TECHNICAL FACTORS WHICH AFFECT COTTON PRODUCTION IN UKEREWE DISTRICT

by

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DEDICATION

To the author's parents who created in him, since his childhood, a deep interest in agriculture.

DECLARATION

I, JOSEPH STEPHEN NGASA do hereby declare to the Senate of Sokoine University of Agriculture that the work presented here is my own, and has not been submitted for a higher degree in any other University.

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ABSTRACT

This is a cross-sectional descriptive study of factors which affect cotton production in Ukerewe district. The study describes farmers' opinions and extension workers' opinions thought to have a bearing on cotton production.

The study also identifies and describes technical constraints which confound cotton production and recommendations for solving them are made. The main findings of the study are: (1) Cotton farmers in the survey area implement those recommended practices which do not call for financial disbursements and seem to shy away from implementing those recommended practices which call for financial disbursements. (2) Some of the factors which contribute to low cotton yields were identified as lack of proper extension programme planning, a large number of clients per V.E.W., poorly trained extension workers and unattractive working conditions for the extension workers. (3) Although V.E.W.s reported that they favoured the progressive farmers' approach, in practice they adopted the frontal approach which is the current extension policy in Tanzania. (4) The farmers reported deciding freely to grow cotton because it was a means of earning money. On the other hand the extension workers claimed that their clientele were forced to grow cotton.

To overcome the technical constraints it is recommended that: (a) One mechanization centre be established, to facilitate mechanization of cotton farming in the survey area. (2) A provision of credit facilities be made to enable farmers to buy inputs and equipments for efficient cotton production. The government should

introduce a subsidy on these items because their prices, influenced as they are by the current inflation, are prohibitively high for the poor farmers. (3) Both farmers and extension workers should participate in the formulation of extension programme plans. (4) Extension workers should be furnished with current cotton research findings from Ukiriguru. They should as well be afforded the opportunity for further training. Inservice training courses could serve a useful purpose in this regard.

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CHAPTER I

INTRODUCTION

1.1 Background Information

Cotton growing was introduced in Ukerewe district, by Roman Catholic missionaries who started to settle there after the first world war. Cotton is at present one of the most important cash crops in Tanzania. Currently it is second only to coffee as a foreign exchange earner for Tanzania.

More than 90 percent of the cotton which is produced in Tanzania comes from the Western Cotton Growing Area (W.C.G.A.), with areas near and around Lake Victoria predominating. In 1971, for example, Mwanza and Shinyanga regions alone accounted for 75 percent of the country's cotton production, while all cotton output in Tanzania accounted for 15 percent of the country's total export earnings (Malima, 1971:17).

In the year 1984, it was reported that cotton accounted for 30 percent of all agricultural export earnings (Omari, 1984:172). More recent observations indicate that cotton's contribution to the country's foreign exchange earnings have kept fluctuating between 20 and 30 percent between 1976 and 1985 (Kigoda, 1987).

Cotton is a raw material for the growing textile industry in Tanzania, and the seeds form the basis of the vegetable oil industry. The residue from oil extraction is an important fat and protein supplement in animal feeds.

Since its introduction to Tanzania, cotton has been the only major cash crop in Ukerewe district. It has therefore, more than any other crops, introduced peasants in that Island, to a cash economy. The crop has been particularly well served by research over the last

half century. Most of this research is conducted at Ukiriguru Research Centre in Mwanza region. This research centre caters for the W.C.G.A. and Ukerewe district is within this zone.

1.2 Statement of the problem

Agricultural development in developing countries like Tanzania, is influenced by environmental, social, economic and technical factors among others. These factors interact in such a way that it is not easy to pin-point a single most important one, the solution of which could bring about agricultural development.

In general, many researchers, (including Cliff et al., 1968; de Wilde, 1967:448; Malima, 1971:38; Mapolu and Phillipson, 1984:51; Omari, 1984:50; Rutachokozibwa, 1985:25-26 and Lupanga, 1986:30) have expressed, in their different works, critical observations about the effectiveness of extension services in Tanzania. The general concensus is that extension workers are not effective because of their poor training and low technical support. Their abilities to communicate technical innovations to farmers are not adequate. Poor links between extension, research centres and other knowledge generating sources in the country are among the technical factors which confound agricultural development.

Another school of thought is that Tanzania has tended to concentrate on cash crops like coffee, cotton and cashewnuts to the detriment of food crops (Hulls, 1970; Africa Now, 1984). Despite the truism of that school of thought the trend, as shown in the review of literature, indicates that cotton output has been declining over the years (Tanzania, Marketing Development Bureau, 1984:20), though an

upward trend occurred in 1986 and 1987 (Daily News, October 2, 1986; Uhuru, October 28, 1987). This upward trend could probably be due to the increases in producer prices which were announced by the Government in 1985 and 1986. Cotton output rose from 200,000 bales in 1985 to 400,000 bales in 1986. Anticipated output for 1987 was 480,000 bales (Daily News, October 19, 1987).

The technical factors which affect agricultural production in general and cotton in particular as indicated above, were at a micro-level. Their magnitude was measured and described. It was not possible to deal with all factors that affect cotton production in a single study like this one, constrained as it was by time, financial resources and manpower. For that matter, the researcher decided to pick out one dependent variable 'cotton production' and a set of independent variables, namely; technical factors which affect cotton production. In this regard, one has to agree with Msambichaka (1984:8) who insists that one cannot solve all problems in a single study, and that the best alternative is "to attempt to encapsule one problem so that all efforts are directed towards a defined point". Because of this parsimonious characteristic of survey research and due to the significance of the technical constraints to the agricultural sector in general, the researcher decided to select this problem to study and describe its magnitude in relation to cotton growing in the survey area.

Specifically the problem is that although cotton is significant to the national economy and particularly as an important cash crop to the farmers in the survey area, the application of modern technology in the growing of the crop is more rhetorical than practical; hence

the decision by the researcher to undertake a descriptive study of the magnitude of the technical factors which affect the production of cotton in the survey area. Emphasis was placed on: (i) the adequacy of the technical package for cotton production; (ii) communication of the technical package for cotton growing, to cotton farmers in the survey area by village extension workers; (iii) the actual situation of extension services on cotton farming in the survey area; (iv) the level of farmers' education which is crucial in enabling them to comprehend and apply correctly the recommended technical packages; (v) the extension worker's levels of education and professional qualifications to enable them to perform their duties competently as extension workers; are among the technical factors which were measured, analysed and described in this study.

1.3 Rationale of the study

The information obtained from the results of this study, was aimed at broadening the understanding of the technical factors which affect cotton production in the survey area. It was intended to serve as a source of information for both cotton farmers and extension workers in Ukerewe district.

1.4 Objectives of the study

The aim of this study is to describe the way in which technical factors affect cotton production in Ukerewe district. In order to achieve this goal, the study has five objectives:

1. to identify and describe the technical factors which affect cotton production in Ukerewe district,
2. to determine the magnitude of the technical constraints by

comparing the actual and ideal situations, of cotton growing in the survey area,

3. to seek farmers' opinions towards their village extension workers' abilities to assist them to overcome the technical constraints related to cotton production,
4. to seek village extension worker's opinions about their clienteles' response in implementing the technical package for cotton growing,
5. to suggest possible solutions to the technical constraints identified.

1.5 Hypotheses

In the process of data analysis, the following hypotheses were tested:

1. There is no significant difference between the ideal yield of cotton as recommended by Ukiriguru Research Centre and the actual yields of cotton obtained by farmers in the survey area.
2. There is no significant difference in cotton yields obtained by farmers who have contacts with village extension workers and cotton yields obtained by farmers who have no contacts with extension workers.
3. Farmers' opinions about their extension workers are independent of their level of education, age and gender.
4. Extension workers' opinions about their clienteles' response towards modern cotton growing are independent of their levels of education, age and gender.

These hypotheses were tested utilizing the Student's t-test, the

chi-square and correlational techniques.

1.6 The study area

The survey area for this study was in Ukerewe district which is an Island in Lake Victoria. The Island is made up of four divisions namely: Ilangala, Mmumbuga, Mmumlambo and Ukara. The Island is within the W.C.G.A. where most of Tanzania's cotton is grown.

According to Conyers et al. (1970), most of the cotton that is produced in Ukerewe comes from the eastern part of the Island. For that reason, the researcher made a purposive decision to conduct the survey in that part of the district. This area comprises Mmumlambo and Mmumbuga divisions and has a total of twenty-four villages.

An additional reason for selecting to locate the study in the two divisions was that the researcher had worked in Ukerewe for three years, between 1983 and 1985. He was therefore familiar with some of the social norms of farmers in Ukerewe Island. This advantage, it was believed, would help to minimize some of the obstacles generally associated with data collection including building of rapport by being able to speak some common words like greeting in the vernacular language for, there are special greetings for the elders, for the women and youths. A person who can handle such situations is likely to create rapport more easily than one who cannot. The researcher had met some of the village leaders and extension workers before so he was not a stranger to them and this was an added advantage in obtaining their cooperation while conducting the study.

1.7 Limitations of the study

The study was constrained by a number of limitations, including:

1.7.1 Limitation of time

The researcher had only three months to complete the survey. With that limitation, the cross-sectional design, which is the simplest correlational design available, was the only suitable design for his situation. The same limitation, together with lack of financial resources and efficient means of transport, prevented him from covering a larger survey area than the two divisions in the W.C.G.A.

1.7.2 Limitations of instruments

Structured questionnaires are the main instruments which were used in data collection. One of the weaknesses of such instruments was pointed out by Blalock (1982:45) when he said:

> ...We do not know whether the respondents will tell us how they really feel and think. They may decide to tell us what they think we want to hear or what they consider to be a socially approved answer.

In order to reduce the magnitude of this limitation, triangulation techniques were applied. They included: the non-participant as observer technique, unstructured interviews and informal discussions with different key informants in the survey area.

Another limitation associated with the measuring instruments was that both the farmers' and extension workers' questionnaires were not pre-tested for lack of time and resources on the part of the researcher. For that reason, when the researcher was out in the field to conduct the interviews, he realized that questions number 1, 11, 20, 25 and 36 on the farmers' questionnaire needed some minor

modifications which the researcher made as he went along.

1.7.3 Limitation in the sample size

Although all the village extension workers from the survey area were included in the sample and that all of them were interviewed, their number was very small. There were only seven village extension workers in the survey area. In addition, there was very little variation in their characteristics. Therefore, the results of data analysis from the village extension workers' questionnaires could not be generalized beyond the sample of respondents who were interviewed.

1.8 Definition of terms

Abbreviations and terms used throughout the study are as follows:

1.8.1 Abbreviations

1. C.C.M. - Chama Cha Mapinduzi -- It is the only political party in Tanzania allowed by law.
2. D.S.M. - Dar-es-Salaam
3. G.D.P. - Gross Domestic Product
4. G.N.P. - Gross National Product
5. S.M.S. - Subject Matter Specialist
6. T.C.A. - Tanzania Cotton Authority
7. T & V - Training and Visit Extension Approach
8. V.E.W. - Village Extension Worker
9. W.C.G.A. - Western Cotton Growing Area

1.8.2 Terminology

Actual situation -- The actual situation was operationally defined as a measurement of what is actually happening in the real world.

For example the current number of village extension workers per given number of farmers or villages; or the amount of cotton produced by farmers per unit area.

Bale -- A parcel of lint cotton weighing 181.4 kg -- 1 kg = 2.205 lb.

Census -- When all elements in the target population are included as respondents in the sample, it is referred to as a census in survey research. For example in this study, all the village extension workers working in the survey area were included in the sample.

Clientele -- The farmers who are being served by an extension worker are the clientele of that extension worker.

Cross-sectional design -- This is one of the correlational designs in which measurements are taken at one point in time.

District -- A smaller administrative sub-division of a region. The number of districts in one region is determined by the size and population of a region, among other factors.

Division -- A smaller administrative sub-division of a district. The number of divisions in a district is determined by the size and population of the district.

Element -- An element in this study is an individual cotton farmer or an individual extension worker or an individual key informant from whom information was collected during the survey.

Extension contact -- This refers to the number of times a farmer comes into contact with his village extension worker in a period of one year.

Extension model -- A representative or configuration of the structure and process of extension system in operation.

Extension Saturation Project (E.S.P.) -- An extension model practiced in Uganda. The basis of E.S.P. has been the allocation of one extension worker to an area of 12 to 80 square kilometers having 300 to 500 farmers.

Interview schedule -- This is the process of collecting data through which the researcher fills the forms in a face-to-face contact with the respondent.

Formal education -- That education which a person acquires through the formal school setting. This was classified as primary school education, -- 1 to 7/8 years, ordinary level secondary school education -- form I to form IV, advanced level secondary school education -- form V to form VI. Any training taken after any one of the above formal education levels was considered to be formal education.

Ideal situation -- The situation which is considered to be optimal, i.e. the right or correct way of doing things. For example according to the Ministry of Agriculture in Tanzania (1983:18) a V.E.W. with an ordinary level secondary school education and a 2-year certificate course in agriculture is expected to be assigned to one village or two nearby villages. This is an ideal situation.

Lint cotton -- Cotton which has been separated from its seeds.

Non-formal education -- Education which has been acquired by a person through adult education consisting of planned activities outside the formal school setting.

Non-response -- The failure to interview all respondents from a selected sample, due to different reasons, is known as non-response.

One-task extension worker -- An extension worker who is specialized in one activity only. An example would be an extension worker specializing on cotton extension only.

Parsimonious -- This is a characteristic of survey research which means that the researcher has to limit himself or herself to a limited number of variables in describing a certain phenomenon. The researcher becomes a bit stingy but careful not to leave out the most important variables to explain the phenomenon.

Phenomenon -- What we can see and explain in the real world is called a phenomenon.

Plant population -- The number of planted plants in a given area.

Progressive farmers -- Farmers who are most receptive to recommended practices. Usually these are the rich farmers in the community.

Questionnaire -- A device for securing answers to questions by using a form which the respondent fills in himself. A questionnaire is referred to as a schedule when its questions are asked and filled in by an interviewer in a face-to-face situation with the respondents. A questionnaire as a research instrument, contains a of questions all logically related to a central problem or problems.

Recommendation -- A description of a new element in a production technology, such as an improved variety or a new chemical, which researchers believe farmers will find useful.

Region -- The biggest administrative unit in Tanzania, also referred to as province in some other countries. Its boundaries are determined by the government. Tanzania is divided into 25 regions.

Respondent -- An individual who has been sampled for being interviewed to provide information or data. Sometimes respondents are referred to as observational units or elements.

Research design -- The logical and systematic planning and directing of a piece of research work.

Rural area -- Area of the countryside. In Tanzania the villages make up the rural areas.

Sample -- That portion of the population, which has been selected for observation or interviewing. It is a sub-set of elements from the population.

Sampling frame -- The actual list of the cotton farmers from which the sample of respondents was drawn.

Sampling interval -- The ratio between the sampling frame and sample size. Sampling interval (k) = $\frac{N}{n}$

Where N = Sampling frame = 2227

n = Sample size = 120

k = Sampling interval = 19

Sampling ratio -- The interval of selecting elements to make up a sample in the systematic sampling procedure.

Sampling ratio = $\frac{1}{k}$

Where k = Sampling interval.

In this study the sampling ratio was 1:19.

Sample size -- The number of elements which make up a sample.

Seed cotton -- Cotton which has not been separated from its seeds.

Self administered questionnaires -- When the researcher issues the forms to each respondent who completes them individually and

returns them to the researcher, the forms in this case are referred to as self administered questionnaires.

Sukumaland -- The area near and around Lake Victoria which is populated predominantly by an ethnic group called 'Wasukuma'.

Survey -- The process of finding out facts. A survey is used to collect data about a phenomenon.

Swahili -- This is a Bantu language whose origins can be traced to the East Coast of Africa. It is the national language of Tanzania.

Systematic Sampling Procedure -- This is one of the probability sampling designs in which every Kth element, from the sampling frame, is drawn systematically for inclusion in the sample after determining a random start.

