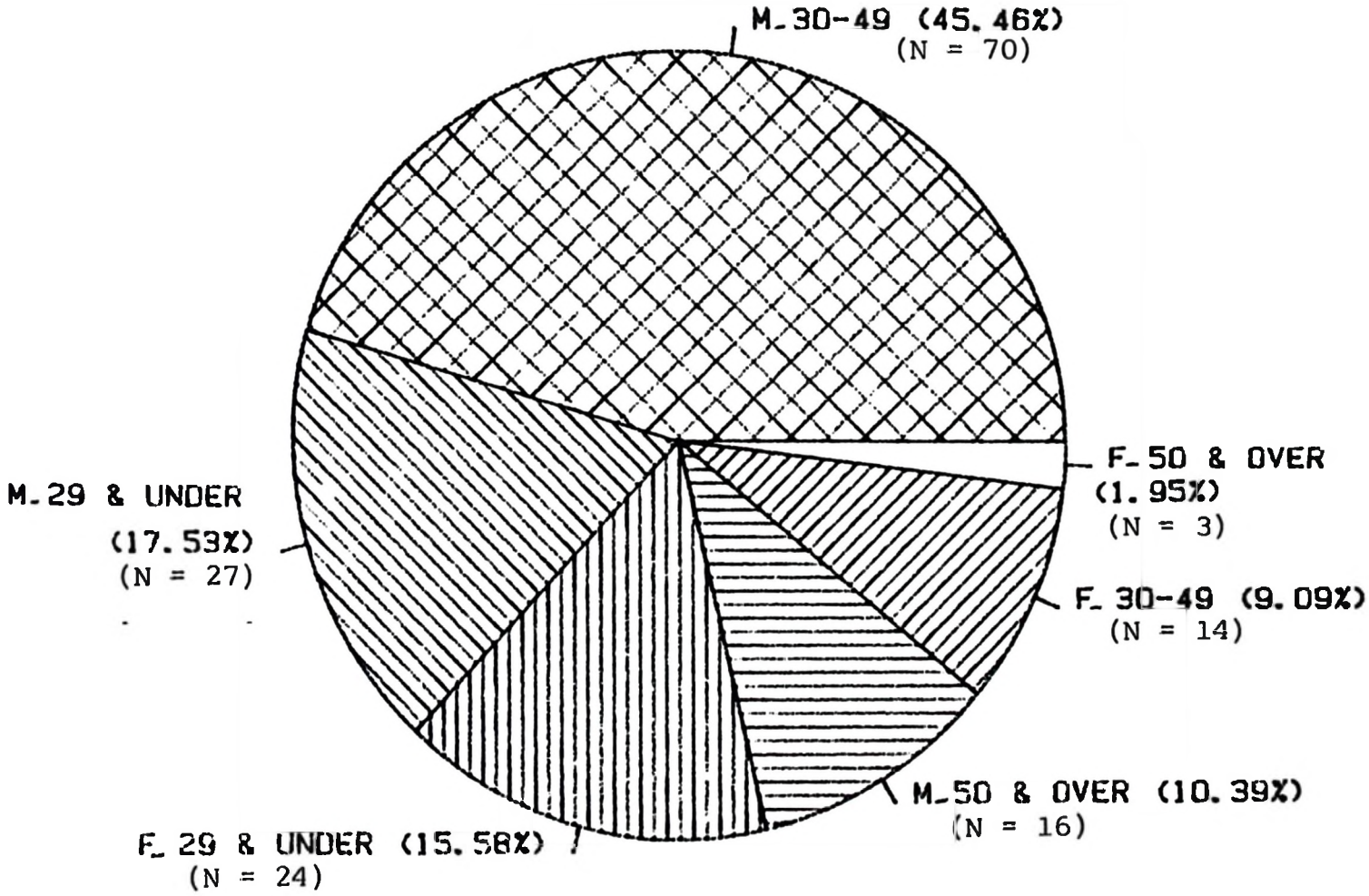


Figure 3. Age (in years) of TRD-trained respondents (M = male; F = female)

majority of trained respondents fell between the ages of 30 and 49 years (54.55%). Respondents of ages below 30 years and above 50 years of age constituted 33.11% and 12.34% of the sample, respectively. However, more males from age 30 years to 49 years (45.46%) and more females below 30 years (15.58%) attended the TRD training.

Among these TRD-trained respondents, about 35% of the males had formal education and 19% had no formal education. The ratio of females with formal education and those with no formal education was about five-to-one (22.08%:4.55%, respectively; see Figure 4). Further examination of Figure 4 indicates that, out of 154 respondents, 118 (77.1%) had completed some formal education and 36 (22.9%) had no formal education. However, over 90% of those who did not have formal education had some adult education training (nonformal functional literacy programs). Figure 5 shows that three-fourths of the respondents (65 males and 10 females) were village leaders. Other respondents were nonleaders in the village (48 males and 31 females).

To determine and analyze the perceptions of the importance of the TRD training program among the TRD-trained respondents, descriptive analysis of the central tendency (means) and variability (standard deviations), and inferential analysis (analysis of variance and t-test) were computed on each of the five training categories using the SPSSx

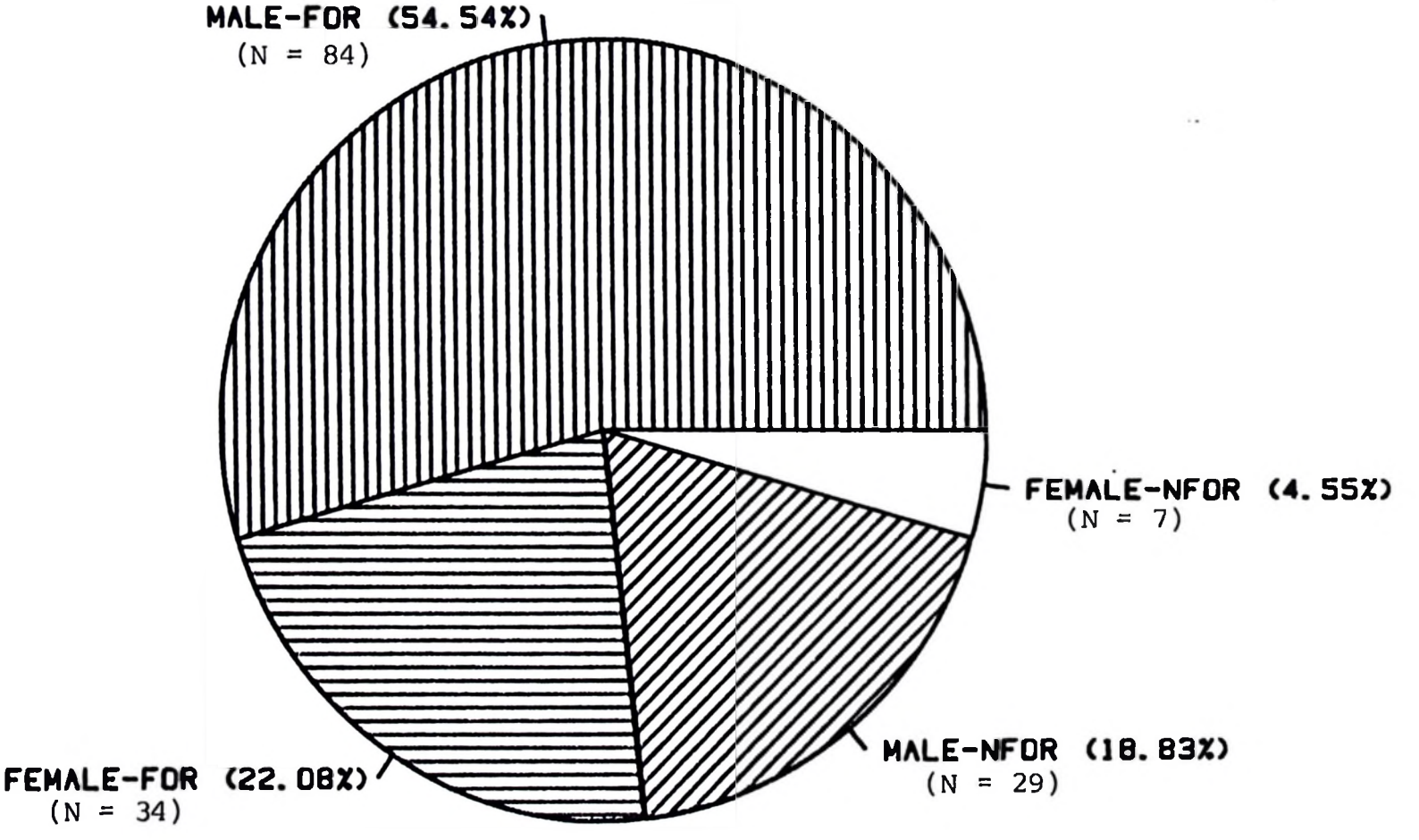


Figure 4. Gender and education background of TRD-trained respondents (FOR = formal; NFOR = nonformal)

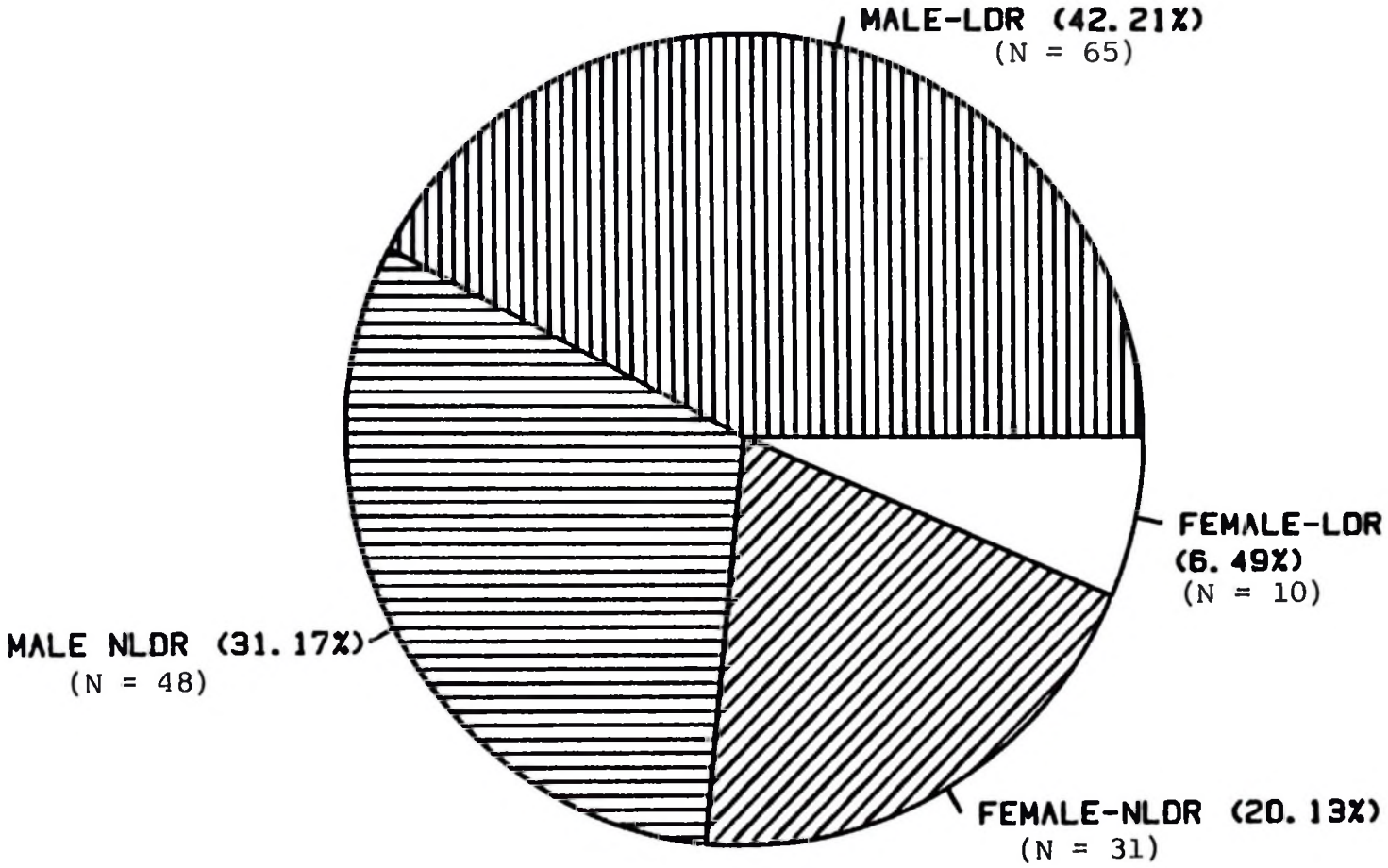


Figure 5. Gender and function in the village of TRD-trained respondents (LDR = leader; NLDR = nonleader)

subprograms (SPSSx, Inc., 1983). The descriptive results reported in Table 1 indicate that all but one training category for one region perceived the importance of the TRD training as high (4.0) to very high (5.0). The means ranged from 4.15 to 4.64 on a five-point scale. The livestock production category for the Rukwa region was the only one with an importance rating below 4.0; it was 3.94.

An analysis of variance was performed on the data using the SPSSx subprogram "oneway" to test the hypothesis that there is no significant difference among regions in the respondents' perceptions of the TRD training program. F-tests were run with region as the independent variable and perceived importance of leadership and communication, project planning and management, crop production, livestock production, and farm management as the dependent variables. As indicated by the data in Figure 6, the results of the F-test statistic were not significantly different at .05 level among the four regions. The hypothesis was tenable.