Target population -- That aggregate of population about which we generalize our information. In this study, the target population comprised all farmers who grow cotton in the survey area.

Technical package -- A list of recommendations or recommended practices which have to be applied together in a systems approach, in order to attain optimum production. It comprises a set of innovations. For example the technical package for cotton growing in the W.C.G.A. includes: (i) land preparations to be ready by mid-November; (ii) ploughing and planting to be done during two weeks either side of 1st December; (iii) spacing to be 45 cm x 45 cm on a 180 cm ridge and 90 cm x 45 cm on flats; (iv) weeding to be done as soon as weeds make their appearance; (v) thinning to be done when seedlings are three weeks old at two seedlings per hill; (vi) amount of fertilizers to be applied

is 202 kg per ha. of ammonium sulphate at weeding time and 100 kg per ha of triple supper phosphates at planting time; (vii) spraying against insect pests requires three applications of D.D.T. followed by three applications of carbaryl, after flowering, at 2 weeks intervals; (viii) harvesting should be done as soon as the crop is ready and graded into AR and BR grades; (ix) sanitation requires that cotton plants be uprooted and burned by 15th September.

Universe of the study -- A hypothetical combination of all elements from which the sample is drawn. For example this study is concerned with cotton farmers as making the sample; then all cotton farmers make up the universe of this study.

Village-- A sub-division within a ward. In Tanzania, villages are the rural communities as established by the 1975 villagezation Act.

Village Extension Worker (V.E.W.) -- An agricultural technician who works as an agricultural knowledge disseminator at village level.

Ward -- Wards are the administrative sub-divisions which make up a division.

CHAPTER II

MATERIALS AND METHODS

2.1 Design considerations

In designing a piece of research, one has to consider the availability of time, manpower and financial resources. One has to also consider the availability of data and the extent to which it is desirable to impose upon respondents and social institutions which might supply the data.

There is practically no such a thing as a "single" or "correct" design (Young, 1966). What a research design does, is that, it represents a compromise dictated by the many practical considerations that go into the social research. Different researchers will come up with different designs favouring their own situations.

A research design, therefore, is not expected to be a highly specific and rigid plan to be followed without deviations, but rather it is a series of guideposts to keep one guided in the right direction. The design is significant to the researcher in that it attempts to describe, to predict and often to control real world phenomena. It provides the conceptual framework that dictates the type of data to be collected; and the nature of the analysis to be carried out also flows from the type of design used in the survey.

The design which was considered favourable to the situation of the researcher in this study was the cross-sectional design. According to Babbie (1973:62), a cross-sectional design is appropriate for a descriptive study. So, this design is suitable for the present study because it is a descriptive one. A cross-sectional

design is also suitable for determining if two or more variables are correlated. It is, however, less reliable if the researcher wants to determine causal relationships between variables (Lupanga, 1986: 89). In this study the researcher set out to determine if some of the variables were correlated or not, so the design suited him well.

2.2 Population and sampling procedures

2.2.1 Population

The universe for this study comprised farmers who grew cotton. More specifically, the target population for the study was farmers who grew cotton in the survey area. This is the population on which the researcher limited his generalization of the results from the analysis of data. From the target population, a census was made by the researcher to determine the sampling frame. The census identified a sampling frame of 2,227 cotton farmers from the survey area. This was the pool from which the researcher drew the required sample.

As for the sample size, the researcher used arbitrarily a table which was developed, from extensive experience with survey research, by Lawrance P. Clark (1976:68), as a guiding device in choosing a convenient sample size. The table was developed at a 95 percent confidence level. From the sampling frame of 2,227, the table indicated that a researcher could draw any sample size ranging from a minimum of 100 respondents to a maximum of 150 respondents. These ranges could allow the researcher to report his or her generalization of results to the target population at $\pm$ 9.7 and $\pm$ 7.8 percent respectively at 95 percent confidence level.

Guided by this device, the researcher decided to draw a sample

size of 120 respondents from the sampling frame.

2.2.2 Sampling procedures

The systematic sampling procedure, which is one of the probability sampling procedures, was followed in drawing the sample. The sampling interval was 19 and the sampling ratio was 1:19. After determining the sampling interval, the researcher used the first 19 names of cotton farmers from the sampling frame to determine the random start for selecting the respondents to make up the required sample size. The random start was determined by writing numbers 1 to 19 on separate pieces of papers which were mixed well and one village extension worker was asked to pick up one piece of paper. Through this process, the random start was determined as farmer number 11 out of the first 19 names from the sampling frame. So the farmer whose name was corresponding to number 11 in the sampling frame was picked as the first respondent. The second respondent was farmer number 30, the third one was farmer number 49 and so on until the desired sample of 120 respondents was obtained.

For the village extension workers the sampling procedure followed was a census. All the village extension workers working in the survey area were included in the sample. There were in fact only seven village extension workers serving in the survey area when this survey was conducted.

2.3 Instrumentation

Two main instruments were prepared for data collection. These instruments were structured questionnaires. The first questionnaire was designed for administering to the sample of cotton farmers in

the survey area. The second one was designed for collecting data from village extension workers assigned to villages in Mmumlambo and Mmumbuga divisions which comprise the survey area. Both questionnaires were translated into Swahili from English by a consultant from the Swahili Institute of the University of Dar es Salaam.

In addition to the structured questionnaires, the researcher kept a diary as an instrument for triangulation purposes. Daily activities during the course of the survey, observations and data obtained from sources other than the sampled respondents were recorded in this diary. The use of this instrument was in line with Webb's (1966:32) conviction that "over-reliance on questionnaires and interviews is dangerous as it does not give us enough points in conceptual space to triangulate". According to Webb et al. (1966:1), "there is no research method which is without bias or weaknesses". For that matter, questionnaires were not used alone. The structured questionnaires, interviews and schedules were supplemented by other methods, of data collection, which have different methodological weaknesses. Such other methods of data collection included: (i) observation: in this respect the non-participant as observer technique was employed. Such observations involved physical checks on how the farmers carry out some of the operations involved in the technical package for cotton production. For example timely harvesting, uprooting and burning of cotton plants after harvesting, spacing and thinning could be easily observed during the survey by taking a look at the cotton farms where cotton plants were not yet uprooted and burnt. (ii) Informal, unstructured interviews and discussions with different key informants in the survey area, were

made and data obtained in this way were recorded separately in the diary which was kept for this purpose. Among the people who supplied very valuable information in this respect was the District Agricultural Development Officer for Ukerewe district.

2.4 Data collection strategies

Data were mainly collected through interviews. Both the sample of cotton farmers and the village extension workers were interviewed. Structured questionnaires were administered, to the sampled cotton farmers, in the form of interview schedules. The questionnaires for village extension workers were self administered. Some village extension workers sought clarification on some of the items in the questionnaires before they had completed them.

There was no problem of inconsistency in the way interview schedules were administered to the cotton farmers because it was the researcher himself who administered all the interview schedules. All of them were administered in the same way. Out of 101 cotton farmers who were interviewed, there was only one case in which the respondent was not able to speak Swahili. In that particular case, the researcher had to seek for the help of an interpreter.

In carrying out the actual data collection, the respondents were visited individually at their homes. This strategy was deemed to be satisfactory and convenient because it caused very minor disturbances to the respondents. It was also assumed that the respondents could feel more free to respond positively to the interviews which were conducted within their own environments. Movement in the survey area was facilitated by means of a bicycle. The researcher was led

from house to house by one of the villagers in each village. In most cases, it was either the village Chairman or the village Secretary.

Most of the respondents who were interviewed were not found at their homes on the first day of each appointment. They were successfully interviewed after calling back once or twice in some instances.

Out of the sample size of 120, the researcher managed to interview 101 respondents. There was a non-response of 15.8 percent. The reasons for this non-response were as follows: In Ukerewe Island, some of the farmers go fishing after they have finished harvesting their crops, so that six respondents were not available at the time the interviews were being conducted. They had left for fishing expeditions away in Lake Victoria. The researcher failed to interview some other two respondents because they were always drunk when he called at their homes. Two other respondents just refused to be interviewed. Five respondents were involved in ferrying citrus fruits to Mwanza town and were therefore not available for the interviews. One respondent was on maternity leave and she was not interviewed because she had gone to visit her relatives in another district when the interviews were being conducted. Two other respondents were in Bugando consultant hospital taking care of their sick relatives who were admitted there; and very unfortunately one respondent died in a district hospital in Ukerewe before he was interviewed.

The strategy which was used to secure data from the village extension workers was that, the researcher issued self administered questionnaires to each V.E.W., assigned in the survey area, at a

meeting which usually brings all village extension workers to their District Head Office once every month.

At the end of every questionnaire, an open ended question was included. It was posed in the form of a request. The respondents were expected to give their own views on anything which they felt had been overlooked in the formal interviews with respect to technical factors affecting cotton growing.

The survey lasted for three months from July to September, 1987.

CHAPTER III

REVIEW OF LITERATURE

Cotton growing was introduced in Tanzania by the Germans, after the first world war; but according to Bellamy (1963:1), it was not until 1952 that rapid progress was made when production rose from 46,000 bales to over 78,000 bales.

Research for all cotton grown in the western cotton growing area (W.C.G.A.) is done at Ukiriguru Research Centre in Mwanza region. Recommendations for cotton growing from Ukiriguru come in the form of research notes. The recommendations which make up a "technical package" cover such areas as land preparation, planting time, spacing, weeding and thinning, manure and fertilizer applications, spraying against insect pests and diseases, harvesting, grading and sanitation (Spencer, 1969). If farmers adhere to these recommendations, they can harvest yields ranging from a minimum of 371.84 kg/ha to a maximum of 658.56 kg/ha of seed cotton (Saylor, 1975:389). Gibbon (1985:56) has reported that average yields of seed cotton in the tropics range from 100 kg/ha to 220 kg/ha. In Tanzania it has been reported that peasant farmers harvest an average of 229.6 kg/ha of seed cotton. This figure compares unfavourably with an average of 269.9 kg/ha for Africa, 272.16 kg/ha for Asia, 331.5 kg/ha for Eastern Europe, 536.48 kg/ha for North America and 722.4 kg/ha for Europe (Omari, 1984:172).

Studies which have been conducted in developing countries and those carried out in the Western Cotton Growing Area of Tanzania, that relate to this study reveal that the failure by farmers to

achieve higher yields in agriculture may be partly due to the lack of competence of the extension workers and the low levels of education of peasant farmers.

Von Freyhold (1975:243), for example, reported that extension had a partial effect on coffee cultivation in Rungwe district and very impressive results in tea where prices and markets were attractive, research results available and the extension staff well supervised. Her conclusion was that, extension is only useful under circumstances in which what the extension worker has to say is both new and profitable to the clientele.

Technical factors such as poorly operating research and extension systems, lack of proper organization, planning, funding and staffing have been identified as being responsible for the decline of agriculture in Tanzania (Cliff, 1968; Lupanga, 1986:30).

In Uganda, Watts (1975:155) found out that many farmers got low yields because they were unaware of the availability of help from extension services. He associated this phenomenon with the separation of extension from input supplies (Department of Co-operatives), roads (local authority) and veterinary services.

In Kenya it was found out that extensjon workers concentrate their efforts on the progressive farmers only. The poor peasants are ignored. The extension workers entrusted with the responsibility of communicating technical knowledge to the farmers were identified as the junior agricultural assistants who are not well trained for the job (Leonard, 1975:198). Similarly, Compton (undated) holds the same view for the technical effectiveness of extension services. He asserts among other things that:

> ....Extension workers have been scrutinized and found to be lacking in practical experience, training appropriate to the task to which they have been assigned, and prone to favour working with the best farmers rather than those who most need their services.

However, Compton adds some institutional factors which confound the application of technical knowledge by farmers in agriculture. He cites such factors as weak links between extension and research which result sometimes in outdated or inappropriate technical information being disseminated by extension staff.

Okafor (1979:252) identified the following weaknesses of the extension service in Nigeria:

(a) Small number of extension workers in comparison with the number of farmers they are supposed to serve.

(b) Low level training and motivation of extension workers.

(c) Concentration of extension resources on export crops, and or big farmers at the expense of the small scale producers who are regarded as non-viable and uneconomic.

(d) Paying unsatisfactory attention to traditional agricultural sectors and their contribution to the country's economy, and

(e) Failure of planners to articulate more carefully the needs of small farmers.

Working in several developing countries, Qamar (1979) identified some weaknesses that are responsible for poor yields in the agricultural sector. Such factors included:

(a) Extension services that are very narrow in scope.

(b) Extension services that lack effective links with different arms within the general extension organization.

(c) Extension approaches which are not in line with contemporary

ideas on rural development. It is alleged that the conventional extension approach is not in line with integrated rural development approach, which calls for an interdisciplinary and unified efforts by different departments directed towards rural development. Mascarenhas (1979:169) emphasizes this point by saying that the little training in extension areas which the village extension workers receive at school, is not based on the realities in the field, so that unless the educational training programmes for extension workers are dramatically altered to give them the means to carry out their tasks, it is unlikely that much change can be expected.

After examining the trend of cotton yields in Tanzania, de Wilde et al (1967) found out that between 1938 and 1968, there were marked increases in cotton production. No clear reasons were given for the increased trend. Later on, Malima (1971:38) argued that the total output of cotton which rose from 35,000 bales in 1938 to 435,000 bales in 1966 was partly due to extension work. This line of argument tends to suggest that government influence was exercised in achieving increased cotton production in the 1960s; because agricultural extension is an outreach arm of the government in Tanzania.

On the other hand, Omari (1984:50), attributes this increase in cotton output to causes other than agricultural extension services. He points out that, between 1938 and 1966, Sukumaland, which is the main cotton producing area in Tanzania, gradually expanded as both cotton and cattle moved with the population into the neighbouring regions of Tabora, Kigoma, Mara etc. The overall result of this expansion was a more than tenfold increase in cotton production.

In this respect Hyden (1980:58) seems to support that view when he writes:

> ....the Sukumaland Development Scheme stabilized the population of central Sukumaland, enabled approximately 30,000 people to resettle in the neighbouring Geita district over a period of five years and permitted a fivefold increase in cotton output between 1947-1961. The production increases however were primarily achieved through extending the acreage under cotton cultivation rather than any changes in the farming systems.

These arguments suggest that the increase in the overall production has come about from the expansion of hectares under cotton while production per unit area had by and large remained stagnant.

The upward trend in cotton output, however, culminated in the inauguration of the Tanzania Cotton Authority (T.C.A.) in the 1972/73 season. Production records show that a climax of 423,982 bales was reached during that season (Tanzania, Ministry of Agriculture - Task force report, 1982:37). A declining trend in cotton output started in the 1973/74 season. Although the T.C.A. was established by the State specifically to boost cotton production in the country, its inauguration coincided with the beginning of a downward trend in production. There was a sharp decline for example between 1974 and 1975 when production dropped from 75,000 tonnes to 38,000 tonnes respectively (Green, 1980:32). The highest record of cotton output in Tanzania, since the establishment of T.C.A. was reached in the 1980/81 season when approximately 323,588 bales of lint cotton were produced (Tanzania, Ministry of Agriculture - Task Force Report, 1982:37).

Data in table 1, illustrates both the upward trend of cotton output in the 1960s; and the corresponding downward trend of the

crop's output after 1972/73 season.

Table 1. Lint Cotton - Marketing Quantities 1960-62 - 1978: (Volume in Thousands of Tons)

Year	Tons
1960-62	34.0*
1964	52.4
1965	66.0
1966	77.6
1967	69.7
1968	50.7
1969	69.7
1970	76.4
1971	65.4
1972	76.9
1973	65.1
1974	71.5
1975	59.2
1976	70.5
1977	67.2
1978	51.8

Source: Table A-7 Appendix in Green, R.H. et al (1980). Economic Shocks and National Policy Making: Tanzania in the 1970s. Institute of Social Studies. The Hague.

This table indicates that cotton output reached the highest peak in 1966, and maintained a steady trend which ended in 1972. Thereafter a declining trend followed with the lowest production being recorded in 1978.

Studies which have been conducted in the cotton growing area of Western Tanzania show that the low output of cotton is due to the failure of farmers to abide by the scientific and technical package for growing the crop. This failure has been associated with the

*Average

ineffectiveness of the extension services as well as other factors.

A survey on cotton production and its relationship with the extension services in Sukumaland conducted by Saylor (1975), indicate that average plant population per hectare ranges between 34,425 to 38,250 in Mwanza and Shinyanga regions. This is substantially below the recommended plant population of 52,200 plants per hectare advocated by Ukiriguru Research Centre. On average, this reduces farmers output per hectare from a high of 212.8 kg/ha to a low of 139.5 kg/ha. Similar observations led Hulls (1975) to the conclusion that low average plant population per hectare is one of the causes for the low output of cotton in the W.C.G.A. He pointed out that plant population per hectare in the villages in the Western Cotton Growing Area ranges from a low of 30 percent to a high of 67 percent less than the recommended plant population from Ukiriguru. In the same survey it was established that there was no measurable positive influence of farmers' contact with extension workers on cotton husbandry standards. Hulls stresses that the failure to communicate modern agricultural technology to the vast majority of the farmers in the W.C.G.A. appeared to have been total; but he hesitated to attribute the whole tragedy to the poor extension services. He believed that other factors besides poor extension services, could have been responsible for the whole problem. For example such factors as markets, inadequate transport and credit facilities could have inhibited the rate at which farmers changed their traditional practices.

Before the Hulls study, Malima (1971) held the same view on technical knowledge geared to increased quality and quantity of

cotton production. He maintained that the problem urgently called for a satisfactory solution. Raising the level of education of peasant farmers in the rural areas was one possibility. For as Dumont (1967:59) pointed out:

> ....as long as peasants remain uneducated, they often present the most frightening inertia to all forms of progress. The vocational training of peasants will constitute the most effective level of agricultural development and thereby general progress in tropical Africa.

Dumont's lament is very valid in the sense that the communication of agricultural techniques to farmers would prove to be less difficult if the farmers had a high level of education.

While it may be true that farmers have too low education to be able to comprehend the technical package for cotton production, and that extension programmes need to be supplemented by programmes to raise the level of general education among farmers in rural areas; it may be equally true that the extension workers and the general extension organization system leaves much to be desired. As Malima (1971) observes, "there is a great and urgent need for a new type of extension worker."

De Vries (1976) is strongly convinced that the main cause for a poor extension service system in Tanzania is that the system has been adopted from countries whose situation is drastically different from Tanzania. The challenge is therefore to device an extension approach which is appropriate to the local situation. An authentic extension model which is relevant to the realities of Tanzania is needed. De Vries (1978:19) suggests elsewhere that an open two-way communication extension approach which he calls "the dialogical agricultural

extension model" -- adopted from Freire's concept of dialogue, could be appropriate for Tanzania. This extension model is based on the philosophy of a horizontal sharing of ideas between change agents and their clientele; reflecting and acting on the world in order to understand it and change it (Freire, 1970:75). Within the dialogical extension context, one of the basic requirements on the part of the change agents is that they must have a strong commitment to working with their clientele. Idealy, according to Axinn (1972:189) the change agents should be responsible to their clientele. One possibility of achieving this condition is for the village extension workers to be directly answerable to their clientele; and this is possible only if they were employees of the clientele's organizations like the co-operative societies rather than the government. In that way the change agents would be more clientele oriented than government oriented as the case is now in Tanzania.

The dialogical extension model requires, also, that clients be fully involved in the decision making process as well as in the implementation process. To this effect, Freire (1970:53) suggests that there must be an open exchange of ideas, a dialogue between change agents and clientele, out of which grow critical perception and action.

In practice, however, it has been demonstrated that although the philosophy of popular participation and "bottom-uping" is beautiful, the problem is that in too many instances it just hasn't happened (De Vries, 1978:22). This truism has been put forward more succinctly by Freire (1973:116) that "extension agents on discussing the dialogical agricultural extension model, invariably raise

questions about its feasibility". Examples have been pointed out where ironically even after independence, some government officials have tried to use compulsion to encourage farmers to adopt certain techniques of agricultural production, but the effect has almost invariably been disastrous. For example in Morogoro region, farmers perceive cotton growing as something the government wants rather than as a means of earning them money to buy their equipments. They grow it just because it is required by law (Percy, 1975:253; De Vries, 1978; Mmbaga, 1983:23).

All in all, the trend is that there is a general decline in the productivity of the agricultural sector in Tanzania. In his address to the nation to mark the International Workers Day (Daily News, May 2, 1986), President Mwinyi expressed great concern over this total decline of agricultural output in the country. Among other food and cash crops, the President indicated that cotton production has declined from 75,200 tonnes in 1972/73 season to 51,900 tonnes in 1984/85 season (Daily News, May 2, 1986); and according to Mapolu (1984) cotton is one of the crops which has received by far the most concentration of extension services from various technical ministries and various official projects but its husbandry practices and productivity have more or less remained stagnant. Percy (1975) tries to suggest that cotton production has not increased because farmers have found out a better return to their labour from maize due to increase in the price of maize; and that maize production requires only half the labour that is required in the production of cotton. But according to President Mwinyi (Daily News, May 2, 1986), even maize production had been declining, thus casting doubt on Percy's suggestion.

CHAPTER IV

DATA PROCESSING, ANALYSIS, RESULTS AND INTERPRETATIONS

4.1 Data Processing and Analysis

The purpose of data processing and analysis was explained by Rutachokozibwa (1981:49) as to condense information from a body of data into a form which can be easily comprehended and integrated. For this study two questionnaires were used to collect the data. The first one was designed for cotton farmers and the second one was designed and administered to village extension workers in the survey area.

The data from both questionnaires were coded, the variables were given value labels and the coded information was recorded on IBM cards following the SPSSX format.

In analyzing the data, descriptive and inferential statistical procedures of sub-programmes from the statistical package for the social sciences were utilized.

For the descriptive analysis, the statistics under frequencies to give the mean, standard error of the mean, standard deviation, variance, range (minimum and maximum) and summations were computed to summarize the data.

In carrying out the inferential analysis, cross tabulations, the chi-square test for independence, Somer's d (symetric and assymetric), and the Pearson correlation coefficients were performed to determine if there were any differences and correlations between variables.

A total number of 36 variables from the farmers' questionnaire were processed and analysed. 35 of these variables were analyzed

through the computer and data for one variable were processed and analyzed using a hand calculator.

From the farmers questionnaires, the variable which was analysed using a hand calculator was the mean of yields of cotton by farmers as compared to the ideal mean yields, of cotton, recommended by Ukiriguru research centre. This variable was utilized to test the null hypotheses that: (i) there is no significant difference between the ideal output of cotton as recommended by Ukiriguru Research Centre and the actual outputs obtained by farmers in Ukerewe. (ii) There is no significant difference in cotton outputs obtained by farmers who have contacts with village extension workers and cotton outputs obtained by farmers who have no contacts with village extension workers.

Those two hypotheses were tested, by comparing the means of the two populations respectively, utilizing the student's t-test. Data on cotton output were in the ratio or interval scale. and that is why it was possible to use the student's t-test technique.

The ideal recommended output of cotton was given in kilograms per hectare. Therefore outputs of cotton for every respondent farmer were correspondingly converted to kilograms per hectare. Their mean was computed and the Student's t-test was computed.

With regard to the second hypothesis the two means which were compared and tested for significant difference using the student's t-test were the mean of cotton output by farmers with extension contact and the mean of cotton farmers without any extension contact.

Together with the remaining 35 variables from the farmers questionnaires, another set of 34 variables from the village extension

workers questionnaires were analyzed through the computer services at Sokoine University of Agriculture.

The variables in the farmers' questionnaire are explained below. The first variable in question number one was farm size. Respondents were asked to indicate the sizes of their cotton farms. This variable enabled the researcher to determine cotton output per unit area; and to ascertain whether farmers adhered to the minimum legal requirement of 0.8 ha of cotton by every farmer in the survey area.

Questions number 2 to 5 consisted of variables which were intended to indicate the efficiency with which the work of cotton production can be carried out in the survey area. These variables included: implements which the cotton farmers use in ploughing their cotton farms, the distance from the farmers' homes to their cotton farms, and the means of transport which farmers use when going to work on their cotton farms.

Variables in questions 6 to 17 covered the technical packages for cotton growing. They were designed to measure farmers' knowledge about the technical packages and how the farmers adhere to the recommended practices involved. The variables measured in this respect were: Optimum time for land preparation, ploughing and planting; method of planting, spacing, thinning, use of manures and fertilizers, weeding, spraying against insect pests and diseases, harvesting and sanitation.

The variable in question 18 involved identifying the means which

respondent farmers use to transport their cotton to the buying posts; and question 19 was intended to show how payments are effected to farmers after delivering their cotton to the buying posts.

Question 20 was designed to measure the amount of cotton that individual farmers harvest per hectare from their different farms.

In order to get a measure of how farmers like or dislike cotton growing, question 21 was designed in such a way that five crops which grow in Ukerewe; including cotton, were listed and farmers were asked to rate them according to their own preferences. The farmers were asked to indicate only three crops which they prefered most out of the five crops listed in the question.

Soil fertility is one of the technical factors which could affect cotton production; and crop rotation is one of the most important cultural practices for maintaining and conserving soil. So question 22 was designed to show whether cotton farmers practice crop rotation.

The researcher used question 23 to find out whether farmers in the survey area grew cotton only because it was required by law or otherwise.

Questions 24 to 25 were intended to measure the extent to which farmers have access to extension services through face-to-face contacts with their village extension workers in their respective villages.

Questions 26 to 35 were posed in the form of a five point Likert scale; each one ranging from strongly disagree, disagree, undecided, agree to strongly agree. They were aimed at eliciting farmers' opinions about their cotton village extension workers.

Demographic facts about the respondents in the survey area were obtained through questions 36 to 37.

The village extension workers' questionnaire contained items which provided measurements on the following variables:

Questions 1 to 16 were constructed in the form of a five-point Likert scale. The first eleven questions were designed to measure village extension workers' opinions about their work; while questions number 12 to 16 were designed to measure village extension workers' opinions about their clientele.

Question 17 was intended to show how extension programme planning is done in Ukerewe, while question 18 sought extension workers' opinions about the best strategy which could promote increased cotton production in the survey area.

Question 19 to 26 had items which were designed to measure village extension workers' knowledge about the technical packages for cotton growing as recommended by Ukiriguru research centre. Question 27 aimed at finding out whether these technical packages were either re-inforced by field trials under local conditions in the survey area or whether the packages were based only on blanket recommendations from the research station.

Questions 28 to 38 in the village extension workers' questionnaire consisted of items which were designed to elicit demographic facts about the village extension workers working in the survey area.

Both the farmers' and V.E.S.s' questionnaires are attached as Appendix A.

4.2 Results of Data Analysis

Both descriptive and inferential statistical procedures were utilized in the processing and analysis of data as explained in 4.1. In this section, an endeavour is made to report the results which were revealed by these procedures of data analysis.

4.2.1 Description of the Sample

Most of the cotton farmers from the sample of the respondents were men. 85.1 percent of the cotton farms belonged to men; while 14.9 percent of them belonged to women. It was also determined that cotton farming is mostly carried out by fairly old farmers. Of all the farmers interviewed, 54.5 percent were above 45 years old, 24.8 percent were between 36 and 45 years old and 20.7 percent were between 18 to 35 years old.

The majority of the respondent farmers (69.3 percent) had acquired formal primary school education, 22.7 percent had gone through various stages in the non-formal adult education classes and 8 percent of the respondents were illiterate.

For the village extension workers from the survey area, 85.7 percent were men and a figure of 14.3 percent represented the women. 71.4 percent of the V.E.W.s had acquired formal education up to primary school level, 28.6 percent had gone through ordinary level secondary school education. The majority of the village extension workers (57.1 percent) had attended short courses in agriculture at Folk Development Colleges and 42.9 percent had acquired 2 year certificate courses in agriculture from the Ministry of Agriculture Training Institutes in the country.

Summaries of demographic facts about the respondent farmers and village extension workers are given in tables 3 and 5 respectively.

4.2.2 Results of the Descriptive Statistical Analysis

Here a description of the results of frequency distributions of the analysis of variables is given.

The farms were predominantly less than one hectare. 82 percent of the respondent farmers had farms which were less than one hectare. In computing outputs per hectare, the researcher noticed that farmers with smaller farms generally got more yields than the farmers with relatively larger farms. Farmers who had less than 1 hectare of cotton farms had an average output of 558.31 kg per hectare while farmers with 1 hectare and above, of cotton farms, harvested an average of 403.22 kg per hectare of cotton from their farms.

Measuring the efficiency with which the work of cotton growing is carried out by the farmers, the results show that all farmers in the sample used hand-hoes to plough their cotton farms; their means of transport to their farms from home and back was on foot. Even the farmers who had bicycles did not use them when going to work on their cotton farms. However, many farms were within manageable walking distances. 53.1 percent of the respondents had their cotton farms at a distance of less than one kilometer from their residences. 27.7 percent had their farms situated at a distance of about one kilometer and 18 percent of the respondents said that they had to walk for more than one kilometer from their homes to their cotton farms.

Variables which were measured so as to show the extent to which

cotton farmers in Ukerewe know and apply the technical package for cotton growing included: time of planting, method of planting, spacing, thinning of seedlings, use of manures and fertilizers, phases of fertilizer applications, spraying against insects, early harvesting, uprooting and burning old cotton plants after harvesting to prevent incidences of insect pests and diseases.

The results show that 36.6 percent of the respondents planted their cotton in November, 55.4 percent planted in December and 5.9 percent planted in January. The recommendation from Ukiriguru Research Centre for the W.C.G.A. is to plant two weeks either side of 1st December. So these results show that 5.9 percent of the respondent farmers were late to plant their cotton farms and 92 percent planted at the right time as recommended by Ukiriguru Research Centre. All respondents in the sample (100 percent) planted their cotton in rows. 79.2 percent of them followed the recommended spacing of 45 cm x 45 cm. All the respondents thinned their cotton seedlings at 3 weeks old, to two plants per stand, which is the recommended practice.

On the use of manure and fertilizers, the results show that 54.5 percent of the respondents use farm yard manure which they apply at planting time. 2.97 percent use artifical fertilizers and another 2.97 percent of the respondents use both farm yard manure, at planting time, and artifical fertilizers, at weeding time. For those who use fertilizers, 2 percent applied 2 bags of Sulphate of ammonia per hectare, 3.9 percent applied one bag of Sulphate of ammonia per hectare. 38.6 percent of the respondents neither applied farm yard manure nor inorganic fertilizers to their cotton plants. The

recommended practice is to apply 100 kg of Triple supper phosphate at planting time and 202 kg per hectare of Ammonium sulphate at weeding time.

Weeding of cotton farms was done two times, before harvesting, by all the respondents. The recommended practice is that weeds should be removed as soon as they make their first appearance.

With regards to spraying against insects; 17 percent of the respondents scored the recommended spraying regime of six times after flowering at an interval of two weeks. 2.97 percent sprayed four times, 5.94 percent sprayed three times, 16.8 percent sprayed two times and 10.9 percent sprayed once. 62.4 percent did not spray their cotton at all. Those who did not spray their cotton had different reasons for not spraying. 4.95 percent said that insecticides were out of stock when the farmers needed to spray their cotton. 13.86 percent said that the insecticides were very expensive and at that time farmers had no money. 31.68 percent responded that batteries were not available at the time when they wanted to spray their cotton. Another 13.86 percent of the respondents gave the reason that they failed to secure spraying equipments, i.e., the spraying pump and batteries.

On time of harvesting, results show that 31.7 percent of the respondents harvested half of their cotton early and 47.5 percent harvested all their cotton early and 20.8 percent were late in harvesting their cotton.