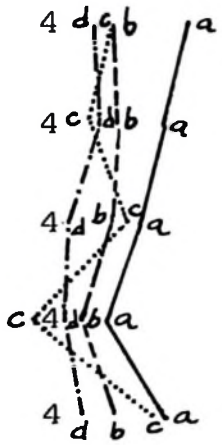
For testing the hypothesis that TRD-trained leaders and nonleaders were not significantly different in the way they perceived the importance of the TRD training program in village development, the SPSSx subprogram "t-test" was computed for comparing the means of "leaders" and "nonleaders" on their perceptions of the importance of the training

Table 1. Means and standard deviations of the TRD-trained respondents' perceived importance of the training program by region[a]

Training category	Region							
	Iringa		Mbeya		Rukwa		Ruvuma	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Leadership and communication	4.64	0.49	4.36	0.83	4.36	0.66	4.29	0.61
Project planning and management	4.52	0.61	4.28	0.78	4.25	0.87	4.16	0.49
Crop production	4.36	0.64	4.21	0.83	4.31	0.75	4.08	0.62
Livestock production	4.24	0.89	4.18	1.06	3.94	1.11	4.08	0.75
Farm management	4.53	0.6o	4.29	0.98	4.44	0.61	4.16	0.75

[a]Scale used: 1 = no importance, 2 = low importance, 3 = moderate importance, 4 = high importance, 5 = very high importance. N = 154.

Training category	Degree of importance 3 Moderate	4 High	5 Very high	F-value	F-prob.
Leadership and communication	3	4	5	1.84	0.143
Project planning and management	2	4	5	2.20	0.091
Crop production	3	4	5	1.13	0.340
Livestock production	3	4	5	0.62	0.598
Farm management	3	4	5	1.74	0.161



Key: a _____ Iringa
b ----- Mbeya
c ····· Rukwa
d -·-·- Ruvuma

Figure 6. Mean responses and F-tests of TRD-trained respondents' perceived importance of the training program by region

Table 2. t-test analysis of the TRD-trained respondents' perceived importance of the training program by function in villages[a]

Training category	Function in village	N	Mean	SD	t-value	2-tail t-prob.
Leadership and communication	Leaders	67	4.43	0.68	0.57	0.571
	Nonleaders	63	4.36	0.68		
Project planning and management	Leaders	68	4.29	0.65	0.14	0.892
	Nonleaders	65	4.28	0.80		
Crop production	Leaders	72	4.20	0.77	-0.51	0.609
	Nonleaders	74	4.27	0.69		
Livestock production	Leaders	70	4.13	0.96	0.36	0.722
	Nonleaders	71	4.07	0.98		
Farm management	Leaders	70	4.33	0.83	-0.29	0.772
	Nonleaders	71	4.37	0.70		

[a]Scale used: 1 = no importance, 2 = low importance, 3 = moderate importance, 4 = high importance, 5 = very high importance. N = 154.

program. Data in Table 2 reveal that the t-values were not statistically significant at .05 level (two-tail t-tests). The null hypothesis was retained.

The tenability of both hypotheses in the preceding analyses, and the fact that the group means were very high (Figure 6 and Table 2) indicates that all respondents considered the TRD training program important for village development. These findings may, in addition, help to support the conclusion that the TRD training is meeting the needs of people in the villages. Since its establishment, the TRD project has had a participatory strategy incorporated in its training programs. The results of this study are consistent with those of Moland (1981) and Gonsalves (1984). They found that farmers perceived the TRD training programs for village management, leadership, and farming technology to be important in conducting village development programs.

Perceptions of the degree of effectiveness among the TRD-trained respondents in the four regions and the five training categories were analyzed by subprograms "frequencies" (to determine the means and standard deviations) and "oneway" (to test the hypothesis that respondents in four regions were not significantly different in the way they perceived the effectiveness of the training program).

The data in Table 3 indicate that, in general, respondents rated the training program effective in developing

Table 3. Means and standard deviations of the TRD-trained respondents' perceived effectiveness of the training program by region[a]

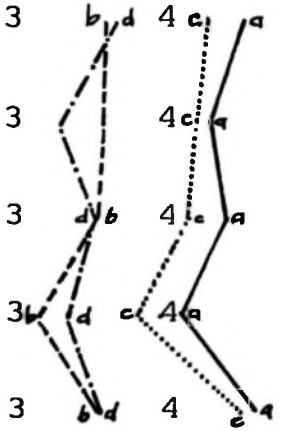
Training category	Region							
	Iringa		Mbeya		Rukwa		Ruvuma	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Leadership and communication	4.45	0.56	3.72	0.70	4.32	0.75	3.74	0.79
Project planning and management	4.23	0.61	3.72	0.74	4.19	0.86	3.45	0.92
Crop production	4.33	0.93	3.63	1.13	4.17	0.77	3.62	0.85
Livestock production	4.06	0.95	3.16	1.24	3.84	1.14	3.29	0.93
Farm management	4.49	0.74	3.66	0.85	4.42	0.60	3.66	0.81

[a]Scale used: 1 = not effective, 2 = somewhat effective, 3 = moderately effective, 4 = highly effective, 5 = very highly effective. N = 154.

their abilities to conduct village development programs. The means ranged from 3.16 to 4.49 on a five-point scale. However, the findings in Figure 7 illustrate that there were variations among the regions in the degree of effectiveness of the training program as perceived by the TRD-trained respondents. The F-values of region as the independent variable and perceived effectiveness as the dependent variable were: $F = 10.10$ ($p<.001$) for leadership and communication, $F = 8.12$ ($p<.001$) for project planning and management, $F = 5.91$ ($p=.001$) for crop production, $F = 5.97$ ($p=.001$) for livestock production, and $F = 13.36$ ($p<.001$) for farm management. The hypothesis that there were no significant differences among regions in the way respondents perceived the training program was rejected.

Further analysis of the differences among regions using the Tukey (Honest Significant Difference) procedure (Hinkle et al., 1979; Ott, 1977) (Figure 7) revealed that the mean for Iringa region respondents was significantly higher than the means for Mbeya and Ruvuma respondents for all five training categories. On the other hand, the Rukwa region respondents had a significantly higher mean than the Mbeya and Ruvuma region respondents for the leadership and communication and farm management training categories. Also, the mean for the Rukwa region respondents was significantly higher than the mean for the Mbeya region for project planning

Training category	Degree of effectiveness: 3 Moderate	4 High	5 Very high	F-value	F-prob.	Significant difference
Leadership and communication	3	4	5	10.10***	0.000	a,c > b,d
Project planning and management	3	4	5	8.12***	0.000	a > b,d c > b
Crop production	3	4	5	5.91***	0.001	a > b,d
Livestock production	3	4	5	5.97***	0.001	a > b,d a > b
Farm management	3	4	5	13.36***	0.000	a,c > b,d



Key: a _____ Iringa
b ----- Mbeya
c ..... Rukwa
d -.-.- Ruvuma

***Significant at $p \leq .001$.

Figure 7. Mean responses and F-tests of TRD participants' perceived effectiveness of the training program by region (N = 154)

and management and livestock production training categories.

The finding that TRD-trained participants perceived the training to be effective is consistent with the findings of Ashraf (1978), Mamat (1982), and Gonsalves (1984). They also found that training programs that involve trainees in the development process are more effective than programs where trainees are not involved in the planning process.

One possible partial explanation of the differences in the respondents' perceptions among regions is that respondents from Iringa may have enjoyed benefits of being closer to the training center than the other regions. In the early years of the project, the only training center was at Ruaha, Iringa. From the researchers' experience with the project, farmers from Iringa region were seen making more frequent visits to the center than farmers from other regions. It can also be speculated that long-distance travel of trainees from their locations to Ruaha, Iringa may have contributed to the way respondents from the more distant regions perceived the training effectiveness. However, the hypothesis of problem of transportation to training centers is independent of region was tenable (Table 9). Since the TRD training of farmers is now being conducted in their home regions, this is an area that needs further study.

The hypothesis that respondents' age (young, mid-age, and old), educational background (formal, nonformal),

function in the village (leader, nonleader), and gender do not contribute to the prediction of their perceived effectiveness of the training program in "management" and "technical" training[1] was rejected at the .01 level of significance. Data in Table 4 exhibit that respondents' function in the village was the best predictor of perceived effectiveness accounting for almost 7.0% of the variance. Age contributed to the prediction by accounting for an additional 6.0% of the variance. After function and age were accounted for, none of the remaining variables made a significant contribution. The same two variables, that is, age and function, emerged as the best predictors for "technical" training perceived effectiveness, accounting for approximately 4% of the variance each time (Table 5).

Although function in the village and age of a respondent were found to be statistically significant contributors to the prediction of perceived effectiveness in the "management" and "technical" training with $p < .01$, none of these factors accounted for a sizable variance which could be considered meaningful educationally. In fact, the total variance determined by the combination of function and age was about

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[1]"Management" training is operationally defined to include training categories of leadership and communication, project planning and management, and farm management. "Technical" training is operationally defined to include crop production and livestock production training categories.

Table 4. Summary of regression analysis on management training (N = 154)

Variable	Multiple R	R square	β
Function (leader/nonleader)	0.263	0.069	-0.4618
Age	0.356	0.127	-0.2934
Constant			5.1858

Table 5. Summary of regression analysis on technical training (N = 154)

Variable	Multiple R	R square	β
Age	0.208	0.043	-0.4003
Function (leader/nonleader)	0.295	0.087	-0.4209
Constant			5.1072

13.0% for "management" training and about 9.0% for "technical" training. There is 87.0% and 91.0% of the amount of unpredictable variance with the variables used in management and technical training categories, respectively. Kerlinger (1964), Popham and Sirotnik (1973), and Nunnally (1978) conceptualize that a coefficient of determination of 50.0% or over (of a combination of variance accounted for) would be useful and meaningful. A possible explanation of the relative low multiple correlations (R) is that function in the village and age may have been highly correlated. According to Kerlinger (1964) and Nunnally (1978), when independent variables are correlated, R is small and those variables are, to some extent, redundant in predicting the criterion variable, and they do not add much to the predictive power obtained. It is also tempting to speculate that other variables which may have added to the predictive power were not included in this study.

Training programs of this kind are often associated with many problems. To identify problems encountered, TRD-trained people were asked to check on the questionnaire the listed statements which represented the problems. As indicated by the data in Table 6, five training and implementation problems were identified. The problems listed are those which were discerned by at least 10% of the respondents.

Table 6. Problems encountered during and after training sessions (N = 154)

Problem	Number	Percent
1. Lack of tools to use in the village after training	127	81.4
2. Insufficient training time	91	58.7
3. Very few practical training activities at the training centers	46	27.9
4. Lack of transport to the training centers	43	27.7
5. Some concepts were difficult to understand	29	18.7

Chi-square tests using gender, age, educational background, and location (region) as independent variables and problems identified as dependent variables were executed to test the hypothesis of independence.

The data in Table 7 show that the chi-square values (with the Yates Correction for Continuity; Hinkle et al., 1979) were not statistically significant at .05 level between male and female respondents. The hypothesis that problems identified were independent of gender was retained. Similarly, the hypothesis that problems encountered were independent of educational background (Table 8) was not rejected (with the Yates Correction for Continuity factor).

Table 7. Problems encountered during and after TRD training by gender (N = 154; df = 1)

Problem (dependent variable)	Male n (%)	Female n (%)	Total N (%)	X^2-value	X^2-prob.
Lack of tools to use in the village after training					
Seen as a problem	95 (83.3)	31 (15.6)	126 (81.3)	0.73	0.393
Did not see as a problem	18 (16.7)	10 (24.4)	28 (18.7)		
Insufficient training time					
Seen as a problem	65 (57.0)	25 (62.5)	90 (58.4)	0.18	0.675
Did not see as a problem	49 (43.0)	15 (37.5)	64 (41.6)		
Very few practical training activities at the training centers					
Seen as a problem	34 (29.8)	11 (27.5)	45 (29.2)	0.01	0.939
Did not see as a problem	80 (70.2)	29 (72.5)	109 (70.8)		
Lack of transport to the training centers					
Seen as a problem	31 (27.2)	12 (30.0)	43 (27.9)	0.02	0.892
Did not see as a problem	83 (72.8)	28 (70.0)	111 (72.1)		
Some concepts were difficult to understand					
Seen as a problem	22 (19.3)	6 (15.0)	28 (18.2)	0.14	0.713
Did not see as a problem	92 (80.7)	34 (85.0)	126 (81.8)		

Table 8. Problems encountered during and after TRD training by educational background (N = 154; df = 1)

Problem (dependent variable)	Formal ed. n (%)	Nonformal ed. n (%)	Total N (%)	X^2-value	X^2-prob.
Lack of tools to use in the village after training					
Seen as a problem	101 (82.8)	24 (75.0)	126 (81.2)	0.59	0.441
Did not see as a problem	21 (17.2)	8 (25.0)	25 (18.8)		
Insufficient training time					
Seen as a problem	73 (60.3)	17 (53.1)	90 (58.8)	0.23	0.628
Did not see as a problem	48 (39.7)	15 (46.9)	63 (41.2)		
Very few practical training activities at the training centers					
Seen as a problem	39 (32.2)	7 (21.9)	46 (30.1)	0.80	0.371
Did not see as a problem	82 (67.8)	25 (78.1)	107 (69.9)		
Lack of transport to the training centers					
Seen as a problem	36 (29.8)	7 (21.9)	43 (28.1)	0.40	0.525
Did not see as a problem	85 (70.2)	25 (78.1)	111 (71.9)		
Some concepts were difficult to understand					
Seen as a problem	25 (20.7)	4 (12.5)	29 (19.0)	0.60	0.438
Did not see as a problem	96 (79.3)	28 (87.5)	125 (81.0)		

Since it was found that the training program was perceived important and effective (Figures 6 and 7), and that educational background did not contribute to the prediction of the training program effectiveness (Tables 4 and 5), it could be conceivable that the training offered was within the scope of the villagers irrespective of their literacy levels. These findings concur with those of Gonsalves (1984) who found that educational background of training program participants was not a significant factor in determining the participation of villagers in training programs.