On the practice of sanitation which involves uprooting and burning cotton plants after harvesting, the results show that 91.1 percent of the respondents carried out that cultural practice within

the recommended time of not later than 15th September; 4 percent uprooted cotton plants after harvesting in November and 5 percent did not remember the time when they uprooted and burnt old cotton plants from their cotton farms.

Another variable measured was the means of transport which farmers use to carry their cotton to the buying posts. It was determined that 92.1 percent carry their cotton to the buying posts on their heads. 5.9 percent used bicycles and 1 percent used a lorry and the remaining 1 percent used a tractor trailer.

When the farmers deliver their cotton to Nyanza Co-operative Union, which is the sole buyer of cotton in the area, 77.2 percent respondents said that they were paid immediately, 11.9 percent said that they had to wait for about one month before they got paid for their cotton and 11 percent said that they waited for more than one month before they got their payments.

When the farmers were asked to give the reasons why they grew cotton; 96 percent said that they grew cotton because it was a means of earning them money, 1 percent said they grew cotton because the government forced them to do so and 3 percent said they grew cotton because it was important to the national economy.

Concerning contacts with village extension workers, 18.8 percent of the respondents owned to having had contacts with the V.E.W.s once in a year, while 16.8 percent were visited by a V.E.W. three times in a year. 22.8 percent received extension workers' advice four times in a year and 13.9 percent of the respondents met their respective village extension workers twelve times in a year. Of the remaining 27.7 percent of the farmers, 7.9 percent came into contact

with their village extension workers 24 times in a year while 19.8 percent said they had not been visited by any extension worker for the whole year.

Opinion indicators which were used to measure farmers' opinions about their village extension workers were contained in questions number 26 through 35. A summary of the results of farmers' opinions is given in table 2.

A summary of demographic facts about the respondent farmers in the survey area is given in table 3.

From the village extension workers' questionnaire, the results of their opinions about their organization and their clientele are presented in table 4.

On the procedure which is followed in formulating extension programme planning in Ukerewe district; extension workers in the survey area had mixed opinions. 42.9 percent said that extension programme plans were formulated by officers at the district head office and issued to village extension workers for implementation; 14.3 percent responded that every extension worker makes his or her own extension programme plan for the villages which he or she serves, while 42.9 percent replied that they prepared their extension programme plans in collaboration with villagers in their respective villages.

When the village extension workers were asked to give their opinions as to what they thought was the best strategy for promoting cotton production in Ukerewe, 14.3 percent said the government should open up cotton state farms; 71.4 percent responded that the government could promote increased cotton production if the producer

Table 2. Direction of Farmers' Opinions About Their Village Extension Workers (n = 101, Percentages in Parentheses)

Opinion Indicator	Response Sets** SD	D	U	A	SA
1. The V.E.W. works hard	1 (1)	5 (5)	12 (11.9)	57 (56.4)	26 (25.7)
2. V.E.W.s favour progressive farmers	28 (27.7)	56 (55.4)	14 (13.9)	3 (3)	0 (0)
3. V.E.W. assists all farmers in the village	3 (3)	6 (5.9)	14 (13.9)	62 (61.4)	16 (15.8)
4. V.E.W. spends most of the time drinking local brew	28 (27.7)	22 (21.8)	47 (46.5)	3 (3)	1 (1)
5. V.E.W. is diplomatic in his/her approach to farmers	1 (1)	17 (16.8)	73 (72.3)	10 (9.9)	0 (0)
6. V.E.W. spends most of the time working on his/her own farm	5 (5)	37 (36.6)	48 (47.5)	9 (8.9)	2 (2)
7. V.E.W. is competent in his/her work	1 (1)	11 (10.9)	79 (78.2)	10 (9.9)	0 (0)
8. V.E.W.s are assigned a lot of duties other than extension work *per se*	2 (2)	15 (14.9)	10 (9.9)	74 (73.3)	0 (0)
9. V.E.W. is helpful to farmers	3 (3)	2 (2)	11 (10.9)	69 (68.3)	16 (15.8)
10. V.E.W. has not helped the farmer in any of his problems	76 (75.2)	5 (5)	1 (1)	7 (6.9)	12 (11.9)

** SD = Strongly Disagree
D = Disagree
U = Undecided
A = Agree
SA = Strongly Agree

Table 3. Demographic Facts About Respondent Farmers in the Survey Area (n = 101)

Demographic Fact	Number	Percent
Female respondents	15	14.9
Male respondents	86	85.1
Young respondents (18-35 years old)	21	20.8
Mid-aged respondents (36-45 years old)	25	24.8
Old respondents (above 45 years old)	55	54.5
With formal primary school education	70	69.3
With stage IV adult education	8	7.9
With stage III adult education	5	5.0
With stage II adult education	8	7.9
With stage I adult education	2	2.0
Illiterate respondents	8	7.9

prices were raised; and 14.3 percent suggested that a combination of four strategies could be adopted simultaneously; namely: to open up state farms, to raise producer prices, textile firms to have their own farms and to encourage communal farms.

For the variables which were designed to measure village extension workers' knowledge about the technical packages, the results of data analysis show that all village extension workers know about all the recommended practices for the crop.

Demographic facts about village extension workers in the survey area included: level of formal education, professional training, specialization, inservice training, age and gender. These are summarized in table 5.

Table 4. Direction of V.E.W.s Opinions About Their Organization and Their Clientele (n = 7 Percentages in Parentheses)

Opinion Indicators	Response Sets** SD	D	U	A	SA
1. A V.E.W. has more duties than extension work *per se*	4 (57.1)	1 (14.3)	0 (0)	2 (28.6)	0 (0)
2. V.E.W.s are readily accessible to current information on cotton growing	0 (0)	1 (14.3)	0 (0)	3 (42.9)	3 (42.9)
3. There is a high ratio of V.E.W.: number of farmers	0 (0)	0 (0)	0 (0)	0 (0)	7 (10.0)
4. V.E.W.s are too lowly trained to do their job competently	3 (42.9)	0 (0)	0 (0)	1 (14.3)	3 (42.9)
5. There is good coordination of activities among change agents at village level	3 (42.9)	1 (14.3)	1 (14.3)	1 (14.3)	1 (14.3)
6. A lot of technical information is obtained by V.E.W.s at their District Monthly Meeting	0 (0)	1 (14.3)	0 (0)	1 (14.3)	5 (71.4)
7. Research information, on cotton, from Ukiriguru is readily available to V.E.W.s	6 (85.7)	1 (14.3)	0 (0)	0 (0)	0 (0)
8. Progressive farmers approach is better than the frontal approach	0 (0)	1 (14.3)	0 (0)	2 (28.6)	4 (57.1)
9. Village extension workers' activities come on *ad-hoc* basis	5 (71.4)	1 (14.3)	0 (0)	1 (14.3)	0 (0)
10. A V.E.W. does not need a calender of work	7 (10.0)	0 (0)	0 (0)	0 (0)	0 (0)
11. Working in villages is boring	6 (85.7)	0 (0)	1 (14.3)	0 (0)	0 (0)

Table 4 (Cont.)

Opinion Indicators	Response Sets** SD	D	U	A	SA
12. Farmers grow cotton willingly	4 (57.1)	2 (28.6)	0 (0)	0 (0)	1 (14.3)
13. Farmers are cooperative and friendly to their V.E.W.s	0 (0)	0 (0)	0 (0)	3 (42.9)	4 (57.1)
14. Farmers call for advice on cotton growing to V.E.W.	4 (57.1)	1 (14.3)	3 (0)	2 (28.6)	0 (0)
15. Farmers follow cotton extension worker's advice on cotton growing	2 (28.6)	2 (28.6)	0 (0)	1 (14.3)	2 (28.6)
16. Farmers in Ukerewe are forced to grow cotton	3 (42.9)	0 (0)	0 (0)	3 (42.9)	1 (14.3)

** SD = Strongly Disagree
D = Disagree
U = Undecided
A = Agree
SA = Strongly Agree

4.2.3 Results of the Inferential Statistical Procedures

Inferential statistical procedures were performed to analyze some of the data, so as to test the relationships which exist between the variables which were measured.

The Student's t-test, chi-square test for independence and the Pearsons' correlation coefficients were computed. The results of these statistical tests are presented in three sub-sections below:

4.2.3.1 Results of the Student's t-tests

Two hypotheses were tested using the Student's t-test. The first null hypothesis states that: There is no significant difference between yields of cotton per hectare as obtained by Ukiriguru and the

Table 5. Demographic Facts About V.E.W.s in the Survey Area (n = 7)

Demographic Fact	Number	Percentage
Primary school level education	5	71.4
Ordinary level secondary school education	2	28.6
2-year certificate course in agriculture	3	42.9
Short courses in agriculture at Folk Development Colleges	4	57.1
*Specialists in crop science	6	85.7
**Generalists	1	14.3
Attended one inservice training course	2	28.6
Attended two inservice training courses	1	14.3
Attended more than two inservice training courses	2	28.6
Females	1	14.3
Males	6	85.7

*V.E.W.s who received training in crop science only
**V.E.W.s who received training in both crop and animal sciences

yields which are obtained by cotton farmers in Ukerewe. The test was performed as follows:

$Ho = \mu = \bar{X}$ $\quad n = 101$

$HA = \mu > \bar{X}$ $\quad df = n - 1$

$\alpha = 0.05$ $\quad Sd = 359.0$

$$t = \frac{\mu - \bar{X}}{S\bar{x}} \quad \text{and} \quad S\bar{x} = \frac{S}{\sqrt{n}}$$

Where: Ho = The null hypotheses

HA = The alternative hypothesis

μ = The mean of cotton output as obtained by Ukiriguru Research Centre = 658.56 kg/ha

$\bar{X}$ = Sample mean of cotton outputs produced by farmers = 529.13 kg/ha

n = Sample size

$S\bar{x}$ = Standard error of the sample mean

α = Level of significance

df = Degrees of freedom

Sd = Standard deviation of the sample mean

$$t = \frac{658.56 - 529.13}{35.72} = 3.623$$

$$t_{0.05}^{100} = 1.9820$$

$t > t_{0.05}^{100}$ therefore since the test results in having a calculated t value that is greater than the tabulated t value; we reject the null hypothesis and conclude that there is a significant difference between the two means and that the two mean differences are not due to chance.

The second null hypothesis states that: There is no significant difference in cotton output obtained by farmers who have contacts with their respective village extension workers and the outputs obtained by farmers who have no contacts with village extension workers.

The student's t-test was performed as follows:

$Ho = \bar{X}_1 = \bar{X}_2$ $\quad n_1 = 81, \quad n_2 = 20$

$HA = \bar{X}_1 > \bar{X}_2$ $\quad df = n_1 + n_2 - 2$

$\alpha = 0.05$ $\quad S_1 = 371.66$

$S_2 = 196.96$

$$S\bar{x} = \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$$

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S\bar{x}}$$

Where: Ho = Null hypothesis

HA = Alternative hypothesis

$\bar{X}_1$ = Sample mean of cotton outputs by farmers with extension contact = 569.46

$\bar{X}_2$ = Sample mean of cotton outputs by farmers without extension contact = 321.30

df = Degrees of freedom

$S\bar{x}$ = Combined standard error of $\bar{X}_1$ and $\bar{X}_2$

S_1 = Standard deviation of $\bar{X}_1$

S_2 = Standard deviation of $\bar{X}_2$

n_1 = Sample size of farmers with extension contact

n_2 = Sample size of farmers without extension contact

$$S\bar{x} = \sqrt{\frac{(371.66)^2}{81} + \frac{(196.96)^2}{20}} = 60.37$$

$$t = \frac{569.46 - 321.30}{60.37} = 4.11$$

$$t_{0.05}^{100} = 1.982$$

$t > t_{0.05}^{100}$ i.e., the calculated t-value is greater than the tabulated t-value. Therefore we reject the Ho and conclude that there is a significant difference in cotton yields obtained by farmers who are in contact with their respective village extension workers and the yields which are obtained by farmers who have no interaction with their village extension workers.

The detailed lists of cotton outputs per hectare which are harvested by both farmers with extension contact and those without extension contact are attached as Appendix B.

4.2.3.2 Results of the Chi-Square Tests for Independence

The chi-square test for independence technique was used to test two hypotheses. Each of the two hypotheses was broken into a number of sub-hypotheses. The first of the two hypotheses states that: Farmers' opinions about cotton extension workers, in the survey area, are independent of their levels of education, age and gender. The sub-hypotheses were tested and the details of the results, from the computer printouts, are presented in the form of contigency tables and their respective calculated and tabulated chi-square values at 0.05 level of significance. The contingency tables are found in Appendix C, tables C1 to C22.

These chi-square tests for independence were performed so as to test the sub-hypotheses that farmers' opinions about their extension worker's:

(i) Commitment to work

(ii) Biasness towards progressive farmers

(iii) Tendency towards drunkenness

(iv) Diplomatic approach to their clientele

(v) Utilization of working hours

(vi) Competence

(vii) Overloaded with extra duties other than extension work *per se*, and

(viii) Being of any help to their clientele; are independent of their level of education, age and gender.

Results of the chi-square tests for independence revealed that farmers' opinions towards their extension workers commitment to work, biasness for progressive farmers, competence and their being of any

help to their clientele are independent of the farmer's gender. The chi-square tests on these opinion indicators were significant at the chosen level of significance of 0.05; and so the null sub-hypotheses were rejected in favour of the alternative sub-hypotheses for dependence.

The farmers' opinions towards their extension workers' tendency for drunkenness, diplomatic approach to their clientele, utilization of their working hours, being overloaded with extra duties other than extension work per se were determined through the tests, to be not significant. So the researcher failed to reject the null sub-hypotheses for independence on these opinion indicators, and concluded that farmers' opinions towards these indicators are independent of their gender.

On the other hand, farmers' opinions towards their extension workers' commitment to work, biasness for progressive farmers, competence in their work and whether extension workers are of any help to farmers were determined through the chi-square tests for independence, as shown in Appendix C, tables C16, C17, C21 and C23 respectively, to be significant at the chosen level of significance of $\alpha = 0.05$. So the null sub-hypotheses were rejected in favour of their alternatives that the farmers! opinions on these opinion indicators were dependent of their gender.

The results of the chi-square tests for independence show that, for all the opinion indicators which were used to test the sub-hypotheses, farmers' opinions are independent of their levels of education and age, because all of them were not significant at the chosen level of significance of $\alpha = 0.05$.

The second hypothesis states that: Extension workers' opinions about cotton growers in Ukerewe are independent of their level of training, age and gender. This hypothesis was also broken into a number of sub-hypotheses. The sub-hypotheses were tested through the computer utilizing the chi-square test for independence. Details of the tests are presented in Appendix D, tables D1 to D20.

The chi-square tests for independence which were performed tested the sub-hypotheses that: Extension workers' opinions towards their clienteles': (i) Willingness to grow cotton; (ii) Friendliness to extension workers; (iii) Initiative to seek extension advice; (iv) Ability to follow extension advice; and (v) Perception that the government forces them to grow cotton, are independent of the extension workers' level of training, age and gender.

The results of five sub-hypotheses which were tested against village extension workers' level of professional training, number of inservice training courses which the village extension workers had attended, age and gender; revealed that: extension workers' opinions about their clienteles' perception that the government forces them to grow cotton, and initiative to seek extension advice are dependent on their age and gender respectively. The chi-square test on those two opinion indicators were significant. These results are shown in tables D15 and D18 in Appendix D.

The chi-square test for independence were not significant on the other opinion indicators. In other words, extension workers' opinions about their clienteles' willingness to grow cotton, friendliness to V.E.W.s and ability to follow extension advice, are independent of the extension workers' level of training, number of

inservice courses attended, age and gender. These are shown in tables D1 to D14, D16, D17, D19 and D20 in Appendix D.

4.2.3.3 Results of the Nonparametric Correlation Between Variables

In order to determine the direction and magnitude of association between variables, Pearson correlation coefficients were calculated. A total number of 78 pairs of variables were run through the computer to determine the direction and magnitude of association which exists between them.