The hypothesis that problems identified were independent of region was rejected in one problem of "lack of tools to use in the village after training" (X^2 = 26.62, df = 3, $p<.001$, see Table 9), indicating that a significant dependent relationship existed between the two variables. Within the 4 x 2 contingency table, cells were not collapsed because there were no more than 20% of the cells containing an expected frequency of less than five (Hinkle et al., 1979). To determine the magnitude of relationship, the contingency coefficient of .381 obtained was compared with the estimated maximum value of contingency coefficient (C-max) (Hinkle et al., 1979). For this test, the C-max was calculated to be .707 and the dependency relationship between region and problem of lack of tools to use in the village after training was interpreted to be moderate. The dependency of lack of

Table 9. Distribution of problems experienced during and after TRD training by region (N = 154; df = 3)

Problem (dependent variable)	Region: Iringa n (%)	Mbeya n (%)	Rukwa n (%)	Ruvuma N (%)	Total (%)	X^2-value	X^2-prob.
Lack of tools to use in the village after training							
Seen as a problem	20 (55.6)	35 (78.3)	35 (94.6)	35 (97.3)	125 (81.4)	26.62***	0.000
Did not see as a problem	16 (44.4)	10 (21.7)	2 (5.4)	1 (2.7)	29 (18.6)		
Insufficient training time							
Seen as a problem	16 (44.4)	28 (62.6)	24 (64.9)	22 (62.2)	90 (58.7)	4.01	0.260
Did not see as a problem	20 (55.6)	17 (37.8)	13 (35.1)	14 (37.8)	64 (41.3)		
Very few practical training activities at the training centers							
Seen as a problem	9 (25.0)	16 (35.6)	14 (37.8)	7 (18.9)	46 (29.7)	4.36	0.226
Did not see as a problem	27 (75.0)	29 (64.4)	23 (62.2)	29 (81.1)	108 (70.3)		
Lack of transport to the training centers							
Seen as a problem	10 (27.8)	9 (20.0)	11 (29.7)	13 (35.1)	43 (27.7)	2.43	0.489
Did not see as a problem	26 (72.2)	36 (80.0)	26 (70.3)	23 (64.9)	111 (72.3)		
Some concepts were difficult to understand							
Seen as a problem	10 (27.8)	9 (20.0)	4 (10.8)	6 (16.2)	29 (18.7)	3.66	0.300
Did not see as a problem	26 (72.2)	36 (80.0)	33 (89.2)	30 (83.8)	125 (81.3)		

***Significant at $p < .001$.

facilities to use on region may have been attributed by the Iringa region in which the expected frequencies of 6.7 (vs 16 observed) (for "did not see as a problem") and 29.3 (vs 20 observed) (for "seen as a problem") were lower and higher, respectively, than other regions.

As indicated by the data in Table 10, the hypothesis that problems encountered were independent of age was rejected at .05 level of significance in the problem of "insufficient training time" (X^2 = 6.81, df - 2, $p<.05$). Further analysis of this information revealed a contingency coefficient of .209. However, this relationship between age and the problem of insufficient training time was concluded to be low when compared with the C-max of .707. The dependent relationship may have resulted from the higher expected frequency (52.6 vs 45 observed) of respondents between 30 and 49 years of age than those 29 years and under, and 50 years and over.

The TRD training program may get credit for creating people's awareness about their development potentials and limitations. However, the project may have pervasively introduced a crisis of development without, for example, tools, as identified in one of the problems. Since the duration of training at the centers is limited to one month only, it is possible that villagers were eager to learn more, but time would not allow. This might be one of the reasons why

Table 10. Distribution of problems experienced during and after TRD training by age (young = 29 & under; mid-age = 30-49; old = 50 & over) (N = 154; df = 2)

Problem (dependent variable)	Age: Young n (%)	Age: Mid-age n (%)	Age: Old n (%)	Total N (%)	X^2-value	X^2-prob.
Lack of tools to use in the village after training						
Seen as a problem	38 (82.6)	72 (80.9)	11 (73.3)	121 (80.7)	0.63	0.729
Did not see as a problem	8 (17.4)	17 (19.1)	4 (26.7)	29 (19.3)		
Insufficient training time						
Seen as a problem	33 (73.3)	45 (50.6)	10 (66.7)	80 (59.1)	6.81*	0.033
Did not see as a problem	12 (26.7)	44 (49.4)	5 (33.3)	61 (40.9)		
Very few practical training activities at the training centers						
Seen as a problem	18 (40.0)	22 (24.7)	4 (26.7)	44 (29.5)	3.42	0.181
Did not see as a problem	27 (60.0)	67 (75.3)	11 (73.3)	105 (70.5)		
Lack of transport to the training centers						
Seen as a problem	11 (24.4)	23 (25.8)	7 (46.7)	41 (27.5)	3.10	0.213
Did not see as a problem	34 (75.6)	66 (74.2)	8 (53.8)	108 (72.5)		
Some concepts were difficult to understand						
Seen as a problem	8 (17.8)	18 (20.2)	2 (13.3)	28 (18.8)	0.44	0.801
Did not see as a problem	37 (82.2)	71 (79.8)	13 (86.7)	121 (81.2)		

*Significant at $p < .05$.

some of the trainees identified the inadequacy of practical training activities at the training centers. Although lack of transportation and difficulty of concepts were identified by a small number of village TRD-trained respondents, they are by no means insignificant. Commenting on transportation problems of farmers, Barwell (1975) asserted that adequate and suitable transport facilities to farmers must be available if training is to be successful. Gonsalves (1984) found that the majority of trained farmers identified the provision of transportation as an impetus for attending training.

It also appears that there may be a tendency to emphasize theory more than the practical training activities during the residential training. This was evidenced by one of the problems identified. In relation to this, Wilson (1977) cautioned that there is a tendency for (farmers') training centers to make technical training rely heavily on formal type of education, a tendency that may overlook the needs of trainees and create a problem of the training not being understood by the recipients. Therefore, training program planners should come to grips with the fact that adults want to learn what is of immediate use to them. One useful check point is to involve them in practical activities during training, for much is remembered and practiced when learning-by-doing is emphasized. Learning-by-doing is also a useful strategy that ensures the interface of theory and practice.

Conclusions and Recommendations

Conclusions

1. TRD-trained participants perceived the training program as important for village development programs. No significant differences were found among regions and between village leaders and nonleaders in the respondents' perceptions of the importance of the training program. Based on these findings, it is concluded that the TRD training program was based on village needs.

2. There were significant differences among regions in the TRD-trained villagers' perceived effectiveness of the training program. However, in general, the training program was perceived effective in developing villagers' abilities to conduct various village development programs.

3. The respondent's age and function in the village were the only two variables that contributed to the prediction of training program effectiveness in management and technical training. However, these variables accounted for only a small amount of the variance, and their practical value as predictors of training program effectiveness remains questionable. It is assumed that other variables not included in this study would have added to the predictive power of the criterion.

4. Five major problems in the TRD training process and

implementation of concepts in villages were identified. Most of these problems were found to be independent of age, gender, educational background, and region of respondent. However, these problems may be very crucial in the implementation and success of the TRD village development programs.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. It is recommended that village needs assessment for establishing the training content for TRD be continued. It is from these activities that participatory education and subsequent success of training programs are enhanced.

2. Since the training program effectiveness was perceived significantly different among regions, decentralization of the TRD training centers is strongly encouraged. These newly established centers should be adequately staffed and equipped with facilities to facilitate comprehensive training.

3. Avenues to explore supply of facilities for village development, such as credit to farmers, access to information on improved farming, farm equipment supplies, and many others should be incorporated into the program. The access to these facilities will enable farmers to get information and purchase farming equipment and eventually apply those concepts learned at the centers. The author contends that it is

incumbent upon the TRD project to ensure that these activities are done.

4. For farmers to keep themselves up-to-date with the changing technology, training offered to them should be a continuous process. Current needs of those who have been trained should be assessed, and training programs developed and conducted accordingly. Mamat (1982) expressed concern that forgetting is higher when training is conducted on a one-shot basis. The former TRD-trained could be retrained at centers or village-based training programs conducted.

5. Since it was identified that training time and practical activities at the training centers were insufficient, it is recommended that the training process be revised to include more learning-by-doing activities, and that possibilities of extending the duration of training be explored.

Recommendations for further research

1. Investigations should be made to assess the practicality of the concepts learned from the TRD training programs for village development.

2. It is recommended that comparative studies between the TRD training program and other farmers' training programs be done to determine the origin of the training content and how farmers feel about the training they received.

3. A recommendation is made that further research be

done to identify other variables that may contribute to the prediction of the training program effectiveness as perceived by participants.

4. Further investigations in this matter including more villages, especially those that were incorporated in the project in the later years, are recommended.

5. Other similar studies to assess and compare the impact of the TRD project utilizing villages in one region as independent variables are recommended.

SECTION II. TRAINING FOR VILLAGE DEVELOPMENT: A CASE STUDY OF THE TRAINING FOR RURAL DEVELOPMENT (TRD) PROJECT IN TANZANIA

Introduction

Agriculture is and will probably continue to be the mainstay of the economic growth and development of the Tanzanian society. Today, over 90% of the population live on farms as subsistence farmers (Lele, 1975; Rhodes, 1980). However, Tanzania and other predominantly agricultural nations in the third world suffer from the shortage of food, basic commodities and services (Hardt, 1981), and according to Münker (1978), development of rural areas has deteriorated rather than improved. For example, in Tanzania, the average index of food production declined from 100 units between 1969-71 to 91 units between 1979-1981 (World Bank, 1982). There are both endogenous and exogenous reasons which could contribute to this development stagnation. However, as it will be explained later, one of the major problems has been inadequate educational systems for rural people.

It is conceivable that, for rural people to keep abreast with technological innovations in agriculture, which in turn, will result in increased production of food and fiber, they must have access to knowledge in a comprehensible manner. Thus, investment in human capital is, perhaps, the most important resource of any country. This concept was emphasized by the late Secretary General of the United Nations,

Dag Hammarkesjold:

> Great economic programs have been planned which are held back more by lack of (persons) to direct them than by lack of capital.... Fundamentally, (people are) the key to our problems, not money. Funds are valuable only when used by trained, experienced and devoted men and women. Such people, on the other hand, can work miracles even with small resources and draw wealth out of barren lands (Lindley, 1975, p. 77).

Therefore, education per se is the key ingredient in enhancing long-term productivity and growth of human resources in the agricultural sector and other forms of rural development (Curle, 1970; World Bank, 1980). For example, World Bank studies show that education's contribution to farmer efficiency in production ranged from 7 to 11% in the Republic of Korea, 14 to 25% in Thailand, and 25 to 40% in Malaysia (World Bank, 1982). Also, Hess (1980) found that training enabled the farmers of Mahastra village in India to triple their income in a very short time. In Nepal, farmer education was found to be highly correlated with efficiency in wheat production (World Bank, 1982).

Despite some successes as the result of farmer training, many past educational programs for rural people have had very little impact in improving the conditions of farmers. Arguments have been that many teaching methods for farmers have been sporadic, isolated, and inadequate to the extent that theory and practice have remained at variance (Lele, 1975; Nagel and Schubert, 1981; Stevens, 1981). Another major constraint affecting the effectiveness of rural training pro-

grams has been lack of people's involvement in programs designed for their development. Even in recent years where the theory of adult education emphasizes participatory nonformal education, training programs have been planned for farmers with almost no regard of their needs, interests and accumulated repertoire of knowledge of their environment (Gibbons and Schroeder, 1983; Mulusa, 1983). Farmer training institutions in Tanzania were found to be conducting training which was not according to village plans (Mosha, 1982), and nonformal programs were not helping women solve their development problems (Kokuhirwa, 1982). Although some of the rural development critiques blame farmers' ignorance and disinterest as a stumbling block for rural development, Whyte (1975) argues that the major problem has been a conviction of the technocrats that farmers are ignorant and cannot contribute intelligibly towards their own development efforts.

Agricultural and rural development which are currently conducted by the TRD project in Tanzania have tried to incorporate people's participation in designing and implementing village development programs. The project, which was started in 1979, purports to provide, at the village level, training in leadership, management and technical skills in agriculture and other areas related to rural development (USAID, 1981). The training provided is supposed to be linked with other development processes. From the training given, farmers are expected to apply concepts learned to

improve village management programs and increase productivity.

Purpose of the Study

The main intent of the study was to assess the magnitude to which the TRD project interventions and training of villagers have helped village development in agriculture and other rural aspects. The specific objectives were:

1. To identify and analyze demographic characteristics of respondents.
2. To document changes made in villages since the establishment of the TRD project in the following areas:
    a. Adoption of improved farming and management practices for village development,
    b. Practical use of concepts learned at centers in village development,
    c. Increased leadership abilities for the TRD-trained respondents,
    d. Increased rate in the use of farming and management practices in village development.

The following hypotheses were tested:

1. TRD-trained respondents have a higher rate of use of farming and management practices than their village counterparts who did not attend the TRD training.
2. Adoption of improved farming and management practices is independent of the location (region) of respondent.

3. The identified TRD contributions to village development are independent of the gender of respondent.
4. Leaders and nonleaders who attended the TRD training program are not significantly different in their perceived increased leadership abilities in conducting village programs.