The results indicated that, of the seventy eight pairs of variables, ten evinced meaningful correlations between them. The direction and magnitude of the correlations between these pairs are presented in Table 6.

Table 6. Pearson Correlation Coefficients Between Pairs of Variables ($n = 101, \alpha \leq 0.05$)

Variable pairs	Pearson (r)	Significance
Farm size with use of fertilizers	0.18*	0.03
Farm size with extension contact	-0.12	0.10
Distance with use of fertilizers	0.23*	0.01
Distance with sanitation	-0.14	0.07
Early planting with crop rotation	0.21*	0.01
Use of fertilizers with spraying	0.13	0.10
Use of fertilizers with early harvesting	-0.20*	0.02
Spraying with crop rotation	0.13	0.11
Early harvesting with age	0.15	0.06
Literacy with age	-0.25*	0.0

* = Significant at $\alpha \leq 0.05$.

4.3 Interpretations

4.3.1 Interpretations from the Descriptive Analysis

The results show that farmers had very small farms. Only 9.9 percent of the respondents had an average farm size of 0.8 hectare under cotton. This is the minimum requirement in Ukerewe district. Those who surpassed the minimum requirement represented only 5.94 percent of all respondents. The remaining 84.16 percent had cotton farms ranging between 0.1 to 0.8 hectare. Three types of interpretations could be made out of this situation. One possibility is that farmers are not willing to grow cotton because it is very laborious and the producer prices are not very attractive. Another possible reason is that there is not enough land for the farmers to expand their farms. The third possibility could be that farmers are constrained by inefficient farming tools and/or labour shortages. The latter interpretation is reinforced by the fact that all the respondents reported using hand-hoes to plough their cotton farms. Considering that all farmers used hand-hoes to plough their cotton farms and that walking on foot to and from their homes to their cotton farms was the only form of transport, one can say that the efficiency with which cotton farming is carried on in the survey area is low. The lack of transport facilities could be one of the factors which contribute to the farmers' failure to use farm yard manure on their cotton farms because they find it difficult to carry the manure on their heads. One could speculate further that under the constraints which prevail in the survey area, attempts to mechanize cotton production could be almost impossible. This is true because agricultural mechanization is facilitated by modern and efficient

means of communications and labour supply.

For the technical packages, it was determined that 2.97 percent of the respondents use inorganic fertilizers. The small percentage of respondents who applied inorganic fertilizers to their cotton farms could be due to the unsubsidized high costs of fertilizers in Ukerewe district. At the time the survey was being conducted, the prices for 50 kg bags of sulphate of ammonia, C.A.N., urea and T.S.P. were T.Shs.410.00, T.Shs.375.00, T.Shs.460.00 and T.Shs.535.00, respectively. There were no credit facilities for cotton farmers in Ukerewe. So this could have compounded the farmers' inability to cope with the high prices of fertilizers.

Similar interpretations could be extended to the low percentage of farmers who sprayed their cotton against insect pests and diseases. The chemicals and spraying equipment were reported by the respondents to be very expensive for them. To complicate matters, the expenditures for fertilizers, insecticides and sprayers were called for at a season when farmers have nothing to sell to the market so as to get the money required to meet these disbursements. In this regard, one could see the rationale of providing the inputs to farmers on credit on the understanding that they pay back when marketing their cotton after harvesting.

A different story emerged regarding adhering to recommendations which did not need spending money. A high percentage of the farmers adhered to such recommendations. This means that if their economic constraints were solved, more farmers could implement fully the technical packages for cotton growing in the survey area.

As far as marketing of cotton is concerned, all cotton that is

grown in the survey area is sold to Nyanza Co-operative Union through its primary societies. The societies have buying centres in every village. Farmers from 20 villages, out of the 22 villages where the survey was conducted, were paid their money immediately after delivering their cotton to these buying centres. The move by Nyanza Co-operative Union to pay farmers as soon as they delivered their cotton to their primary societies could be regarded as an incentive for the farmers to continue growing the crop which is very important to the economy of Tanzania.

The interactions between cotton farmers and their village extension workers were favourably high. Only 20 percent of the respondents reported that they had no face-to-face contacts with their village extension workers for the whole year. The remaining 80 percent of respondents had face-to-face contacts with their respective village extension workers, ranging from 2 to 24 contacts in a year. This high percentage in extension contacts means that extension workers in the survey area performed their work well in rendering extension services to their clientele, despite the facts that they had poor means of transport, living conditions and lacked working tools.

This good performance of village extension workers is also reflected in the farmers' opinion about their extension workers. Data in table 2 indicate that all the positive opinion indicators about the extension workers rated high in farmer respondents agreement with them. The negative opinion indicators about village extension workers had high percentage rates of disagreements. This could imply that farmers in the survey area had enough confidence in

their extension workers and that village extension workers have created good working relationships and rapport with their clientele.

One observation revealed that cotton farming in the survey area is undertaken mostly by old farmers. 54.5 percent of the cotton farmers in the sample were above 45 years of age. This means that peasants in the survey area have a tendency to postpone going into cotton farming until they have passed the middle-age stage. The reason behind this phenomenon could be that older farmers have larger families from which they get family labour to work on cotton farms, for the crop is known to be labour intensive. The young farmers normaly have smaller families, a fact which may probably explain why such farmers in the survey area postponed cotton growing until later.

The responses of village extension workers on their work, imply that they have a negative outlook about their organization. They feel that: (a) their organization does not furnish them with current information about cotton growing, (b) they have too many farmers to work with, (c) there is no proper coordination of activities among change agents in the villages, and (d) research reports on cotton growing, from Ukiriguru are not available to them. This state of affairs leads to the interpretation that village extension workers in the survey area have a negative outlook about their organization. Some of these constraints have been observed elsewhere; for example Kauzeni (1987) observed that there were only 5,600 extension workers of all levels in Tanzania. About 72 percent of these, i.e., 4,032 are village extension workers. This figure conveys the message that village extension workers in Tanzania have too many farmers to work with. Because this factor has been reported by village extension

workers in the survey area as one of the factors which contribute to the V.E.W.s' negative attitude towards their organization, it may be assumed that village extension workers elsewhere in the country feel the same way as their counterparts in the survey area.

There was variation in the village extension workers' opinions about their clientele. Some held positive attitudes while others held negative attitudes about their clientele. This means that village extension workers perceptions about their clientele are not uniform. The reason for this observation could be due to the gap in educational levels of the village extension workers. While 42.9 percent had acquired ordinary level secondary school education with two years certificate training courses in agriculture, 57.1 percent had gone through primary school level education with short courses in agriculture in folk development colleges. This discrepancy in academic qualifications may have introduced differences in their abilities to perceive and reflect on phenomena and hence the variation in their attitudes towards their clientele.

Different responses were also given by the village extension workers on how extension programme plans were formulated in Ukerewe. This could simply mean that there is no clearly stated and established uniform procedure which is followed in formulating extension programme plans in Ukerewe district.

The results of data analysis about village extension workers' understanding of the technical package for cotton growing indicate that all of them were conversant with the contents of the package. This means that given proper working conditions they have the potential for rendering the right extension service, to their clientele, on

cotton farming in their respective villages.

Regarding the demographic facts about village extension workers, it can be said that, the implementation of the Tanzania agricultural policy, which was adopted in 1983, leaves much to be desired. Many of the village extension workers (57.1 percent) do not qualify to be employed as village extension workers; because according to the Agricultural Policy of Tanzania (1983:18) one has to be a certificate holder in agriculture after completing ordinary level secondary school education. As for the observation that village extension workers were predominantly males, this came as no surprise; because the ratio of boys to girls in Tanzanian secondary schools is always not equal. More boys go to secondary school than the girls in this country.

The large percentage of village extension workers holding short courses from folk development colleges and the small percentage of their attendance of inservice training courses mean that village extension workers at least in the survey area had meager opportunities to advance in the academic arena. Generalization of this finding can be assumed as evidence put forward elsewhere indicates (Lupanga, 1986:247).

4.3.2 Interpretations from the Inferential Analysis

In the first place a Student t-test was performed to determine whether there existed any significant difference between the mean of cotton output which is obtained by Ukiriguru research centre and that which farmers harvest in the survey area. The results, which led to the rejection of this null hypothesis is in favour of the alternative hypothesis, meaning that the gap which existed between the two means

was a real one, and was not due to chance. While it is said that the yields of cotton by farmers could be 658.56 kg per hectare if they followed the contents of the technical package for cotton growing, the respondent farmers in the survey area managed to harvest an average of 529.13 kg per hectare of seed cotton. There was a significant gap of 129.42 kg per hectare.

While it is required to follow all the recommendations stipulated in the technical package for cotton growing; most of the respondents failed to apply any fertilizers or manures to their cotton plants. A large percentage of them did not spray their cotton against insect pests and diseases. These could be the main technical factors which contributed to the existence of a significant difference in the gap between the two means.

The other null hypothesis, which was tested using the Student t-test technique, states that there is no significant different in cotton output obtained by farmers who have contacts with their respective village extension workers and the outputs obtained by farmers who have no contacts with any village extension workers. This null hypothesis was also rejected in favour of its alternative. This means that farmers from the survey area who had contacts with their respective village extension workers, harvested significantly more cotton than their counterparts who had no contacts with any village extension worker. The differences in the two means were real and they did not come by chance. This means that ceteris paribus, extension workers' contacts with their clientele have a significant effect on the productivity of farmers at least in the survey area. Generalization of this finding can be assumed as evidence adduced

elsewhere indicates. According to Von Freyhold (1975:243), extension workers' contacts with farmers had very impressive results on tea production in Rungwe district. De Vries (1978:189) contends that new farming practices and other proposed changes can be achieved through groups of farmers coming in contact with their frontline extension workers. Kauzeni (1979:181) observed that extension contacts through group based agricultural extension methods had a signficant increase in incomes per hectare of his respondent farmers in the Coast region of Tanzania. These extension contacts were based on demonstrations and formal scheduled group discussions between village extension workers and their clientele.

Two other hypotheses were tested using the chi-square test for independence technique. Some of the opinion indicators for both farmers' opinions twards their village extension workers and the village extension workers' opinions towards their clientele were determined to be dependent on age and gender. The levels of education by respondent farmers, village extension workers and the level of training and amount of inservice training by village extension workers were found to be independent on all the opinion indicators for both groups of respondents. This could probably be due to the fact that there were small variations in the demographic characteristics among the respondents within each group.

Regarding the correlations between the ten pairs of variables identified above, the following interpretations can be offered:

1. The correlation coefficient between farm size and use of fertilizers had a value of 0.18. This means that the use of fertilizers and size of farms had a positive correlation, i.e.,

farmers with larger farms used more fertilizers. In other words farmers with smaller farms use less fertilizers. This is so because a farmer with a larger farm would need more fertilizers than one who has a smaller farm.

2. The variables farm size and extension contact had a correlation coefficient of -0.12. The negative correlation between this pair of variables means that farmers with large farms tend to have less extension contacts. This could be due to the fact that farmers with large farms continue to maintain their farms in the places where they used to live before they were required to move into ujamaa villages in 1976. These farms are normally more than one kilometer away from the villages. This could have been the reason why the farmers with large farms had less extension contacts because, constrained with transport problems, the village extension workers would tend to visit farmers whose farms were near the villages. The farmers with smaller farms had a tendency to have more interactions with their village extension workers. This could probably be one of the reasons why cotton yields were relatively higher from smaller farms than those from the larger farms.

There was a positive correlation coefficient of 0.23 for the pair of variables: distance with use of fertilizers. This means that as distance from the farmers' homes to their farms increased, the consumption of fertilizers also increased. This can be further interpreted that those farmers whose cotton farms are far from their homes had a tendency to consume more fertilizers than the farmers

whose farms were near their homes. Although one could expect farmers whose farms were near their homes to use more fertilizers, because of the convenience of carrying the fertilizers to the farms, the results were contrary to this expectation. The reason for these results being so could be that farmers with large farms had their farms normally far away from the villages and consumption of fertilizers is positively correlated with farm sizes. That could have been the reason why farmers whose cotton farms were far from their homes tended to consume more fertilizers than the farmers whose farms were near their homes. On the other hand, there was a negative correlation coefficient of -0.14 when distance was correlated with sanitation. This means that farmers who had to walk for longer distances to their cotton farms did not uproot and burn old cotton plants in time after harvesting. This could have been so for convenience reasons. It requires more time and efforts to go to work in a distant place than it is the case when the farm is near to the farmer's home.

The interpretation that old farmers harvest their cotton earlier than middle-aged and young farmers was arrived at when a positive correlation coefficient of 0.15 was indicated by the variables early harvesting with age. The reason for this could also be, as it has been said earlier, that older farmers normally have larger families so that they have enough family labour to enable them to harvest their cotton as soon as it is ready.

Finally the finding that younger farmers had more education than older farmers was confirmed by the negative correlation coefficient of -0.25 when literacy was correlated with age. This is probably

because in the past, especially before independence, there were less schools in Tanzania than is the case after independence. So young farmers have had more chances of going to school than their older counterparts.

CHAPTER -V

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

The average yield of cotton in the survey area was found to be 529.13 kilograms per hectare. Saylor (1975:389) reported that on average, farmers in the W.C.G.A. could get yields ranging from a low of 371.84 to a high of 658.56 kg/ha. So farmers' average yields in the survey area were far above the minimum level although the maximum level was higher than the mean output obtained by them. The difference was statistically significant.

Omari (1984:172) reported different yields of cotton from different countries. For Africa he observed outputs of 269.6 kg/ha; for Asia 272.16 kg/ha; Eastern Europe 331.5 kg/ha; North America 536.48 kg/ha and Western Europe 722.4 kg/ha. From the tropics, Gibbon (1958:56) reported average yields of cotton ranging from a low of 100 kg/ha to a high of 220 kg/ha. Thus, it can be seen that the mean yield of cotton in the survey area is surpassed only by those of North America and Western Europe.

The researcher was not very surprised by these results, because farmers in the survey area were observed to follow most of the recommended practices; except for those practices which required the farmers to have some capital to buy the chemicals, spraying equipment, fertilizers and means of transport. Those other contents of the package which did not need any financial disbursements were implemented very well. Regarding plant population, Hulls (1975), Saylor (1975) observed that low average plant population per hectare was a serious factor which contributed to a reduction of yields per hectare from a

high of 212.8 kg/ha to a low of 139.5 kg/ha. This was not the case in Ukerewe. Farmers in Ukerewe follow closely the recommended spacing of 0.45 m x 0.45 m planting in two rows on each ridge. This enables farmers in the survey area to have 98,765 plants per hectare. This plant population is about 2.87 times more than that which farmers in Shinyanga and Mwanza regions were reported to have planted on their cotton farms.

Lack of proper extension programme planning, a large number of clients per extension worker, poorly trained village extension workers were identified as some of the technical factors which could be responsible for low cotton outputs per unit area in the survey area. These findings conform with what Lupanga (1986:30) and Cliff (1968) observed from their respective studies.

The village extension workers in the survey area were identified as junior agricultural assistants who are not well trained. Out of the 7 village extension workers from the survey area, 4 had attended short courses in agriculture, at Folk Development Centres after completing their primary school education. Three of them had 2-year certificate course after they had completed their ordinary level secondary school education or its equivalent. One of the three village extension workers was selected to take the two-year certificate course after passing her ordinary level secondary school as a private candidate.

Given a choice between the frontal and progressive approaches to extension, six of the seven extension workers chose the progressive approach as the most suitable in their area. In Tanzania, the formally accepted policy is for the extension workers to follow

the frontal approach.

These findings more or less correspond with what Leonard (1975: 198) observed in Kenya, where the junior agricultural assistants who are not well trained are entrusted with the responsibility of communicating technical knowledge to the farmers. Tney were prone to concenirate their efforts on progressive farmers.