Methods of Study

This descriptive study employed a triangulation of survey and observation research methods. The four regions in the TRD project area comprised the strata of the study with a total of 15 villages in which the project had operated since 1979.

Data were collected during July and August 1984 through personal interviews of the TRD-trained and TRD-untrained villagers. Interviews were conducted by the researcher and a team of 13 TRD in-country trainers. A three-section questionnaire was used by the interviewers. The interviews were conducted in Swahili. Additional information was obtained by interviewers' observations during and after interview sessions. Interviews were conducted with a random sample of 375 subjects, yielding 331 usable questionnaires.

The instrument was validated through a review of the literature and by individuals at Iowa State University (USA) and also by individuals in Tanzania. A post-hoc Cronbach's alpha reliability test revealed coefficients of .90 for the

rate of increase in farming and management practices measure and .92 for the increased leadership abilities measure.

Findings and Discussion

An analysis of the data in Figure 1 illustrates that out of the 331 respondents, 90 (27.19%) were from Iringa region, 85 (25.68%) from Mbeya region, 70 (21.15%) from Rukwa region, and 86 (25.98%) from Ruvuma region. The breakdown of the respondents in Figure 2 indicates that a total of 238 (71.90%) and 93 (28.10%) constituted the sample. From these, a total of 154 respondents (46.53%) were TRD-trained and 177 (53.53%) were non-TRD-trained (Figure 3). Data in Figure 4 show that 75 (48.70%) were TRD-trained leaders, whereas 79 (51.30%) of the interviewees were TRD-trained nonleaders.

To determine the adoption of selected improved farming and management practices in villages, percentages of "use before TRD", "use after TRD", and "percent increase (gain)" in the respondents' practices of the activity between "before" and "after" the TRD were computed. As indicated by the data in Table 1, the six highest (by percentage of respondents) practiced activities before the TRD establishment were "use of chemical fertilizers" (75.4%), "attend village meetings" (68.7%), "follow extension advice" (61.8%), "seek extension advice" (60.7%), "purchase new farm tools" (59.0%), and "process a farm loan from the bank" (59.0%). Further

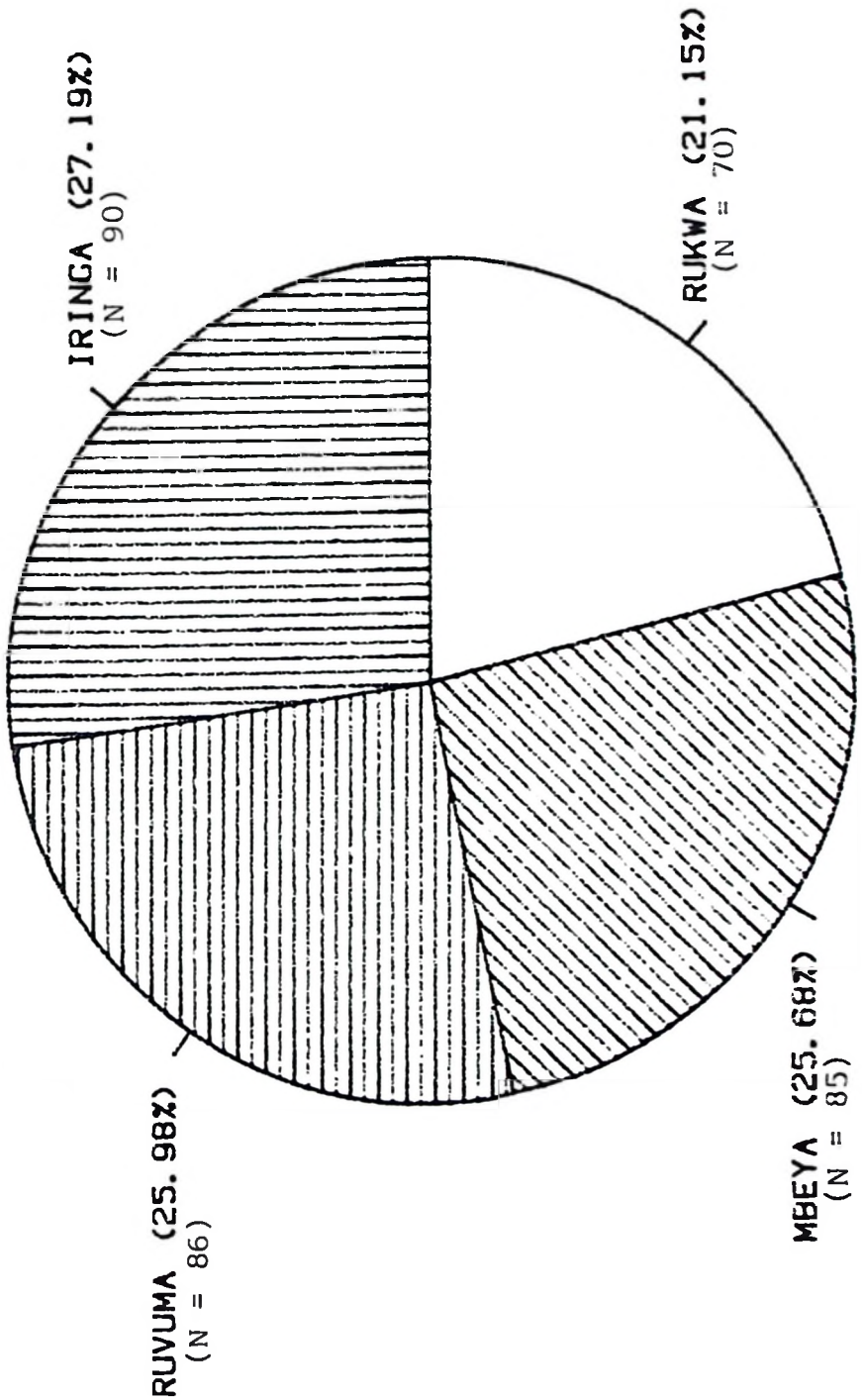

Figure 1. Respondents by region of residence

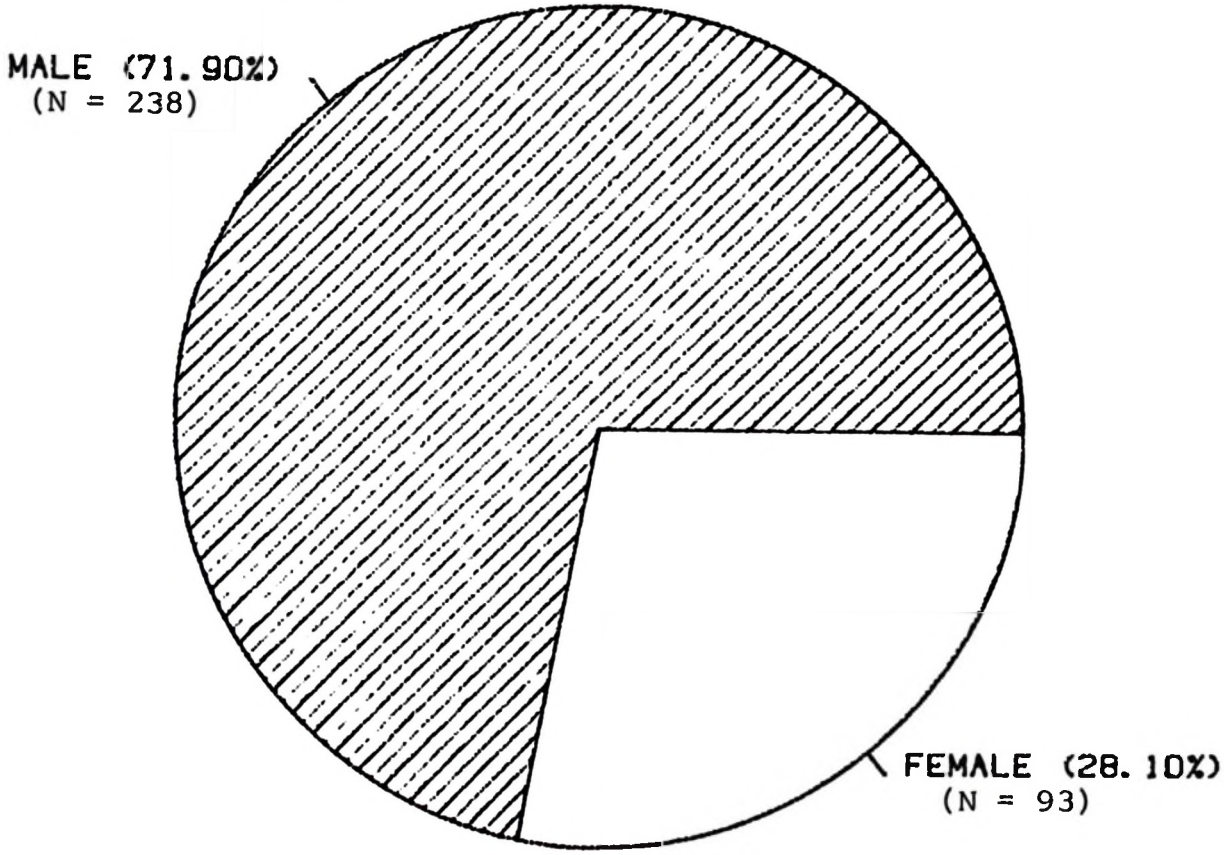

Figure 2. Gender of respondents

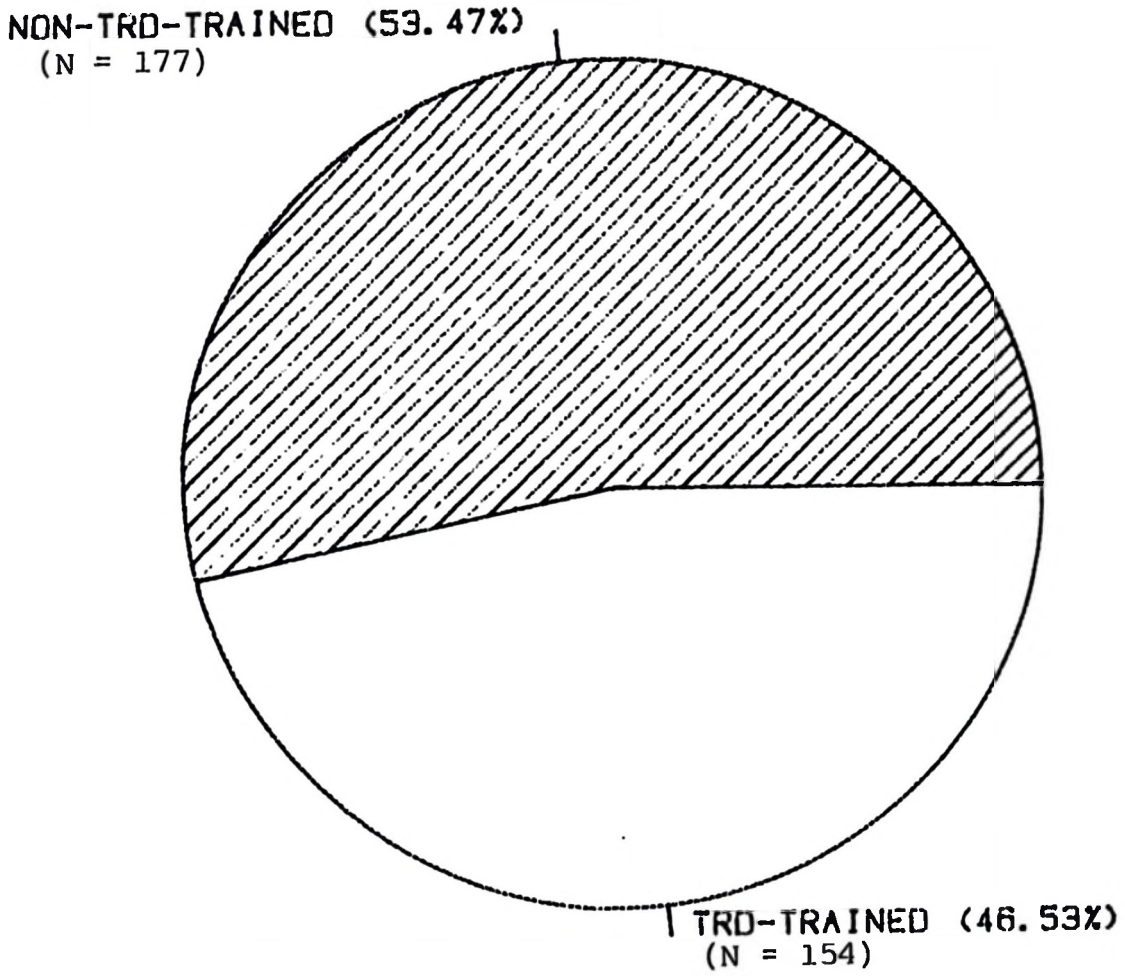

Figure 3. Respondents by the TRD training category

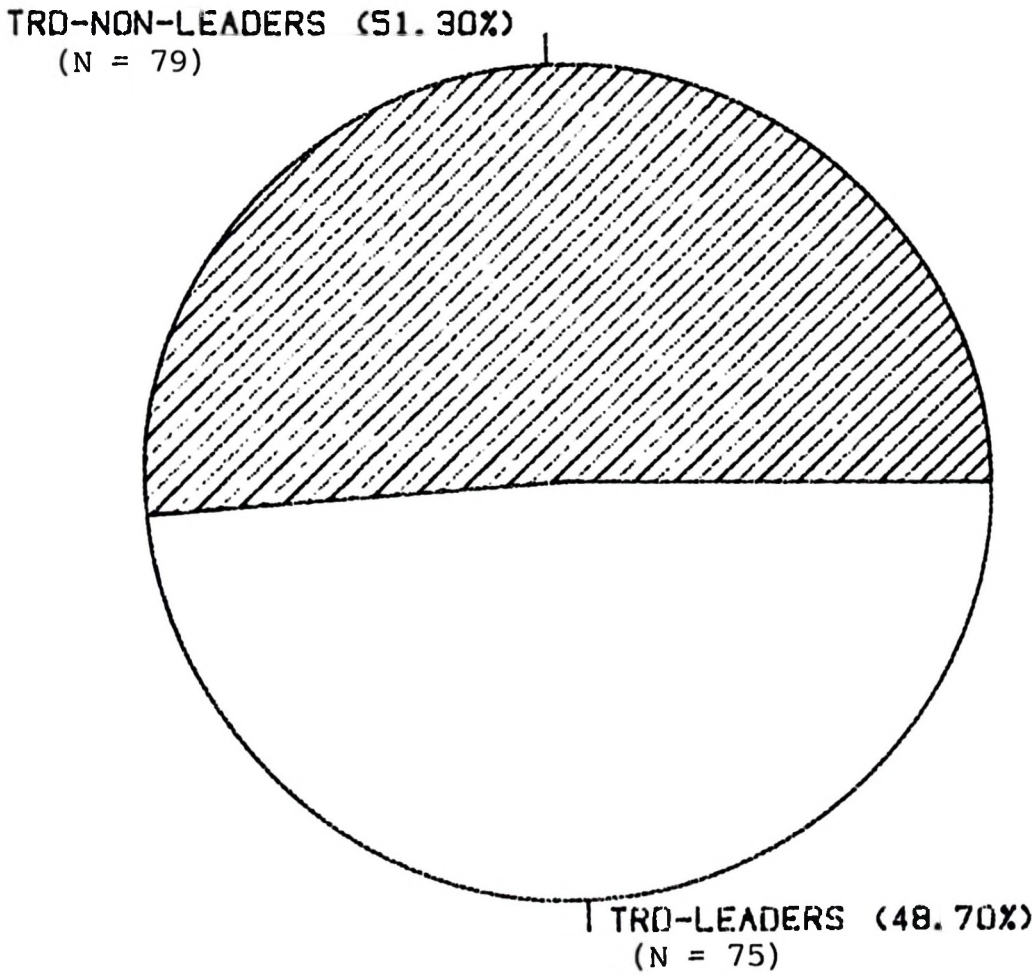

Figure 4. TRD-trained respondents by function in the village

examination of the data in Table 1 reveals that the practice of 14 out of 18 activities before the project was under 60.0%.

However, after the TRD project establishment, the six highest (by percentage of respondents) practiced activities were "timely farm operations" (98.5%), "use recommended spacing" (98.2%), "seek extension advice" (97.6%), "attend village meetings" (96.1%), "use of chemical fertilizers (94.2%), and "follow extension advice" (92.9%). The respondents' use rate of activities after the TRD establishment was higher than 60.0% in 15 out of 18 selected items. This indicates an improvement in the number of people practicing the activities.

The five highest percentage gains between "before" and "after" the project were evidenced in "teaching others about improved farming" (55.5%), "use recommended spacing" (53.2%), "timely farm operations" (48.3%), "use improved seed" (47.1%), and "establish a vegetable garden" (45.3%). However, percentage gain (adoption rate) was observed in all 18 practices albeit at varying percentages. It should be noted that, due to the statistical regression factor, those activities which were practiced by 50% or over of the respondents before the TRD project could not have gained beyond another 50% after the establishment of the project. With this limitation in consideration, the percentage increase between "before" and "after" for those activities where initial practice was close

Table 1. Percentages of use of improved farming and management practices for village development before and after the TRD project (N = 331)

Practice	% use before TRD project		% use after TRD project		Increase (gain)
	n	%	n	%	%
Timely farm operations	164	50.2	323	98.5	48.3
Use recommended spacing	148	45.0	322	98.2	53.2
Seek extension advice	199	60.7	320	97.6	36.9
Attend village meetings	226	68.7	316	96.1	27.4
Use of chemical fertilizers	248	75.4	310	94.2	18.8
Follow extension advice	201	61.8	302	92.9	31.1
Establish a vegetable garden	153	46.8	301	92.1	45.3
Use improved seeds	181	55.0	301	92.1	47.1
Teach others about improved farming	112	34.1	294	89.6	55.5
Plant trees	173	52.6	280	85.1	32.5
Keep farm records	184	55.9	274	83.3	27.4
Purchase new farm tools	194	59.0	271	82.4	23.4
Process a farm loan from the bank	193	59.0	246	75.2	16.2
Practice soil conservation technique	139	42.4	234	71.2	29.0
Use of farmyard manure	163	49.7	231	69.8	20.1
Read about modern farming	167	51.1	209	63.4	22.3
Compost-making	75	22.8	145	44.1	21.3
Improved poultry-keeping	56	17.0	74	25.5	8.5

or above 50% is interpreted as a substantial increase in the practice of those activities.

It appears from the analysis that "improved poultry keeping" and "compost making" were very low before and after the project (Table 1). The reasons for the low practice rate in improved poultry keeping might be attributed to lack of facilities in villages like poultry feeds, poultry housing equipment, drugs, suitable breeds, initial capital, and the technicalities and risks involved in the industry. In many places in the country, especially in rural areas, modern poultry keeping is still a far-fetched enterprise.

The reasons why compost making has not been adequately adopted in many parts of the country are inconceivable, but the speculation that very little emphasis has been put in compost making cannot be overruled. The predominant slash-and-burn farming practices and low initiatives in soil conservation measures may have stifled compost making practices.

To find out whether the increase in the adoption of the 18 selected farming and management practices was independent of location (region) of residence of respondents, a chi-square test using activities as dependent variables and region as the independent variable was executed.

The chi-square distribution results are presented in Tables 2a and 2b. In Table 2a, the 3 x 4 contingency tables had no threat to the continuity of the theoretical sampling distribution resulting from more than 20% of the cells con-

Table 2a. Distribution of respondents' adoption of farming and management practices before and after TRD by region (N = 331; df = 6)

Practice (dependent variable)	Region: Iringa n (%)	Mbeya n (%)	Rukwa n (%)	Ruvuma n (%)	Total N (%)	X^2-value	X^2-prob.
Use of farmyard manure							
Never practiced	12 (14.6)	20 (23.8)	19 (27.5)	47 (54.7)	99 (30.2)		
Practiced before TRD	53 (59.6)	55 (65.5)	28 (40.6)	27 (31.4)	163 (49.7)	49.91***	0.000
Practiced after TRD	23 (25.8)	9 (10.7)	22 (31.9)	12 (14.0)	66 (20.1)		
Compost making							
Never practiced	46 (51.1)	53 (63.1)	31 (44.9)	54 (62.8)	184 (55.9)		
Practiced before TRD	15 (16.7)	18 (21.4)	16 (23.2)	26 (30.2)	75 (22.8)	25.32***	0.000
Practiced after TRD	29 (32.2)	13 (15.5)	22 (31.9)	6 (7.0)	70 (21.3)		
Use improved seeds							
Never practiced	7 (7.8)	5 (6.0)	6 (8.7)	10 (11.6)	28 (8.5)		
Practiced before TRD	54 (60.0)	52 (61.9)	31 (44.9)	44 (51.2)	181 (55.0)	7.07	0.314
Practiced after TRD	29 (32.2)	27 (32.1)	32 (45.4)	32 (27.3)	120 (36.5)		

***Significant at α = .001.

Table 2a. (Continued)

Practice (dependent variable)	Region: Iringa n (%)	Mbeya n (%)	Rukwa n (%)	Ruvuma n (%)	Total N (%)	X^2-value	X^2-prob.
Keep farm records							
Never practiced	13 (14.4)	19 (22.6)	8 (11.6)	15 (17.4)	55 (16.7)		
Practiced before TRD	52 (58.9)	53 (63.1)	30 (43.5)	48 (55.8)	184 (55.9)	19.02**	0.004
Practiced after TRD	24 (26.7)	12 (14.3)	31 (44.9)	23 (26.7)	90 (27.4)		
Process a farm loan from the bank							
Never practiced	14 (15.6)	30 (36.6)	23 (33.3)	14 (16.3)	81 (24.8)		
Practiced before TRD	63 (70.0)	47 (57.3)	28 (40.6)	55 (64.0)	193 (59.0)	28.63***	0.000
Practiced after TRD	13 (14.4)	5 (6.1)	18 (26.1)	17 (19.8)	53 (16.2)		
Read about modern farming							
Never practiced	21 (23.9)	24 (28.6)	17 (24.6)	25 (29.1)	87 (26.6)		
Practiced before TRD	44 (50.0)	50 (59.5)	29 (42.0)	44 (51.2)	167 (51.1)	11.63	0.071
Practiced after TRD	23 (26.1)	10 (11.9)	23 (33.3)	17 (19.8)	73 (22.3)		

**Significant at $\alpha = 0.01$.

Table 2a. (Continued)

Practice (dependent variable)	Region				Total	x^2- value	x^2- prob.
	Iringa n (%)	Mbeya n (%)	Rukwa n (%)	Ruvuma n (%)	N (%)		
Establish a vegetable garden							
Never practiced	10 (11.1)	7 (8.5)	6 (8.7)	3 (11.5)	26 (8.0)		
Practiced before TRD	35 (38.9)	50 (61.0)	27 (39.1)	41 (47.7)	41 (47.7)	14.35*	0.026
Practiced after TRD	45 (50.0)	25 (30.5)	36 (52.2)	42 (48.8)	42 (48.8)		
Purchase new farm tools							
Never practiced	11 (12.4)	10 (11.9)	9 (12.9)	28 (32.6)	58 (17.6)		
Practiced before TRD	59 (66.3)	57 (67.9)	38 (54.3)	40 (46.5)	194 (59.0)	22.62***	0.001
Practiced after TRD	19 (21.3)	17 (20.2)	23 (32.9)	18 (20.9)	77 (23.4)		
Plant trees							
Never practiced	6 (6.7)	21 (25.3)	9 (12.9)	13 (15.1)	49 (14.9)		
Practiced before TRD	52 (57.8)	45 (54.2)	29 (41.4)	47 (54.7)	173 (52.6)	20.39**	0.002
Practiced after TRD	32 (35.6)	17 (20.5)	32 (45.7)	26 (30.2)	107 (32.5)		

*Significant at α = .05.

Table 2a. (Continued)

Practice (dependent variable)	Region: Iringa n (%)	Mbeya n (%)	Rukwa n (%)	Ruvuma n (%)	Total N (%)	X^2-value	X^2-prob.
Practice soil conservation techniques							
Never practiced	11 (12.2)	39 (47.6)	16 (22.9)	28 (29.8)	94 (28.7)		
Practiced before TRD	48 (53.3)	33 (40.2)	27 (38.6)	31 (36.0)	139 (42.4)	34.98***	0.000
Practiced after TRD	31 (34.4)	10 (12.2)	27 (38.6)	27 (31.4)	95 (29.0		
Teach others about improved farming							
Never practiced	8 (9.0)	12 (14.3)	7 (10.1)	7 (8.1)	34 (10.4)		
Practiced before TRD	24 (27.0)	33 (39.3)	22 (31.9)	33 (38.4)	112 (34.1)	6.92	0.328
Practiced after TRD	57 (64.0)	39 (46.4)	40 (58.0)	46 (53.5)	182 (55.5)		

Table 2b. Distribution of respondents' adoption of farming and management practices before and after TRD by region (N = 331; df = 3)

Practice (dependent variable	Region: Iringa n (%)	Mbeya n (%)	Rukwa n (%)	Ruvuma n (%)	Total N (%)	X^2-value	X^2-prob.
Practice improved poultry-keeping methods							
Never practiced	31 (34.4)	63 (75.9)	65 (92.9)	86 (100.0)	245 (74.5)	117.85***	0.000
Practiced before TRD and after TRD	59 (65.6)	20 (24.1)	5 (7.1)	0 (0.0)	84 (25.5)		
Use of chemical fertilizers							
Never practiced and practiced before TRD	78 (86.7)	66 (78.6)	46 (66.7)	77 (89.5)	267 (84.2)	15.57***	0.001
Practiced after TRD	12 (13.3)	18 (21.4)	23 (33.3)	9 (10.5)	62 (18.8)		
Seek extension advice							
Never practiced and practiced before TRD	52 (58.4)	59 (70.2)	44 (63.8)	52 (60.5)	207 (63.1)	2.94	0.401
Practiced after TRD	37 (41.6)	25 (29.8)	25 (36.2)	34 (39.5)	121 (36.9)		
Timely farm operations							
Never practiced and practiced before TRD	49 (55.1)	48 (57.8)	34 (49.3)	38 (44.2)	169 (51.7)	3.76	0.289
Practiced after TRD	40 (44.9)	35 (42.2)	35 (50.7)	48 (55.8)	158 (48.3)		

***Significant at α = .001.

Table 2b. (Continued)

Practice (dependent variable)	Region					X^2- value	X^2- prob.
	Iringa n (%)	Mbeya n (%)	Rukwa n (%)	Ruvuma n (%)	Total N (%)		
Use recommended spacing							
Never practiced and practiced before TRD	44 (48.9)	42 (50.0)	35 (50.7)	33 (38.4)	154 (46.8)	5.13	0.527
Practiced after TRD	46 (51.1)	42 (50.0)	34 (49.3)	53 (61.6)	175 (53.2)		
Follow extension advice							
Never practiced and practiced before TRD	57 (63.3)	57 (72.2)	45 (64.3)	65 (75.6)	224 (68.9)	4.18	0.243
Practiced after TRD	33 (36.7)	22 (27.8)	25 (35.7)	21 (24.4)	101 (31.1)		
Attend village meetings							
Never practiced and practiced before TRD	59 (66.3)	64 (76.2)	55 (78.6)	61 (70.9)	239 (72.6)	3.70	0.295
Practiced after TRD	30 (33.7)	20 (23.8)	15 (21.4)	25 (29.1)	90 (27.4)		

taining an expected frequency of less than 5 (Hinkle et al., 1979). Therefore, cells were not collapsed. However, in Table 2b, cells were collapsed to form a 2 x 4 contingency table for those activities where cells' expected frequencies of less than 5 exceeded 20% (Hinkle et al., 1979).