Although the village extension workers in the survey area responded that they would prefer to concentrate their efforts on progressive farmers, results show that this was not put in practice, because it was observed that only 19 percent of the farmers missed extension contacts. The majority of the respondents, 91 percent, had received extension services in a face-to-face contact with their respective village extension workers. So despite the fact that village extension workers were convinced that the progressive farmers approach was better, in practice they adopted the frontal approach.

While Percy (1975:253), De Vries (1978) and Mmbaga (1983:23) observed that farmers in Morogoro region perceive cotton growing as something the government wants rather than as a means of earning them money to buy their requirements; the researcher observed a different situation in Ukerewe. Two questions were posed to try to find out farmers perceptions about this issue in the survey area. One of the questions directly wanted the farmers to indicate if the government forced them to grow cotton. Only 1 percent of the farmers said that they were forced to grow cotton, 3 percent replied that they grew cotton because they understood that it was an important crop to the national economy and 69 percent said they decided freely to grow cotton because it was a means of earning them money.

In another question, a list of five crops were listed including cotton and farmers were asked to indicate in order of priority which crops they prefered most. The results show that 45.5 percent of the respondents indicated cotton growing as their first priority, 29.7 percent indicated cotton as their second priority, 15.8 percent rated cotton as a third priority and 8.9 percent did not want to grow cotton at all. These two sets of results indicate that farmers in the survey area grow cotton of their own free will.

Village extension workers from the survey area were also asked to indicate whether farmers perceived cotton growing as something which the government imposed on them without their will. 32.9 percent of them indicated that farmers grow cotton willingly while 67.1 percent responded that farmers in their respective villages were forced to grow cotton. While the majority of village extension workers had indicated that some kind of force is applied to encourage farmers to grow cotton, the farmers themselves responded that they grew cotton willingly as a means of earning money and not because they were forced by the government to do so.

This contradiction in responses between the village extension workers and their clientele could be explained in terms of what Blalock (1982:45) pointed out to be the weakness of questionnaires. Researchers cannot prove whether the respondents will tell them how they really feel and think. The respondents may decide to tell researchers what they consider to be socially accepted answers. The farmers might have responded differently from their village extension workers in order to give to the researcher what they thought was the socially approved response and not what they really felt was the true

situation.

5.2 Conclusions

In order to tie up all the aspects which were covered in this study, the following conclusions were made:

1. Cotton farming in the survey area is practiced on a small scale basis. The farm sizes are predominantly less than one hectare for most of the farmers.
2. Farmers in the survey area use hand-hoes as their only means of cultivation. This is the most rudimentary and primitive means of cultivation.
3. Economic constraints prevent farmers from practicing some of the recommendations which constitute the technical package for cotton growing. Most farmers implement well those recommendations which do not call for financial disbursements.
4. The efficiency with which cotton farming can be done, is constrained by a lack of transportation facilities.
5. The marketing system for cotton in the survey area is satisfactory. There is a cotton buying centre in every village and payments, except in a few and exceptional cases, are effected immediately when the farmers bring their cotton to these centres for sale.
6. Farmers with smaller farms harvest more cotton per unit area than their counterparts who have larger farms.
7. It was not clearly ascertained whether farmers in the survey area grow cotton of their own will or some force is exercised by the government to encourage them to go into cotton farming.

The farmers and village extension workers differed on this point.

8. There is a satisfactory interaction in the form of face-to-face contacts between farmers and their respective village extension workers in the survey area.
9. There is very little variation, among farmers in the survey area, in terms of their demographic characteristics.
10. Cotton growers in the survey area have a positive attitude towards their village extension workers. The village extension workers on the other hand, have different opinions about their clientele. On one extreme there are those who have a negative attitude towards their clientele and on the other extreme there are those who have a positive attitude towards their clientele.
11. The village extension workers portray a negative outlook towards their organization, especially in providing them with a conducive working environment.
12. There is no commonly established and accepted procedure by which extension programme plans are formulated in the district.
13. The village extension workers are conversant with the contents of the technical package for cotton growing. Given a proper conducive working environment, they have the potential for offering the right extension advice on cotton farming to their clientele.
14. Raising the producer prices and opening up cotton state farms are considered to be the best strategies for promoting increased cotton production in the survey area.
15. The technical package for cotton growing is based on blanket

recommendations because it is not re-inforced by any field trials at the local level in the survey area.

5.3 Recommendations

In considering to eliminate the technical constraints which confound cotton production in the survey area, the following recommendations are drawn up:

1. One mechanization center could be established in the survey area. This will enable farmers to hire tractors to plough and harrow their farms thus removing the burden and drudgery which is associated with the use of the hand-hoe. This mechanization will increase cotton output.
2. Wheelbarrows are very important in the transportation of farm yard manure and cotton from the fields and to the buying centres. At the time this survey was conducted, there were very many wheelbarrows in the Nyanza Co-operative Union shops, but their prices were prohibitive to the farmers. A subsidy on the prices of wheelbarrows could be of great help to the peasants in the district.
3. Due to the fact that farmers do not have a continuous and steady source of income throughout the year, it so happens that at the time when they need to buy inputs, they do not have money for marketing season is not ready. It is therefore recommended that there should be a provision for credit facilities to enable farmers to buy fertilizers, chemicals and spraying equipment. It is very easy to do this and recover the money during the marketing season because all cotton is sold through a monopoly, the Nyanza Co-operative Union and all

cotton farmers have membership cards.

4. The Nyanza Co-operative Union should improve the safety facilities at its buying centres in the villages, and employ faithful cashiers, so as to prevent loss of money through thefts which cause delayed payments to the farmers.
5. The district headquarters should device a system of formulating extension programme plans, which will involve both village extension workers and their clientele.
6. As a strategy for increasing cotton production, the government should attract farmers to grow more cotton by raising producer prices and subsidizing the prices of inputs. It is also recommended that the government should open up its own cotton state farms as is the case with some other crops like rice, wheat, tea, coffee etc.
7. Although village extension workers are conversant with the contents of the technical package for cotton growing, they should be furnished with current technical information, especially the research findings from Ukiriguru research centre. They should as well be afforded the opportunity for further training. Inservice training courses could serve a very good purpose in this regard.
8. When rendering extension services in the survey area, village extension workers should be aware of the fact that their clients' opinions about some phenomena are influenced by age and gender, so that these demographic characteristics should be taken into consideration when trying to introduce new innovations.

9. More emphasis on literacy campaigns should be placed on the older members of the society in the survey area because it was this group of respondents who were identified to have many illiterate people. The campaigns should be supplemented by a special programme to solve eyesight problems which prevent some of the members from taking part in adult education classes.

5.4 Suggestions for Further Research

Four areas of further research are suggested. They could be conducted at district, divisional, sub-divisional or village levels, depending on the situation of the researcher in terms of time, manpower and financial resources available to him or her.

1. The feasibility of providing credit facilities to cotton farmers in Ukerewe. This study would identify whether it is feasible or not to provide credit facilities to cotton growers.
2. Another area of interest would be to carry out an evaluation study so as to determine the efficacy with which the Tanzania Agricultural Policy is implemented at district level.
3. The third area of study would be to identify the factors that work against effective agricultural extension services and suggest ways of removing them.
4. Finally a study on the socio-economic factors which influence cotton growing in Ukerewe district would be another area for further research. This study could identify the social and economic factors which act for and against increased cotton production in Ukerewe district.

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Appendix A

MEASURING INSTRUMENTS

A.I Questionnaire which was Administered to Cotton Farmers in the Survey Area

1. What is the size of your cotton farm?

____ 1. Less than one ha = _____ ha
____ 2. One ha = _____ ha
____ 3. Two ha = _____ ha
____ 4. More than two ha = _____ ha

2. What instruments do you use when ploughing your cotton farm before planting?

____ 1. Tractor plough
____ 2. Hand-hoe
____ 3. Ox-plough

3. How much time does it take you to finish ploughing your cotton farm using the implement you mentioned above?

____ 1, Tractor plough ____ days
____ 2. Hand-hoe ____ days
____ 3. Ox-plough ____ days

4. How far is it from here (at the respondent's home) to your cotton farm?

____ 1. Less than one km
____ 2. About one km
____ 3. More than one km

5. What means of transportation do you use when going to work on your cotton farm?

____ 1. A bicycle
____ 2. Walk on foot
____ 3. Board a bus

6. When did you finish planting your cotton this season (1986/87)?

____ 1. November
____ 2. December
____ 3. January
____ 4. February

7. Which of the following planting methods did you use this season (1986/87)?

____ 1. Broadcasting
____ 2. Row planting

8. If planted in rows, which spacing did you use?

____ 1. 45 cm x 45 cm
____ 2. 37.5 cm x 90 cm
____ 3. 45 cm x 90 cm
____ 4. None of the above
____ 5. Specify ____ cm x ____ cm

9. If planting was done in rows, did you do any thinning after seed germination?

____ 1. Yes
____ 2. No

10. If yes in 9 above, how many seedlings per stand did you leave?

____ 1. One seedling per stand
____ 2. Two seedlings per stand
____ 3. Three seedlings per stand
____ 4. More than three seedlings per stand

11. What type of fertilizers did you apply to your cotton plants?

____ 1. Farm yard manure
____ 2. Artificial fertilizers
____ 3. Did not apply any fertilizers
____ 4. Fertilizers + farm yard manure

12. If applied artificial fertilizers, how many bags did you use for your cotton farm?

____ 1. One bag
____ 2. Three bags
____ 3. Four bags
____ 4. Two bags
____ 5. Five bags
____ 6. Six bags
____ 7. None

13. How many applications did you make?

____ 1. Two applications (at planting + weeding time)
____ 2. One application (at planting time)
____ 3. One application (at weeding time)
____ 4. None

14. How many times did you spray your cotton against insects.

____ 1. Once
____ 2. Twice
____ 3. Thrice
____ 4. Did not spray at all
____ 5. Five times
____ 6. Six times
____ 7. More than six times

15. If 14 (4) above applies; what were the reasons for not spraying?

____ 1. Insecticides were not available
____ 2. Insecticides were very expensive
____ 3. Batteries were not available
____ 4. Spraying pump/machine not available
____ 5. I sprayed my cotton

16. How much of your cotton did you sell within the first two weeks, to secure the =/50 cents bonus from cotton sold within the first two weeks of the marketing season?

____ 1. Sold half of my cotton within that period
____ 2. Sold all my AR cotton within that period
____ 3. Did not sell any of my cotton during the first two weeks of the marketing season

17. Can you remember the dates when you finished burning old cotton plant stalks from your cotton field?

____ 1. Mid-December
____ 2. Mid-November
____ 3. Can't remember
____ 4. Mid-September

18. By what means do you transport your cotton to the buying post?

____ 1. Ox-cart
____ 2. Tractor trailer
____ 3. My bicycle
____ 4. Carry on head
____ 5. Hire a lorry
____ 6. Use a wheel-barrow

19. After delivering your cotton to the Co-operative Society, at the buying post, for how long does it take you before you get paid?

____ 1. Payment is done immediately
____ 2. I have to wait payment for one month
____ 3. It takes more than one month before payment is made

20. How much cotton did you sell from your cotton farm in 1986?

_____ kg.

21. Suppose the government wanted Ukerewe district to specialize in three crops only. Which three crops would you prefer among the following list of crops? (Rank the three most preferred crops as 1, 2 and 3)

____ 1. Cassava
____ 2. Cotton
____ 3. Fruits and vegetables
____ 4. Rice
____ 5. Sweet potatoes

22. For how many years have you planted cotton on your present cotton field?

____ 1. More than ten years continuously
____ 2. Planted it with cotton continuously for the past five years
____ 3. Plant a different alternative crop after every other year

23. In your opinion what do you think is the reason why farmers in Ukerewe grow cotton?

____ 1. It is a means of earning money
____ 2. It is required by law
____ 3. It is important for the national economy
____ 4. It is interesting to grow the crop

24. Do you know the name of your V.E.W.?

____ 1. Yes
____ 2. No

25. How often did the V.E.W. visit you last year?

____ 1. One visit during the year
____ 2. One visit every month during the year
____ 3. Two visits during the year
____ 4. Three visits during the year
____ 5. Two visits every month during the year

Directions: Each of the following items is a statement about the qualities which your V.E.W. may have. Respond to each statement in terms of how you disagree or agree with each statement. If you strongly disagree with the statement write "1" on the line infront of the statement. If you strongly agree write "5" on the line use any number from 1 to 5. There are no wrong and right answers. Use the following scale to respond to each item:-

1	2	3	4	5
Strongly disagree	Disagree	Undecided	Agree	Strongly Agree

The V.E.W. in my village:-

____ 26. Works very hard
____ 27. Likes to work with rich farmers only
____ 28. Likes to visit all farmers in the village
____ 29. Spends most of the time drinking local beer
____ 30. Is friendly to the farmers
____ 31. Spends most of the time on his/her own farm
____ 32. Very competent with his work
____ 33. Involved in too many activities other than extension work per se
____ 34. Of much help to farmers
____ 35. Never helped me in any of my farming problems

36. Which of the following stages have you gone through the adult education literacy campaigns?

____ 1. Stage IV

____ 2. Stage III
____ 3. Stage II
____ 4. Stage I
____ 5. Illiterate
____ 6. Formal Primary School education

37. What is your age?

____ 1. Between 18-35 years old
____ 2. Between 36-45 years old
____ 3. Above 45 years old

38. Can you please give me any information on technical factors related to cotton farming which you think we did not cover in our talk

_____

_____

_____

_____

39. If you wish, please ask me any questions that you have about what we have been talking.

_____

_____

_____

_____

40. Gender

____ 1. Female
____ 2. Male

THANK YOU VERY MUCH FOR YOUR COOPERATION

Date ..... Time ..... When the interview was conducted.

A.II Questionnaire which was Administered to Village Extension Workers in the Survey Area

Directions: Each of the following items is a statement about technical factors which may affect cotton growing in Ukerewe. Respond to each statement in terms of how you disagree or agree with the statement. If you strongly disagree with the statement write "1" on the line in front of the statement. If you strongly agree, write "5" on the line. Use any number from 1 to 5. There

are no wrong or right answers. Use the following scale to respond to each item:-

1	2	3	4	5
Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

____ 1. A V.E.W. has too many duties other than agricultural extension per se

____ 2. Sources of current information about cotton production is not a problem for me as a V.E.W.

____ 3. As a V.E.W. I have too many farmers to work with.

____ 4. The training that I have in agriculture is not enough to allow me perform the duties, of advicing cotton farmers properly.

____ 5. There is a good co-ordination of activities by different change agents at village level.

____ 6. At the monthly meetings held at district level, I normally gain a lot of technical information on agriculture.

____ 7. Reports on research findings on cotton growing from Ukiriguru are readily available to V.E.W. in Ukerewe.

____ 8. Experience has shown that it is better to concentrate extension efforts to the progressive farmers than spreading them to all farmers.

____ 9. Most of the activities of a V.E.W. come on ad-hoc basis.

____ 10. For a V.E.W. it is not necessary to have a calendar of work.

____ 11. Working in villages is not good because life is dull and monotonous.

____ 12. Cotton farmers in Ukerewe are interested in growing the crop.

____ 13. Cotton farmers whom I work with are friendly to me.

____ 14. Many cotton farmers call at my house/office for advice on how to grow cotton.

____ 15. Cotton farmers adopt what I tell them to do with respect to cotton growing.

____ 16. Compulsion is the method which is used by the government to make farmers grow cotton in Ukerewe.

Directions: Please answer the following questions. Place a check (_/) by the response which best describes your situation.

17. What is the procedure that is used in Ukerewe district with respect to extension programme formulation?

____ 1. Programmes are prepared at the district and distributed to V.E.W.s
____ 2. Each V.E.W. develops his/her own programme.
____ 3. Village extension programmes are prepared by village extension workers in collaboration with cotton farmers.
____ 4. Village extension workers do not follow particular programmes which are prepared in advance.

18. Which approach do you think could be the best one in promoting increased cotton production?

____ 1. To open up large scale cotton state farms
____ 2. To raise producer prices for small farmers
____ 3. Textile firms to operate their own farms
____ 4. To encourage village communal cotton farms
____ 5. To combine all 1-4 alternatives above

19. What do you consider to be the optimum time for cotton planting in Ukerewe?

____ 1. November to December
____ 2. Two weeks before November
____ 3. Last two weeks of December
____ 4. January to February

20. What is the optimum spacing of cotton plants in Ukerewe district?

____ 1. 45 cm x 45 cm
____ 2. 37.5 cm x 90 cm
____ 3. 45 cm x 90 cm
____ 4. None of the above
____ 5. Specify _____ cm x _____ cm

21. What is the frequency of weeding cotton farms by farmers in the villages where you work?

____ 1. Three times before harvesting
____ 2. As many times as weeds appear
____ 3. Two times before harvesting
____ 4. Once before harvesting
____ 5. No need for weeding

22. To how many seedlings per stand should the thinning of cotton be done in Ukerewe?

____ 1. One seedling per stand
____ 2. Two seedlings per stand
____ 3. Three seedlings per stand
____ 4. Thinning is not necessary

23. How much T.S.P. fertilizers should cotton farmers in Ukerewe apply at planting time?

____ 1. 100 kg/ha
____ 2. 224 kg/ha
____ 3. 250 kg/ha
____ 4. 300 kg/ha
____ 5. No need to apply T.S.P. at planting time

24. What do you think is the optimum spraying regime against insect pests of cotton in Ukerewe?

____ 1. One time just after flowering
____ 2. Two times after flowering
____ 3. Six times after flowering
____ 4. Four times after flowering
____ 5. Five times after flowering

25. What is the right period when old cotton plant stalks have to be uprooted and burned in Ukerewe Island?

____ 1. Mid-November
____ 2. Mid-October
____ 3. Mid-September
____ 4. The operation is not necessary

26. How many trials conducted by Ukiriguru Research Station are there in the villages you work with?

____ 1. One trial
____ 2. Two trials
____ 3. None
____ 4. More than two trials

27. In which year did you complete your formal school education?

In 19....

28. What is the name of the last school you attended? _____

_____

29. What was the last level you completed in that school?

____ 1. Primary school level (Std 1 - 7/8)
____ 2. O-Level secondary school (Form IV)
____ 3. A-Level secondary school (Form VI)

30. What is your professional training qualification?

____ 1. 2-year certificate course in agriculture
____ 2. 9-month diploma course in agriculture

____ 3. 3-year diploma course in agriculture
____ 4. 3-year B.Sc. course in agriculture
____ 5. Other than those above -- specify

_____

_____

31. What is your specialization?

____ 1. Crops
____ 2. Livestock
____ 3. Generalist
____ 4. Others -- specify _____

_____

_____

32. How many inservice training courses have you attended since you were first appointed as an extension worker?

____ 1. One inservice training course
____ 2. None
____ 3. Two inservice training courses
____ 4. More than two inservice training courses

33. If you have attended any inservice courses, please indicate below the type of course(s) which you have attended and duration of courses.

Course	Duration
1. _____	From 19... to 19...
2. _____	From 19... to 19...
3. _____	From 19... to 19...

34. How old are you?

____ 1. Between 18-35 years old
____ 2. Between 36-45 years old
____ 3. Above 45 years old

35. Please can you tell me any other information on technical factors which affect cotton growing in the villages where you serve as an extension worker ; those factors which you feel that we did not cover in our talk.

_____

_____

_____

36. I would also like to answer any questions from you if you have any, in respect to what we have been talking about.

37. Gender of respondent.

____ 1. Female
____ 2. Male

THANK YOU VERY MUCH FOR YOUR CO-OPERATION

Date ..... Time ..... when the interview was conducted.

37. Gender of respondent.

____ 1. Female
____ 2. Male

THANK YOU VERY MUCH FOR YOUR CO-OPERATION

Date ..... Time ..... when the interview was conducted.

Appendix B

RESPONDENTS' FARM SIZES AND THEIR COTTON YIELDS

Table B.1. Farm Sizes and Cotton Outputs Per Hectare

CASE #	FARM SIZE (Ha)	COTTON OUTPUT (Kg)	COTTON OUTPUT (Kg/Ha)
001	0.4	35.0	87.5
002	1.0	392.8	392.8
003	0.4	91.0	227.5
004	1.0	1154.0	1154.0
005	0.6	658.0	1096.7
006	0.8	200.0	250.0
007	0.33	469.0	1421.2
008	0.60	356.0	593.3
009	0.20	81.0	405.0
010	0.20	108.0	540.0
011	0.40	175.0	437.5
012	0.40	143.0	357.5
013	0.20	205.0	1025.0
014	0.33	163.0	493.9
015	0.50	542.0	1084.0
016	0.33	300.0	909.0
017	0.40	150.0	375.0
018	0.20	105.0	525.0
019	0.20	120.8	604.0
020	0.80	325.0	406.3
021	1.20	411.0	342.5
022	1.20	778.0	648.3
023	0.40	200.0	500.0
024	0.40	270.0	675.0
025	0.20	55.0	275.0
026	0.33	368.	1115.1
027	0.40	528	1320.0
028	1.0	624	624.0
029	0.4	316	790.0
030	0.4	170	425.0
031	1.0	254	254.0

Table B.1. (Cont.)

CASE #	FARM SIZE (Ha)	COTTON OUTPUT (Kg)	COTTON OUTPUT (Kg/Ha)
032	0.8	400	500.0
033	0.2	108	540.0
034	0.2	172	860.0
035	0.4	379	947.5
036	0.5	249	498.0
037	0.4	21	52.5
038	1.0	1065	1065.0
039	0.5	256	512.0
040	0.5	384	768.0
041	0.45	248	551.1
042	1.50	477	318.0
043	1.50	307	204.7
044	0.45	271	602.2
045	0.20	55	275.0
046	0.40	81	202.5
047	0.80	560	700.0
048	0.40	124	310.0
049	0.20	145	725.0
050	0.33	250	757.5
051	3.00	650	216.6
052	0.20	81	405.0
053	0.40	93	232.5
054	0.40	65	162.5
055	0.40	30	75.0
056	0.40	24	60.0
057	0.33	96	290.9
058	0.40	379	947.5
059	0.4	108.0	270.0
060	0.4	135.0	337.5
061	1.0	271.0	271.0
062	1.0	271.0	271.0
063	2.5	601.0	240.4
064	0.4	58.0	145.0

Table B.1. (Cont.)

CASE #	FARM SIZE (Ha)	COTTON OUTPUT (Kg)	COTTON OUTPUT (Kg/Ha)
065	0.6	454.0	756.6
066	0.2	86.0	430.0
067	0.4	196.0	490.0
068	0.2	47.0	235.0
069	0.1	89.0	890.0
070	0.2	119.0	595.0
071	0.5	101.0	202.0
072	0.2	18.0	90.0
073	0.5	156.9	313.8
074	1.0	161.0	161.0
075	0.4	86.0	215.0
076	0.4	144.0	360.0
077	0.33	620.0	1878.7
078	0.20	45.0	225.0
079	0.40	475.5	1188.7
080	1.00	617.5	617.5
081	0.20	134.0	670.0
082	0.20	65.0	325.0
083	0.40	86.7	216.7
084	0.50	84.5	169.0
085	0.40	187.4	468.5
086	0.33	460.0	1393.9
087	0.50	393.0	786.0
088	0.40	191.0	477.5
089	1.00	358.0	358.0
090	0.40	216.8	542.0
091	1.50	314.4	209.6
092	1.00	58.5	58.5
093	0.50	212.5	425.0
094	0.40	137.0	342.5
095	0.50	81.3	162.6
096	0.50	531.2	1062.4

Table B.1. (Cont.)

CASE #	FARM SIZE (Ha)	COTTON OUTPUT (Kg)	COTTON OUTPUT (Kg/Ha)
097	0.40	482.4	1206.0
098	0.40	216.8	542.0
099	0.50	162.6	325.2
100	1.00	254.7	254.7
101	0.40	452.7	1131.7
* Σ =	56.24	26,658.00	53443.10
** $\bar{X}$ =	0.557	263.94	529.13
*** Sd =	0.443	215.69	359.00

* = Sum total

** = Mean

*** = Standard deviation

Table B.2. Farm Sizes of Farmers Without Extension Contact and Their Outputs Per Hectare

CASE #	FARM SIZE (Ha)	COTTON OUTPUT (Kg)	COTTON OUTPUT (Kg/Ha)
001	0.4	35.0	87.5
009	0.2	81.0	405.0
010	0.2	108.0	540.0
017	0.4	150.0	375.0
020	0.8	325.0	406.3
032	0.8	400.0	500.0
037	0.4	21.0	52.5
044	0.45	271.0	602.2
045	0.20	55.0	275.0
053	0.20	81.0	405.0
055	0.40	30.0	75.0
056	0.40	24.0	60.0
060	0.40	135.0	337.5
061	1.00	271.0	271.0
066	0.20	86.0	430.0
067	0.40	196.0	490.0
081	0.20	134.0	670.0
095	0.50	81.3	162.6
098	0.40	216.8	542.0
099	0.50	162.6	325.2
* Σ =	8.450	2,863.700	6,426.0
** $\bar{X}$ =	0.423	143.185	321.3
*** Sd =	0.222	107.107	196.96

* = Sum total

** = Mean

*** = Standard deviation

Appendix C

OPINIONS OF FARMER RESPONDENTS: CROSS TABULATIONS

Table C.1. Farmers' Opinions About Their Village Extension Workers Commitment to Work

Farmers' Characteristics A. LEVEL OF EDUCATION	Response Sets** SD	D	U	A	SA	Total
Stage IV Adult education	0	1	0	4	3	8
Stage III Adult education	0	0	0	3	2	5
Stage II Adult education	0	0	0	6	2	8
Stage I Adult education	0	0	0	2	0	2
Illiterate	1	1	3	2	1	8
Primary school education	0	3	9	40	18	70
Total =	1	5	12	57	26	101

$X^2 = 26.0$, df = 20, $X^2_{0.05}(20) = 34.41$, N.S.

Table C.2. Farmers' Opinions About Their Village Extension Workers Biasness for Progressive Farmers

Farmers' Characteristics A. LEVEL OF EDUCATION	Response Sets** SD	D	U	A	SA	Total
Stage IV Adult education	1	0	0	7	0	8
Stage III Adult education	0	0	0	4	1	5
Stage II Adult education	0	0	0	5	3	8
Stage I Adult education	0	0	0	1	1	2
Illiterate	0	2	2	4	0	8
Primary School education	2	4	12	41	11	70
Total =	3	6	14	62	16	101

$X^2 = 21.75$, df = 20, $X^2_{0.05}(20) = 31.41$, N.S.

Table C.3. Farmers' Opinions About Their Extension Workers Tendency for Drunkardness

Farmers' Characteristics A. LEVEL OF EDUCATION	Response Sets** SD	D	U	A	SA	Total
Stage IV Adult education	3	3	2	0	0	8
Stage III Adult education	1	2	2	0	0	5
Stage II Adult education	3	3	1	1	0	8
Stage I Adult education	1	0	1	0	0	2
Illiterate	0	0	8	0	0	8
Primary school education	20	14	33	2	1	70
Total	28	22	47	3	1	101

$X^2 = 19.44$, df = 20, $X^{2(20)}_{0.05} = 31.41$, N.S.

Table C.4. Farmers' Opinions About Their Village Extension Workers Diplomatic Approach to Their Clientele

Farmers' Characteristics A. LEVEL OF EDUCATION	Response Sets** SD	D	U	A	SA	Total
Stage IV Adult education	0	0	1	6	1	8
Stage III Adult education	0	0	0	5	0	5
Stage II Adult education	0	0	2	5	1	8
Stage I Adult education	0	0	0	2	0	2
Illiterate	0	0	4	4	0	8
Primary school education	0	1	10	51	8	70
Total =	0	1	17	73	10	101

$X^2 = 10.69$, df = 15, $X^{2(15)}_{0.05} = 25.0$, N.S.

Table C.5. Farmers' Opinions About Their Village Extension Workers Spending More Time on Their Own Farms

Farmers' Characteristics A. LEVEL OF EDUCATION	Response Sets** SD	D	U	A	SA	Total
Stage IV Adult education	0	3	5	0	0	8
Stage III Adult education	0	3	2	0	0	5
Stage II Adult education	2	3	3	0	0	8
Stage I Adult education	0	1	1	0	0	2
Illiterate	0	2	4	2	0	8
Primary school education	3	25	33	7	2	70
Total =	5	37	48	9	2	101

$X^2 = 14.84$, df = 20, $X^{2(20)}_{0.05} = 31.41$, N. S.

Table C.6. Farmers' Opinions About Their Village Extension Workers Being Overloaded With Extra Duties

Farmers' Characteristics A. LEVEL OF EDUCATION	Response Sets** SD	D	U	A	SA	Total
Stage IV Adult education	0	0	0	0	0	8
Stage III Adult education	0	0	0	0	0	5
Stage II Adult education	0	0	1	1	6	8
Stage I Adult education	0	0	0	0	2	2
Illiterate	0	0	2	0	6	8
Primary school education	0	2	12	9	47	70
Total =	0	2	15	10	74	101

$X^2 = 8.73$, df = 15, $X^{2(15)}_{0.05} = 25.0$, N.S.

Table C.7. Farmers' Opinions About Their Village Extension Workers Being of Any Help to Their Clientele

Farmers' Characteristics A. LEVEL OF EDUCATION	Response Sets** SD	D	U	A	SA	Total
Stage IV Adult education	0	0	1	5	2	8
Stage III Adult education	0	0	1	3	1	5
Stage II Adult education	0	0	0	7	1	8
Stage I Adult education	0	0	0	2	0	2
Illiterate	2	0	2	4	0	8
Primary school education	1	2	7	48	12	70
Total =	3	2	11	69	16	101

$X^2 = 21.60$, df = 20, $X^{2(20)}_{0.05} = 31.41$, N.S.

Table C.8. Farmers' Opinions About Their Extension Workers Commitment to Work

Farmers' Characteristics B. FARMERS' AGE	Response Sets** SD	D	U	A	SA	Total
Young farmers	0	0	4	12	5	21
Middle-aged farmers	0	1	4	12	7	25
Old farmers	1	4	4	32	14	55
Total =	1	5	12	57	26	101

$X^2 = 4.97$, df = 8, $X^{2(8)}_{0.05} = 15.5$, N. S.

Table C.9. Farmers' Opinions About Their Village Extension Workers Biasness for Progressive Farmers

Farmers' Characteristics B. FARMERS' AGE	Response Sets** SD	D	U	A	SA	Total
Young farmers	1	2	2	14	2	21
Middle-aged farmers	0	1	4	19	1	25
Old farmers	2	3	8	29	13	55
Total =	3	6	14	62	16	101

$X^2 = 8.56$, df = 8, $X^{2(8)}_{0.05} = 15.5$, N.S.

Table C.10. Farmers' Opinions About Their Village Extension Workers Tendency for Drunkardness

Farmers' Characteristics B. FARMERS' AGE	Response Sets** SD	D	U	A	SA	Total
Young farmers	8	4	7	1	1	21
Middle-aged farmers	7	5	12	1	0	25
Old farmers	13	13	28	1	0	55
Total =	28	22	47	3	1	101

$X^2 = 6.74$, df = 8, $X^{2(8)}_{0.05} = 15.5$, N.S.

Table C.11. Farmers' Opinions About Their Village Extension Workers Diplomatic Approach to Their Clientele

Farmers' Characteristics B. FARMERS' AGE	Response Sets** SD	D	U	A	SA	Total
Young farmers	0	0	3	13	5	21
Middle-aged farmers	0	0	4	21	0	25
Old farmers	0	1	10	39	5	55
Total =	0	1	17	73	10	101

$X^2 = 8.40$, df = 6, $X^{2(6)}_{0.05} = 12.59$, N.S.