The data in Tables 2a and 2b indicate that statistical significant relationships existed in 10 activities. The magnitude of the relationship between each of the significant activities and region was interpreted as "weak", "moderate", or "high" (Hinkle et al., 1979) in reference to the estimated maximum value of the contingent coefficient (C-max) of .816 and .707, respectively (Table 3).

Analysis of expected frequencies indicated that higher expected values than observed were recorded for "never practiced" in the Iringa region (67 expected vs 31 observed), in the Ruvuma region for "never practiced" (64 expected vs 86 observed), and for the "improved poultry-keeping methods". In "use of farmyard manure", a higher discrepancy between observed and expected frequencies was recorded in the Ruvuma region for "never practiced" (26 expected vs 47 observed) and "practiced before TRD" (42.7 expected vs 27 observed). Also, significant contributions to the dependency came from the Mbeya region for "practiced before TRD" and in "use of farmyard manure" (41.7 expected vs 55 observed). For "practice soil conservation techniques", significant contributions to the rela-

Table 3. Contingent coefficients (C) and interpretation of significant dependent activities

Activity	Contingent coefficient	Estimate of maximum value of C (C-max)	Inter-pretation
Use of farmyard manure	.363	.816	Moderate
Compost making	.267	.816	Weak
Use of chemical fertilizer	.212	.707	Weak
Keep farm records	.234	.816	Weak
Process a farm loan from the bank	.284	.816	Weak
Establish a vegetable garden	.205	.816	Weak
Practice improved poultry keeping	.520	.816	Strong
Practice soil conservation techniques	.310	.816	Moderate

tionship came from "never practiced" for the Iringa region (25.8 expected vs 11 observed) and from the Mbeya region in "practiced after TRD" (23.8 expected vs 10 observed).

One possible partial explanation of the dependency of activities on the independent variable is due to the environmental conditions and availability of resources, especially in those activities in which the relationship between regions and activity was moderate and strong. For example, even

after four or five years of the TRD establishment, over half of the respondents from the Ruvuma region had not used farmyard manure (57.7%) and improved poultry keeping (100.0%). As a matter of fact, livestock production in the Ruvuma region is not a popular industry. On the other hand, farmers from Iringa and Mbeya have kept upgraded cattle and some poultry for some decades. The practice of soil conservation in the Iringa region was lower than expected. Also, a higher use rate of the soil conservation technique was expected in the Mbeya region.

It has been argued in some cases that learning which has been institutionalized and formal has a tendency of not conforming with the learners' environment and, thus, not becoming effective (Agard, 1977; Wilson, 1977). This study intended to identify concepts which the TRD-trained farmers learned from the training centers and were able to apply in their villages. In addition, it was intended to identify those concepts learned but not yet applied for development of any kind. Respondents were asked to list concepts learned from centers and applied in villages. They were also asked to list those concepts which, although learned from centers, they were not able to apply in their villages. As the data in Table 4 indicate, eight farming and management practices were indicated to have been applied in villages. However, only four of those eight were indicated to have been applied

Table 4. Frequencies and percentages of concepts learned and applied in villages (N = 154)

Concept	Frequency	Percentage
Spacing of crops	141	91.6
Vegetable gardening	113	73.4
Teaching others about agriculture	112	72.7
Timely farm operations	109	70.7
Leadership	64	41.6
Planting of trees	52	33.8
Livestock husbandry	44	28.6
Project planning	27	17.5

Table 5. Frequencies and percentages of concepts learned and not applied (N = 154)

Concept	Frequency	Percentage
Poultry production	116	75.3
Compost making	110	71.4
Biogas	70	45.5
Leadership	32	20.8

by over 50% of the respondents. Observations made during the research period showed that, in some areas, improvements were noted. For example, spacing of crops, small vegetable gardens, and participatory leadership were noted. Teaching others about modern agriculture techniques was strongly identified by the villages as indicated by the data in Table 1. This would mean that those villagers who attended the training were sharing knowledge with others who had not received TRD training. The preceding findings concur with the finding of Fremerey (1979) in that village trainees were able to teach others when they returned from training centers.

Although application of leadership principles was identified by about 42% of the respondents, some improvements in village leadership could be observed, especially in village group discussions and meetings. The aforementioned findings are echoed by Gonsalves (1984) who found that increased leadership and improved management and village project planning were the results of the TRD training.

However, those concepts which were not applied in villages (Table 5) pose a great concern to the training process and village development. Emanating from this problem is the question whether some of the training offered is really needed for villagers. One of the reasons given for the failure to apply the concepts learned was lack of facilities

to use in villages. The author argues that, if the training process is based on the village needs, then availability of resources should be considered along with the needs assessment process. Alternatively, ways and means of acquiring resources in villages should be part of the training program. Failure to do this might put the purpose and the whole process of training in jeopardy.

In areas where leadership principles were indicated to have not been applied, it was observed that most of the trainees in that category were not in leadership positions and, therefore, not able to practice those principles. In some cases, those in leadership positions would maintain the status quo and thus not be willing to accommodate new ideas.

It was anticipated by the project that persons who underwent the TRD training would teach others in their respective villages after their return from training centers. Thus, it was deemed necessary to determine the spread effect of this concept by examining if significant differences existed between TRD-trained and non-TRD-trained respondents in the 18 selected farming and management practices; a one-tailed t-test (H_A $\mu_{TRD} > \mu_{NONTRD}$) was computed. According to the data in Table 6, seven activities were found to be significantly different (at .05 and .01 levels) between the TRD-trained and non-TRD-trained villages. The means of the TRD-trained respondents were higher than those of the non-

Table 6. Comparison of TRD-trained and non-TRD-trained respondents on the rate of increase in use of farming and management practices[a]

Activity	Group	N	Mean	SD	t-value	1-tail t-prob.
Use of farmyard manure	TRD trained	153	2.60	1.26	2.60**	0.005
	Non-TRD trained	176	2.28	1.25		
Compost making	TRD trained	154	2.00	1.17	1.13	0.129
	Non-TRD trained	176	1.86	1.09		
Use of chemical fertilizers	TRD trained	154	3.30	0.92	0.53	0.300
	Non-TRD trained	176	3.24	0.96		
Use of improved seeds	TRD trained	152	3.24	0.79	3.00**	0.001
	Non-TRD trained	175	2.93	1.08		
Timely farm operations	TRD trained	151	3.32	0.78	-0.01	0.495
	Non-TRD trained	175	3.33	0.83		
Use recommended spacing	TRD trained	152	3.37	0.79	0.28	0.390
	Non-TRD trained	175	3.34	0.86		
Establish a vegetable garden	TRD trained	152	3.07	0.91	0.72	0.237
	Non-TRD trained	174	2.99	1.03		
Practice improved poultry keeping	TRD trained	151	1.47	0.99	1.47	0.072
	Non-TRD trained	173	1.32	0.79		

[a]Scale used: 1 = no increase, 2 = slightly increased, 3 = moderately increased, 4 = highly increased. N for TRD = 154, N for non-TRD = 177.

**Significant at $\alpha = 0.01$.

Table 6. (Continued)

Activity	Group	N	Mean	SD	t-value	1-tail t-prob.
Plant trees	TRD trained	153	2.88	1.07	1.26	0.105
	Non-TRD trained	174	2.72	1.11		
Practice soil conservation techniques	TRD trained	153	2.63	114	1.50	0.067
	Non-TRD trained	173	2.43	1.20		
Keep farm records	TRD trained	153	2.89	1.05	2.10*	0.019
	Non-TRD trained	176	2.64	1.13		
Process a farm loan from the bank	TRD trained	152	2.49	1.20	0.65	0.259
	Non-TRD trained	174	2.40	1.15		
Read about modern farming	TRD trained	153	2.68	1.12	1.79*	0.038
	Non-TRD trained	172	2.45	1.16		
Seek extension advice	TRD trained	153	3.15	0.87	0.56	0.289
	Non-TRD trained	174	3.10	0.82		
Purchase new farm tools	TRD trained	152	2.67	1.05	1.77*	0.039
	Non-TRD trained	175	2.46	1.08		
Follow extension advice	TRD trained	151	3.12	0.90	1.70*	0.045
	Non-TRD trained	171	2.94	0.97		
Attend village meetings	TRD trained	153	3.11	0.84	0.61	0.271
	Non-TRD trained	174	3.05	0.92		
Teach others about modern farming	TRD trained	153	3.20	0.88	2.32*	0.011
	Non-TRD trained	176	2.95	1.10		

*Significant at $\alpha = 0.05$.

TRD-trained respondents for all seven significant items. It was hoped that no significant differences would be revealed by the t-tests. Therefore, the significant differences exhibited in seven items would mean that the message of those concepts may not have been passed on to non-TRD-trained villagers, or if it was passed, the concepts had not been practiced. Although statistical significances were observed in these activities, all responses revealed a moderate to very high increase in practices after the establishment of the TRD project. The means ranged from 2.28 to 3.24 on a one-to-four point scale. From these findings, it is tempting to speculate that the spread effect, which is indicated by the above mean averages, might have occurred as the result of the TRD project intervention. However, activities of "practice improved poultry keeping" and "compost making" were not improved. These two practices were also highly identified as not being applied for village development (Table 6).

A general point of interest was to identify the most important contributions that the TRD project had made to village development. Respondents were asked to list the three most important contributions they thought the TRD project had made to village development. The data in Table 7 illustrate that five areas in village development were commonly identified: (1) better farming methods, (2) child

Table 7. Distribution of specific TRD contributions to village development by gender (N = 331; df = 1)

Activity (dependent variable)	Male n (%)	Female n (%)	Total N (%)	X^2-value	X^2-prob.
Better farming methods					
Identified	174 (84.9)	61 (82.1)	243 (84.1)	0.33	0.564
Did not identify	31 (15.1)	15 (17.9)	46 (15.9)		
Child care techniques					
Identified	17 (8.3)	39 (46.4)	56 (19.4)	53.06***	0.000
Did not identify	188 (91.7)	45 (53.6)	233 (80.6)		
How to improve diet					
Identified	22 (10.7)	38 (45.2)	60 (20.8)	41.05***	0.000
Did not identify	183 (89.3)	46 (54.8)	299 (79.2)		
Improved leadership					
Identified	23 (11.2)	4 (4.8)	27 (9.3)	2.19	0.139
Did not identify	183 (88.8)	80 (95.2)	263 (90.7)		
Improved livestock husbandry					
Identified	34 (16.6)	11 (13.0)	45 (15.6)	0.16	0.689
Did not identify	171 (83.4)	73 (86.9)	244 (84.4)		

***Significant at α = .001.

care techniques, (3) how to improve diet, (4) improved leadership, and (5) improved livestock husbandry. Chi-squre tests with gender as the independent variable and activities identified as the dependent variables were executed to test the hypothesis that the identified contributions made by the TRD were independent of gender. The results of the chi-square tests were very highly significant in two activities, namely, "child care techniques" (X^2 = 55.47, df = 1, $p < .001$), and "how to improve diet" (X^2 = 43.13, df = 1, $p < .001$). The hypothesis was rejected in both cases. The Yates Correction for Continuity factor was used because of the 2 x 2 contingency tables (Hinkle et al., 1979). The adjusted phi-coefficient of .44 and .39 for "child care techniques" and "how to improve diet", respectively, were obtained. However, the phi-squares of .19 and .15 for "child care techniques" and "how to improve diet", respectively, illustrate that the variance in the dependent variables accounted for in the independent variable was low. Thus, a low relationship of dependency existed. However, it is indicated from the analysis that fewer men than women identified each of the two activities as a contribution by the TRD project (8.3% and 10.7%, respectively). Considering the pattern of life in Tanzania, this finding may be explained by the fact that most domestic activities are done by women. It was also observed that most of the domestic training by the TRD

was limited to women. In fact, Gonsalves (1984) found that women were overwhelmingly concerned with basic domestic issues.

However, since most men are still the household heads and breadwinners, and since men are the primary participants of TRD training programs, efforts to involve them in domestic issues training deserve special attention.

The hypothesis that leaders and nonleaders who attended the TRD training were not significantly different in their perceived increase in leadership abilities was tested by a t-test. Data in Table 8 present the comparison of perceived increase in leadership abilities for village leaders vs nonleaders. The t-value was 1.84 and was not significant at .05 level. The hypothesis was not rejected. Both groups indicated high mean averages, 4.67 and 4.49 on a five-point scale.

Table 8. Comparison of village leaders and nonleaders in their average increased leadership abilities after the TRD training (N = 154)

Group	N	$\bar{X}$	Std. dev.	t-value	2-tail prob.
Leader	73	4.67	0.55	1.84	0.07
Nonleader	72	4.49	0.65		

This analysis of the self-assessment items revealed that the program increased their leadership abilities. These results are similar to those by Howell et al. (1979) that training programs in leadership increased participants' involvement in public affairs, leadership and problem-solving techniques. However, as it was observed in some cases and analyzed earlier on, those respondents who were not in leadership positions found it rather limiting to apply some of the leadership principles learned.

Because maize is a popular crop grown in Tanzania (98.3% of the respondents indicated to have grown maize), a descriptive analysis was performed to find out the average yield per acre from 1981 through 1984 in each region. The data in Figure 5 indicate that the average production for the entire area was between 6 and 11 bags (a bag of maize is approximately 90 kg (200 lb) of maize per acre. From the analysis above that villagers perceived to have improved their farming and management practices, it is tempting to speculate that training may have some relationship with the increase in yield. In spite of the numbers showing an increase in average yields, the production per acre is still very small to indicate a substantial impact in increased production. There are, however, intervening variables which affect the production process that were beyond the scope of this study. These variables might be rainfall variabilities, lack and delay

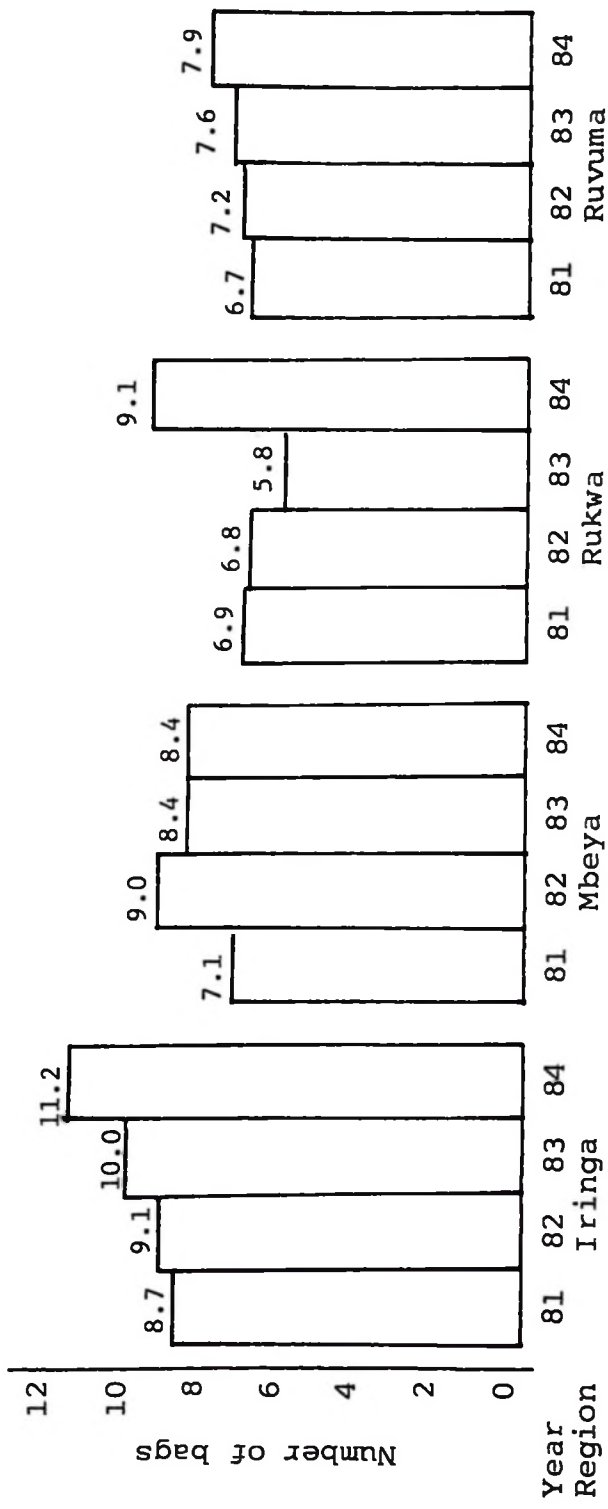

Figure 5. Average maize yield (in bags) per acre by region between 1981-1984 (a bag of maize is approximately 90 kg or 200 lb)

of farm inputs, lack of adequate records on production, and many others.

Finally, almost all interviewees (99%) responded affirmatively that the TRD model programs should be established in other areas in rural Tanzania. The major reasons given were to improve farming practices, village leadership and management, and nutrition, especially to children.

Conclusions and Recommendations

Conclusions

The following conclusions were made based on the finding of the study.

1. The TRD project may be credited with helping farmers adopt improved farming and management skills. In general, a substantial percentage increase in adoption of practices after the establishment of the TRD project was noted. In some practices, however, low adoption rates and statistical significant differences existed among regions. Lack of facilities was considered to be one of the major constraints in adopting most of the training concepts.

2. A number of farming, leadership and management concepts learned at the centers had been applied in villages. This can be regarded as a step in the right direction of merging theory and practice. However, there were concepts which the respondents found difficult to apply in their villages.

Perhaps some theoretical concepts are not appropriate for farmers.

3. It was found that most of the information learned from centers had spread to other members of the villages who had not attended the training. The information was found to have been spread through group demonstrations, discussions, village meetings, and other informal interactions in villages between the TRD-trained and non-TRD-trained villagers. It was observed that such strategies had not been used before the project started. From this interaction and the overall TRD project intervention in villages, respondents were able to identify specific contributions made by the project in village development. An assumption is made that it is from these contributions that respondents wanted similar programs to be established in other parts of the country.

4. A slight increase in maize production was noted from 1981 to 1984. However, it would be naive to claim credit for the yield increase.

5. Leadership abilities were found to have increased among the respondents who attended the training program. However, there were some implementation problems of leadership principles in villages.

Recommendations

Despite the project being perceived practical in many aspects of village development, availability of facilities in many village activities seems to have been neglected. It is suggested that a needs assessment of learning activities of farmers incorporate availability of resources within the proximity of villages. Furthermore, it is recommended that farmers be enlightened on avenues they can explore to get access to resources required for implementing development programs.

Recommendations for further research

1. It is recommended that causal comparative studies be made between the TRD project villages and non-TRD project villages to discern developments that result from the project interventions.

2. Further investigations including more socioeconomic aspects and other variables pertaining to farming and village management practices that are crucial to village development are suggested.

3. A study should be made to compare development levels of villages which started with the project and those which joined the project in phase two.

4. A study to determine the rate of adoption of farming and management practices among villagers in the project using more specific measures is recommended.

SUMMARY AND CONCLUSIONS

Summary

Agriculture is still the key source for economic growth and development of the Tanzanian society. In order to develop agriculture for increased production and diversification of the rural economy, transformation and permissiveness of appropriate technology and strategies are eminent. Since over 80% of the people live on farms as peasants (Rhodes, 1980; South, 1984), efforts to develop agriculture should address the development of rural farmers. Literature indicates that education is a key factor in increased productivity, but arguments are that many educational programs for rural people have not been effective in helping farmers achieve their development targets. It is further conceived that those programs have been formal and have, in many instances, followed pedagogical principles and theories (Nagel and Schubert, 1981; Mulusa, 1983). Such formal education approaches have denied rural people the opportunity to participate in development of educational programs.

However, in recent decades, nonformal educational programs have been viewed as an alternative to formal education. Emphases have been on increasing the abilities of rural people to participate in their development decisions. Despite the fact that involving farmers in determining their own

development enhances the success of education and other programs at the village level, and the fact that education theory emphasizes developing training programs for adults from needs assessment, the practice of this philosophy has not been fully implemented in most training programs for rural people in Tanzania.

The Training for Rural Development (TRD) project in Tanzania was conceived as a training network which tried to incorporate the involvement of training recipients in the design and implementation of its programs. The training process of this project starts with village needs assessment which determines the training content. This is followed by the actual one-month residential training at the project training centers. Finally, follow-up programs of village trainees by the training teams are conducted to assess developments made since training and to provide spontaneous training as necessary.

However, the TRD project is by no means a panacea to the whole process of agriculture and rural development, nor does education alone inspire ubiquitous development because effective training programs for rural development are those which are organized and coordinated with other vital sectors of the development process. Nevertheless, if development programs for rural people are to be successful, people's active participation becomes a sine qua non for the success of those

programs. It is through this active participation that efforts of top-down and bottom-up development strategies become integrated, two-way information flow becomes enhanced, rural people become committed in the implementation process of programs and become beneficiaries of the technological advancements geared towards their development. Any training program that incorporates people's participation has great chances for success of knowledge transfer. Although the TRD project is known to involve farmers in developing village training and development programs, there is insufficient empirical evidence to verify the success of the project in training programs for agriculture and rural development in Tanzania.

This research intended to merge two areas of inquiry that affect the residential training effectiveness and the practicality of such a comprehensive training program for farmers in rural Tanzania.

The objectives of this study were:

1. To identify and analyze demographic characteristics of respondents.
2. To determine and analyze the TRD-trained respondents' perceived importance of the training program for village development.
3. To assess and compare the TRD-trained respondents' perceived effectiveness of the training program in developing their abilities for village development.

4. To document changes made in villages since the establishment of the project in the following areas:
   a. Adoption of improved farming and management practices for village development,
   b. Practical use of concepts learned from centers in villages,
   c. Increased leadership abilities of the trained respondents,
   d. Increased rate in the use of farming and management practices for village development.
5. To identify and analyze problems encountered by the TRD-trained respondents during and after training sessions.

The research was descriptive in nature and utilized surveys and observation techniques. The study was conducted in the TRD project area in southern Tanzania. Farmers from 15 pilot villages in the project served as the population of the study. From this population, a random sample of 331 cases was taken.

Data were collected during July and August 1984 by the author and a team of 13 trained interviewers. A three-section questionnaire was developed and used to gather data through personal interviews. Interviews were conducted in Swahili.

The data were analyzed at Iowa State University utilizing the subprograms from the Statistical Package of the Social Sciences (SPSSx).

The first section of the study aimed at presenting the results of the importance and effectiveness of the TRD project in developing farmers' abilities related to farming and management practices. An additional objective was to identify training problems villagers experienced during and after training.

The second section of the study pursued the extent to which training concepts were utilized by the trainees for village development. Also, the extent to which other villagers who had not attended the TRD training benefited from the project was assessed.

Conclusions

1. It was found that the TRD training program was perceived to be vital for village development. Perceptions of respondents from all four regions and between leaders and nonleaders did not vary significantly. It appears that the TRD training program was meeting needs of the farmers.

2. Although the training program was generally perceived effective, statistical significant differences were identified among regions in the respondents' perceptions of training program effectiveness. It was concluded that training strategies should be location specific rather than using a blanket-type of approaches in all regions.

3. Only two variables, age and function of the respon-

dents contributed to the prediction of the perceived training program effectiveness. However, the variances accounted for by the variable were low and their practical value in the prediction equation was questionable. Other antecedent conditions not included in this study may have added to the predictive power of the equation.

4. A number of problems in the training process and implementation of programs at the village level were identified. It appears from the analysis that most of those problems were found to be independent of age, gender, educational background and location of respondents. This leads to the conclusion that these problems emanate from the training and implementation processes rather than respondent-related variables. Furthermore, it is speculated that these problems may affect the success of the project in the years to come.

5. A substantial increase in the adoption of improved farming and management skills after the establishment of the project was noted for some activities. However, the low rate of adoption of other activities may lead to the conclusion that more training is needed to increase farmers' skills in those areas.

6. The study found that concepts learned at the centers were applicable to village development in most areas. Also, the diffusion of concepts from the TRD-trained to the non-TRD-trained respondents was observed. However, it was

revealed that application of some concepts to village development was difficult. Thus, it is possible that, in some areas, training needs of villagers were not met or probably certain aspects of the training program emphasized theory more than the immediate usefulness of training to villagers.

7. It appears from this study that women are still not adequately involved in the training program. From the study sample, only about 25% of women were TRD trained. Although it is perceived that there may be structural and socioeconomic problems which limit women's participation in training programs, it is inconceivable why strategies to curtail those problems have not been developed. As a matter of fact, women still contribute most of the families' labor, but they are the least educated. Therefore, putting women at the receiving end, the training process might not be doing enough in participatory rural development. Needless to say, training women to solve their own problems is to solve development problems.

8. The positive attitude that was demonstrated by the respondents that the project should be expanded to other rural areas in Tanzania is an indication that the project has been important in helping villagers identify and conduct development endeavors.

Recommendations

1. Needs assessment as a basis for establishing the content of TRD programs should be a continuous process. It is from such activities that participatory education of training programs is enhanced. In addition, the training process itself should be a continuous process so that villagers are kept up-to-date with new technological developments. This should include current assessment of training needs of villagers, both TRD-trained and non-TRD-trained. The training could be delivered in training institutions or in the villages of farmers.

2. Decentralization of training centers to regions is strongly encouraged. This will ultimately increase relevancy of training to local conditions, especially availability of resources needed to utilize new technology. Perhaps localization of training at the village level would be more effective than training at the regional level. In addition, localized training sites such as village-based training might eliminate some of the problems that limit women's participation in training which is conducted at regional training centers.

3. Ways and means of activating tools for use in villages with agriculture and other activities should be incorporated into the training program. Alternatively, a process of involving other ministries and departments in the country in this venture is strongly recommended. It is

through multidisciplinary approaches that vital elements of successful village development are coordinated.

4. The tendency to adhere to syllabi developed on contemporary village needs should not be ignored. It is hereby recommended that the training process be revised from time to time based on the needs of the current participants. It is also important that the duration of training be studied so that training time is adjusted according to the villagers' felt needs. The routine one-month residential training may not always be appropriate. Pretesting of the clientele before training begins would help determine the competency level of participants and the training needed.

5. Although the strategy of providing training to village leaders is highly commended, the project management should come to grips with the fact that in almost all villages women have not yet assumed many village leadership positions. Therefore, concentrating the training to leaders will inevitably limit training opportunities for women. A recommendation is made that whenever training opportunities of villagers other than leaders exist, more women should be included in the participants.