Table C.12. Farmers' Opinions About their Village Extension Workers Spending More Time on Their Own Farms

Farmers' Characteristics B. FARMERS' AGE	Response Sets** SD	D	U	A	SA	Total
Young farmers	1	6	10	3	1	21
Middle-aged farmers	0	6	16	3	0	25
Old farmers	4	25	22	3	1	55
Total =	5	37	48	9	2	101

$X^2 = 9.56$, df = 8, $X^{2(8)}_{0.05} = 15.5$, N.S.

Table C.13. Farmers' Opinions About Their Village Extension Workers Competence

Farmers' Characteristics B. FARMERS' AGE	Response Sets** SD	D	U	A	SA	Total
Young farmers	0	0	4	12	4	21
Middle-aged farmers	0	1	1	20	3	25
Old farmers	0	0	6	46	3	55
Total =	0	1	11	79	10	101

$X^2 = 9.33$, df = 6, $X^{2(6)}_{0.05} = 12.59$, N.S.

Table C.14. Farmers' Opinions About Their Village Extension Workers Being Overloaded With Extra Duties

Farmers' Characteristics B. FARMERS' AGE	Response Sets** SD	D	U	A	SA	Total
Young farmers	0	0	4	5	12	21
Middle-aged farmers	0	1	4	3	17	25
Old farmers	0	1	7	2	45	55
Total =	0	2	15	10	74	101

$X^2 = 9.16$, df = 6, $X^{2(6)}_{0.05} = 12.59$, N.S.

Table C.15. Farmers' Opinions About Their Village Extension Workers Being of Any Help to Their Clientele

Farmers' Characteristics B. FARMERS' AGE	Response Sets** SD	D	U	A	SA	Total
Young farmers	0	1	3	14	3	21
Middle-aged farmers	0	1	3	17	4	25
Old farmers	3	0	5	38	9	55
Total =	3	2	11	69	16	101

$X^2 = 5.4$, df = 8, $X^{2(8)}_{0.05} = 15.5$, N.S.

Table C.16. Farmers' Opinions About Their Extension Workers Commitment to Work

Farmers' Characteristics C. GENDER	Response Sets** SD	D	U	A	SA	Total
Female	1	1	4	7	2	15
Male	0	4	8	50	24	86
Total =	1	5	12	57	26	101

$X^2 = 10.43$, df = 4, $X^{2(4)}_{0.05} = 9.49$, S.

Table C.17. Farmers' Opinions About Their Village Extension Workers Biasness for Progressive Farmers

Farmers' Characteristics C. GENDER	Response Sets** SD	D	U	A	SA	Total
Female	0	3	3	9	0	15
Male	3	3	11	53	16	86
Total =	3	6	14	62	16	101

$X^2 = 9.66$, df = 4, $X^{2(4)}_{0.05} = 9.49$, S.

Table C.18. Farmers' Opinions About Their Village Extension Workers Tendency for Drunkardness

Farmers' Characteristics C. GENDER	Response Sets** SD	D	U	A	SA	Total
Female	4	3	8	0	0	15
Male	24	19	39	3	1	86
Total =	28	22	47	3	1	101

$X^2 = 0.91$, df = 4, $X^{2(4)}_{0.05} = 9.49$, N.S.

Table C.19. Farmers' Opinions About Their Village Extension Workers Diplomatic Approach to Their Clientele

Farmers' Characteristics C. GENDER	Response Sets** SD	D	U	A	SA	Total
Female	0	0	5	7	3	15
Male	0	1	12	66	7	86
Total =	0	1	17	73	10	101

$X^2 = 6.44$, df = 3, $X^{2(3)}_{0.05} = 7.82$, N.S.

Table C.20. Farmers' Opinions About Their Village Extension Workers Spending More Time on Their Own Farms

Farmers' Characteristics C. GENDER	Response Sets** SD	D	U	A	SA	Total
Female	0	3	9	2	1	15
Male	5	34	39	7	1	86
Total =	5	37	48	9	2	101

$X^2 = 5.12$, df = 4, $X^{2(4)}_{0.05} = 9.49$, N.S.

Table C.21. Farmers' Opinions About Their Extension Workers Competence

Farmers' Characteristics C. GENDER	Response Sets** SD	D	U	A	SA	Total
Female	0	0	5	8	2	15
Male	0	1	6	71	8	86
Total =	0	1	11	79	10	101

$X^2 = 9.93$, df = 3, $X^{2(3)}_{0.05} = 7.82$, S.

Table C.22. Farmers' Opinions About Their Village Extension Workers Being Overloaded with Extra Duties

Farmer' Characteristics C. GENDER	Response Sets** SD	D	U	A	SA	Total
Female	0	0	3	1	11	15
Male	0	2	12	9	63	86
Total =	0	2	15	10	74	101

$X^2 = 0.83$, df = 3, $X^{2(3)}_{0.05} = 7.82$, N.S.

Table C.23. Farmers' Opinions About Their Village Extension Workers Being of Any Help to Their Clientele

Farmers' Characteristics C. GENDER	Response sets** SD	D	U	A	SA	Total
Female	8	0	0	2	5	15
Male	68	5	1	5	7	86
Total =	76	5	1	7	12	101

$X^2 = 10.04$, df = 4, $X^{2(4)}_{0.05} = 9.49$, S.

** SD = Strongly Disagree
D = Disagree
U = Undecided
A = Agree
SA = Strongly Agree

X^2 = Calculated Chi-Square
df = Degrees of freedom
$X^2_{\alpha}(df)$ = Tabulated Chi-Square with degrees of freedom and $\alpha = 0.05$
N.S. = Not statistically significant at $\alpha = 0.05$
S. = Statistically significant at $\alpha = 0.05$

Appendix D

OPINIONS OF VILLAGE EXTENSION WORKERS: CROSS TABULATIONS

Table D.1. Village Extension Workers' Opinions About Their Clienteles' Willingness to Grow Cotton

Village Extension Workers' Characteristics	Response Sets**					
A. QUALIFICATIONS	SD	D	U	A	SA	Total
2-year certificate courses in agriculture	1	1	0	0	1	8
Short courses in agriculture	3	1	0	0	0	4
Total = 4	2	0	0	1	7	
$X^2 = 1.9$, df = 2, $X^{2(2)}_{0.05} = 5.99$, N.S.						

Table D.2. Village Extension Workers' Opinions About Their Clienteles' Friendliness to Extension Workers

Village Extension Workers' Characteristics	Response Sets**					
A. QUALIFICATIONS	SD	D	U	A	SA	Total
2-year certificate courses in agriculture	0	0	0	1	2	3
Short courses in agriculture	0	0	0	2	1	4
Total = 0	0	0	3	3	7	
$X^2 = 0.63$, df = 1, $X^{2(1)}_{0.05} = 3.84$, N.S.						

Table D.3. Village Extension Workers' Opinions About Their Clienteles' Initiative to Seek Extension Advice

Village Extension Workers' Characteristics	Response Sets**					
A. QUALIFICATIONS	SD	D	U	A	SA	Total
2-year certificate courses in agriculture	1	1	0	1	0	3
Short courses in agriculture	3	0	0	1	0	4
Total = 4	1	0	2	0	7	
$X^2 = 1.9$, df = 2, $X^{2(2)}_{0.05} = 5.99$, N.S.						

Table D.4. Village Extension Workers' Opinions About Their Clienteles' Abilities to Follow Extension Advice

Village Extension Workers' Characteristics	Response Sets**					
A. QUALIFICATIONS	SD	D	U	A	SA	Total
2-year certificate courses in agriculture	0	1	0	1	1	3
Short courses in agriculture	2	1	0	0	1	4
Total = 2	2	0	1	2	7	
$X^2 = 2.91$, df = 3, $X^{2(3)}_{0.05} = 7.82$, N.S.						

Table D.5. Village Extension Workers' Opinions About Their Clienteles' Perception that the Government Forces Them to Grow Cotton

Village Extension Workers' Characteristics	Response Sets**					
A. QUALIFICATIONS	SD	D	U	A	SA	Total
2-year certificate courses in agriculture	1	0	0	2	0	3
Short courses in agriculture	2	0	0	1	1	4
Total = 3	0	0	3	1	7	
$X^2 = 1.56$, df = 2, $X^2_{0.05(2)} = 5.99$, N.S.						

Table D.6. Village Extension Workers' Opinions About Their Clienteles' Willingness to Grow Cotton

Village Extension Workers' Characteristics	Response Sets**					
B. NUMBER OF INSERVICE TRAINING COURSES	SD	D	U	A	SA	Total
One inservice course	1	0	0	0	1	2
No inservice course	1	1	0	0	0	2
Two inservice courses	0	1	0	0	0	1
More than two inservice courses	2	0	0	0	0	2
Total = 4	2	0	0	1	7	
$X^2 = 7.0$, df = 6, $X^2_{0.05(6)} = 12$, N.S.						

Table D.7. Village Extension Workers' Opinions About Their Clienteles' Friendliness with Extension Workers

Village Extension Workers' Characteristics	Response Sets**					
B. NUMBER OF INSERVICE TRAINING COURSES	SD	D	U	A	SA	Total
One inservice course	0	0	0	0	2	2
No inservice course	0	0	0	1	1	2
Two inservice courses	0	0	0	1	0	1
More than two inservice courses	0	0	0	1	1	2
Total =	0	0	0	3	4	7

$X^2 = 2.92$, df = 3, $X^{2(3)}_{0.05} = 7.82$, N.S.

Table D.8. Village Extension Workers' Opinions About Their Clienteles' Initiative to Seek for Extension Advice

Village Extension Workers' Characteristics	Response Sets**					
B. NUMBER OF INSERVICE TRAINING COURSES	SD	D	U	A	SA	Total
One inservice course	1	0	0	1	0	2
No inservice course	1	1	0	0	0	2
Two inservice courses	0	0	0	1	0	1
More than two inservice courses	2	0	0	0	0	2
Total =	4	1	0	2	0	7

$X^2 = 7.0$, df = 6, $X^{2(6)}_{0.05} = 12.6$, N.S.

Table D.9. Village Extension Workers' Opinions About Their Clienteles' Abilities to Follow Extension Advice

Village Extension Workers' Characteristics	Response Sets**					
B. NUMBER OF INSERVICE TRAINING COURSES	SD	D	U	A	SA	Total
One inservice course	0	0	0	1	1	2
No inservice course	0	1	0	0	1	2
Two inservice courses	0	1	0	0	0	1
More than two inservice courses	2	0	0	0	0	2
Total =	2	2	0	1	2	7

$X^2 = 12.25$, df = 9, $X^2_{0.05}(9) = 16.92$, N.S.

Table D.10. Village Extension Workers' Opinions About Their Clienteles' Perception That the Government Forces Them to Grow Cotton

Village Extension Workers' Characteristics	Response Sets**					
B. NUMBER OF INSERVICE TRAINING COURSES	SD	D	U	A	SA	Total
One inservice course	2	0	0	0	0	2
No inservice course	0	0	0	2	0	2
Two inservice courses	1	0	0	0	0	1
More than two inservice courses	0	0	0	1	1	2
Total =	3	0	0	3	1	7

$X^2 = 9.33$, df = 6, $X^2_{0.05}(6) = 12.59$, N.S.

Table D.11. Village Extension Workers' Opinions About Their Clienteles' Willingness to Grow Cotton

Village Extension Workers' Characteristics	Response Sets**					
C. AGE	SD	D	U	A	SA	Total
Young	3	1	0	0	0	4
Middle-aged	1	1	0	0	1	3
Total =	4	2	0	0	1	7

$X^2 = 1.9$, df = 2, $X^{2(2)}_{0.05} = 2.99$, N.S.

Table D.12. Village Extension Workers' Opinions About Their Clienteles' Friendliness to Extension Workers

Village Extension Workers' Characteristics	Response Sets**					
C. AGE	SD	D	U	A	SA	Total
Young	0	0	0	2	2	4
Middle-aged	0	0	0	1	2	3
Total =	0	0	0	3	4	7

$X^2 = 0.63$, df = 1, $X^{2(1)}_{0.05} = 3.84$, N.S.

Table D.13. Village Extension Workers' Opinions About Their Clienteles' Initiative to Seek for Extension Advice

Village Extension Workers' Characteristics	Response Sets**					
C. AGE	SD	D	U	A	SA	Total
Young	3	1	0	0	0	4
Middle-aged	1	0	0	0	2	3
Total =	4	1	0	0	2	7

$X^2 = 3.94$, df = 2, $X^{2(2)}_{0.05} = 5.99$, N.S.

Table D.14. Village Extension Workers' Opinions About Their Clienteles' Abilities to Follow Extension Advice

Village Extension Workers' Characteristics	Response Sets**					
C. AGE	SD	D	U	A	SA	Total
Young	2	1	0	0	1	4
Middle-aged	0	1	0	1	1	3
Total =	2	2	0	1	2	7

$X^2 = 2.92$, df = 3, $X^{2(3)}_{0.05} = 7.82$, N.S.

Table D.15. Village Extension Workers' Opinions About Their Clienteles' Perception That the Government Forces Them to Grow Cotton

Village Extension Workers' Characteristics	Response Sets**					
C. AGE	SD	D	U	A	SA	Total
Young	0	0	0	3	1	4
Middle-aged	3	0	0	0	0	3
Total =	3	0	0	3	1	7

$X^2 = 7.0$, df = 2, $X^{2(2)}_{0.05} = 5.99$, S.

Table D.16. Village Extension Workers' Opinions About Their Clienteles' Willingness to Grow Cotton

Village Extension Workers' Characteristics	Response Sets**					
D. GENDER	SD	D	U	A	SA	Total
Female	0	1	0	0	0	1
Male	4	1	0	0	1	6
Total =	4	2	0	0	1	7

$X^2 = 2.92$, df = 2, $X^{2(2)}_{0.05} = 5.99$, N. S.

Table D.17. Village Extension Workers' Opinions About Their Clienteles' Friendliness to Extension Workers

Village Extension Workers' Characteristics	Response Sets**					
D. GENDER	SD	D	U	A	SA	Total
Female	0	0	0	1	0	1
Male	0	0	0	2	4	6
Total =	0	0	0	3	4	7

$X^2 = 0.43$, df = 1, $X^{2(1)}_{0.05} = 3.84$, N.S.

Table D.18. Village Extension Workers' Opinions About Their Clienteles' Initiative to Seek for Extension Advice

Village Extension Workers' Characteristics	Response Sets**					
D. GENDER	SD	D	U	A	SA	Total
Female	0	1	0	0	0	1
Male	4	0	0	2	0	6
Total =	4	1	0	2	0	7

$X^2 = 7.0$, df = 2, $X^{2(2)}_{0.05} = 5.99$, S.

Table D.19. Village Extension Workers' Opinions About Their Clienteles' Ability to Follow Extension Advice

Village Extension Workers' Characteristics	Response Sets**					
D. GENDER	SD	D	U	A	SA	Total
Female	0	1	0	0	0	1
Male	2	1	0	1	2	6
Total =	2	2	0	1	2	7

$X^2 = 2.92$, df = 3, $X^{2(3)}_{0.05} = 7.82$, N.S.

Table D.20. Village Extension Workers' Opinions About Their Clienteles' Perception That the Government Forces Them to Grow Cotton

Village Extension Workers' Characteristics		Response Sets**					
D. GENDER		SD	D	U	A	SA	Total
Female		0	0	0	1	0	1
Male		3	0	0	2	1	6
	Total =	3	0	0	3	1	7
	$X^2 = 1.56$, df = 2, $X^{2(2)}_{0.05} = 5.99$, N.S.						

** SD = Strongly Disagree
D = Disagree
U = Undecided
A = Agree
SA = Strongly Agree

X^2 = Calculated Chi-Square
df = Degrees of freedom
$X^{2(df)}_{\alpha}$ = Tabulated Chi-Square with degrees of freedom and $\alpha = 0.05$
N. S. = Not statistically significant at $\alpha = 0.05$
S. = Statistically significant at $\alpha = 0.05$