Recommendations for further research

Research on the impact of farmers' training programs in Tanzania has been neglected. It appears that most efforts have concentrated on the planning and establishment of rural

farmer training programs. However, once training has been conducted, evaluations on the nature, organization, implementation, and usefulness of training programs are rarely carried out. This research has provided some answers pertaining to the importance and effectiveness of TRD training programs, but more information is needed. Additional research is needed to provide a wider understanding of how to improve training programs for farmers. The following studies are recommended.

1. It is recommended that causal comparative studies be made between the TRD project villages and non-TRD project villages to assess the levels of development between them and differentiate developments made that can be attributed to the project intervention.

2. Further investigations including more demographic and socioeconomic variables that may contribute to the predictive power of the training effectiveness perceptions of respondents are suggested.

3. A study should be conducted to compare the TRD training program and other farmers' training programs to discern the origin of training content and attitudes of farmers about the training they received.

4. Further investigations that include more villages, especially those that joined the project in later years should be conducted to determine and compare levels of development between villages.

5. It is recommended that a study be conducted to determine the rate of adoption and differentiate adopters from non-adopters in farming and management practices among villagers in the project using more specific measures.

6. An evaluation to determine the cost-effectiveness of the project should be made to ascertain the feasibility of Tanzania taking over and managing the project after the donor country terminates its support and services.

7. Studies to assess and compare the impact of the TRD project utilizing villages in one region as independent variables are suggested.

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'Tis not too late to seek a newer world."
- Lord Alfred Tennyson

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This research study was approved by the Human Subjects Review Committee.

APPENDIX: THE INTERVIEW INSTRUMENT FOR DATA COLLECTION

Village _____
Region _____

SECTION I

DEMOGRAPHIC DATA

DIRECTIONS: Please check (✓) the response which best describes the respondent's situation or fill in the blanks.

1. What is your highest level of education?

_____1. Primary education, what standard? _____

_____2. Secondary education, what standard? _____

_____3. Post secondary education, specify area _____

_____4. Never went to school

2. If never went to school, are you enrolled in adult education program?

_____1. Yes

_____2. No

3. Which of the following best describes your present position in the village?

_____1. Village elected council member.

_____2. Village government worker

_____3. Ordinary village resident

4. Have you attended the TRD training?

_____1. Yes

_____2. No (go to question 6)

5. If yes in number 4 above, what type of training did you get?

_____1. Residential

_____2. Technical

6. Gender?

_____1. Male

_____2. Female

7. What is your age? _____ years.

8. Please name three crops, acreage cultivated and yield obtained in:

Year		Crops	Acres	Yield (kg/bags)
1980-81	1.	_____	_____	_____
	2.	_____	_____	_____
	3.	_____	_____	_____
1981-82	1.	_____	_____	_____
	2.	_____	_____	_____
	3.	_____	_____	_____
1982-83	1.	_____	_____	_____
	2.	_____	_____	_____
1983-84	1.	_____	_____	_____
	2.	_____	_____	_____
	3.	_____	_____	_____

SECTION II

PROGRAM PARTICIPANTS VIEWS ABOUT THE TRD TRAINING FOR VILLAGE DEVELPPMENT

PART 1

DIRECTIONS: Each of the items below states an ability which may or may not be important for the successful operation of village development programs. Please read each statement carefully and circle the number which best expresses the respondent's opinion about its importance.

If the ability is perceived to be of no importance ..... circle 1

If the ability is perceived to be of low importance ..... circle 2

If the ability is perceived to be of moderate importance ..... circle 3

If the ability is perceived to be of high importance ..... circle 4

If the ability is perceived to be of very high importance ..... circle 5

PART 2

DIRECTIONS: Also, for each ability, indicate how effective the respondent perceived the training program was in developing the ability.

If the training is perceived to have not been effective in developing the ability, ... circle 1

If the training is perceived to have been somewhat effective in developing the ability, ... circle 2

If the training is perceived to have been moderately effective in developing the ability, ... circle 3

If the training is perceived to have been highly effective in developing the ability, ... circle 4

If the training is perceived to have been very highly effective in developing the ability, ... circle 5

EXAMPLE

Ability	Degree of importance					Degree of effectiveness				
1. Process village farm credit	1	2	3	(4)	5	1	(2)	3	4	5
2. Select quality seeds for planting	1	2	(3)	4	5	1	2	(3)	4	5
3. Conduct village meetings	1	2	3	4	(5)	1	2	3	4	(5)

Now do the following:

	Degree of importance					Degree of effectiveness				
	no importance	low importance	moderate importance	high importance	very high importance	not effective	somewhat effective	moderately effective	highly effective	very highly effective
	1	2	3	4	5	1	2	3	4	5
A. Village Leadership & Communication										
Ability to:										
1. Identify facilitors in effective communication	1	2	3	4	5	1	2	3	4	5
2. Identify best leadership strategies for the village	1	2	3	4	5	1	2	3	4	5
3. Coordinate village problems	1	2	3	4	5	1	2	3	4	5
4. Involve others in making decisions	1	2	3	4	5	1	2	3	4	5
5. Supervise village programs	1	2	3	4	5	1	2	3	4	5
6. Be a good leader	1	2	3	4	5	1	2	3	4	5
7. Identify barriers in effective communication	1	2	3	4	5	1	2	3	4	5
B. Project Planning & Management in Village Development										
1. Plan village long-term development programs	1	2	3	4	5	1	2	3	4	5
2. Plan village short-term development programs	1	2	3	4	5	1	2	3	4	5
3. Develop village annual production meetings	1	2	3	4	5	1	2	3	4	5
4. Know resources to use in solving village problems	1	2	3	4	5	1	2	3	4	5
5. Identify ways to successful implementation of village projects	1	2	3	4	5	1	2	3	4	5
6. Develop a monitoring schedule for the implementation of projects	1	2	3	4	5	1	2	3	4	5
7. Work out a cost-benefit analysis for a village project	1	2	3	4	5	1	2	3	4	5

	Degree of importance					Degree of effectiveness				
	no importance	low importance	moderate importance	high importance	very high importance	not effective	somewhat effective	moderately effective	highly effective	very highly effective
	1	2	3	4	5	1	2	3	4	5
8. Plan village project evaluation procedures	1	2	3	4	5	1	2	3	4	5
9. Evaluate village projects	1	2	3	4	5	1	2	3	4	5
C. Crop Husbandry-Horticulture										
1. Plan a horticultural unit for the village	1	2	3	4	5	1	2	3	4	5
2. Prepare suitable nursery beds	1	2	3	4	5	1	2	3	4	5
3. Select quality seeds	1	2	3	4	5	1	2	3	4	5
4. Determine vegetables to grow	1	2	3	4	5	1	2	3	4	5
5. Prepare suitable transplant beds	1	2	3	4	5	1	2	3	4	5
6. Determine correct spacing for the vegetables	1	2	3	4	5	1	2	3	4	5
7. Case of seedlings in the nursery	1	2	3	4	5	1	2	3	4	5
8. Maintain quality of vegetables	1	2	3	4	5	1	2	3	4	5
9. Identify markets for vegetables	1	2	3	4	5	1	2	3	4	5
10. Market horticultural products profitably	1	2	3	4	5	1	2	3	4	5
11. Identify pests of vegetables	1	2	3	4	5	1	2	3	4	5
12. Identify diseases of vegetables	1	2	3	4	5	1	2	3	4	5
13. Control pests of vegetables	1	2	3	4	5	1	2	3	4	5
14. Control diseases of vegetables	1	2	3	4	5	1	2	3	4	5
15. Identify manures and fertilizers to use	1	2	3	4	5	1	2	3	4	5
16. Determine the amount of manure and fertilizer to use	1	2	3	4	5	1	2	3	4	5
D. Livestock Husbandry-Poultry										
1. Prepare suitable poultry houses	1	2	3	4	5	1	2	3	4	5
2. Identify suitable breeds for the purpose	1	2	3	4	5	1	2	3	4	5
3. Determine suitable feeds for different flocks	1	2	3	4	5	1	2	3	4	5
4. Determine amount to feed per day	1	2	3	4	5	1	2	3	4	5
5. Care and manage flocks	1	2	3	4	5	1	2	3	4	5
6. Control quality of products	1	2	3	4	5	1	2	3	4	5
7. Market eggs and meat profitably	1	2	3	4	5	1	2	3	4	5
8. Identify pests of poultry	1	2	3	4	5	1	2	3	4	5
9. Identify diseases of poultry	1	2	3	4	5	1	2	3	4	5
10. Prevent and control pests of poultry	1	2	3	4	5	1	2	3	4	5
11. Prevent and control diseases of poultry	1	2	3	4	5	1	2	3	4	5

	Degree of importance					Degree of effectiveness				
	no importance	low importance	moderate importance	high importance	very high importance	not effective	somewhat effective	moderately effective	highly effective	very highly effective
	1	2	3	4	5	1	2	3	4	5
E. Farm Management										
1. Make decisions on what to produce	1	2	3	4	5	1	2	3	4	5
2. Develop village farm plans	1	2	3	4	5	1	2	3	4	5
3. Prepare a farm budget	1	2	3	4	5	1	2	3	4	5
4. Make decisions on when to produce	1	2	3	4	5	1	2	3	4	5
5. Identify sources for farm credits	1	2	3	4	5	1	2	3	4	5
6. Order inputs in time	1	2	3	4	5	1	2	3	4	5
7. Make decisions on how much to produce	1	2	3	4	5	1	2	3	4	5
8. Identify farm tools and their uses	1	2	3	4	5	1	2	3	4	5
9. Keep inventory of village assets	1	2	3	4	5	1	2	3	4	5
10. Process village farm credits	1	2	3	4	5	1	2	3	4	5
11. Keep records of farm operations	1	2	3	4	5	1	2	3	4	5
12. Evaluate village farm programs	1	2	3	4	5	1	2	3	4	5

SECTION III

PART 1

List the concepts which you learned from the training center and were able to apply for village development.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

PART 2

List the concepts which you learned from the training center but have not been able to apply for village development. Also, indicate the reason(s) why you have not applied the concept.

	Reason(s)
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____

PART 3

What do you think were the major problems encountered during and after training at the center? (Check all that apply)

_____ 1. Insufficient training time

_____ 2. Very few practical activities

_____ 3. Insufficient teaching staff

_____ 4. Concepts were hard to understand

Which ones? (a) _____

(b) _____

(c) _____

_____ 5. Lack of transportation to the training centers

_____ 6. Lack of sufficient tools to learn with

_____ 7. Lack of tools to use in the village after the training

_____ 8. Lack of competent teaching staff

_____ 9. Too old to learn

_____ 10. Groups were too big

_____ 11. _____

_____ 12. _____

_____ 13. _____

_____ 14. _____

PART 4

DIRECTIONS: The following items request responses from interviewees on whether the leadership training at centers helped them increase their leadership abilities. Write 1 on the line if the ability drastically decreased; 2 if decreased; 3 if no change; 4 if increased; and 5 if strongly increased.

Use the following scale:

1	2	3	4	5
Drastically decreased	Decreased	No change	Increased	Strongly increased

_____ 1. Your feeling of confidence to express your views.

_____ 2. Your feeling that you can motivate people to work together.

_____ 3. Your willingness to listen to others' opinions.

_____ 4. Your interest in village and public affairs.

_____ 5. Your ability to influence community affairs.

_____ 6. Your feeing of being accepted as a leader.

_____ 7. Your efforts to involve others in public affairs.

_____ 8. Your feeling of independence.

_____ 9. Your desire to serve the community effectively.

_____ 10. Your ability to work with other people.

_____ 11. Your ability to lead groups.

_____ 12. Your ability to conduct meetings.

_____ 13. Your confidence in your own abilities.

_____ 14. Your flexibility of roles in the family.

PART 5

List three things you think the TRD in general has contributed to the development of your village.

1. _____

2. _____

3. _____

PART 6

DIRECTIONS: Please indicate whether each of the following activities was done in your village before (circle 2) or after (circle 3) the TRDP. Circle 1 if never used the activity. Also, if done/used at all, indicate the extent to which the program has affected the use of the activity.

Circle 1 if there was no increase in the use of the activity.
Circle 2 if the use of the activity was slightly increased.
Circle 3 if the use of the activity was moderately increased.
Circle 4 if the use of the activity was highly increased

	Use of Activity						
	never used	used before	used after	no increase	slight increase	moderate increase	high increase
	1	2	3	1	2	3	4
1. Use of farmyard manure	1	2	3	1	2	3	4
2. Compost making	1	2	3	1	2	3	4
3. Use of chemical fertilizers	1	2	3	1	2	3	4
4. Use of improved seeds	1	2	3	1	2	3	4
5. Keep farm records	1	2	3	1	2	3	4
6. Process a farm loan from the bank	1	2	3	1	2	3	4
7. Read about modern farming	1	2	3	1	2	3	4
8. Seek extension advice	1	2	3	1	2	3	4
9. Timely farm operations	1	2	3	1	2	3	4
10. Use recommended spacing	1	2	3	1	2	3	4
11. Establish a vegetable garden	1	2	3	1	2	3	4
12. Practice improved poultry keeping methods	1	2	3	1	2	3	4
13. Purchase of new farm tools	1	2	3	1	2	3	4
14. Plant trees	1	2	3	1	2	3	4
15. Follow extension advice	1	2	3	1	2	3	4
16. Practice soil conservation techniques	1	2	3	1	2	3	4
17. Attend village meetings	1	2	3	1	2	3	4
18. Teach others about modern farming	1	2	3	1	2	3	4

PART 7

Would you recommend this project to all villages in Tanzania?

_____ 1. Yes

_____ 2. No

Give reasons for your answer

1. _____

2. _____

3. _____

4. _____

5. _____

THANK YOU FOR YOUR COOPERATION