

**AN ECONOMIC ANALYSIS OF FACTORS INFLUENCING FLUE-CURED
TOBACCO PRODUCTION IN TANZANIA: A CASE STUDY OF
IRINGA DISTRICT**

BY

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
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ABSTRACT

The study focuses on factors affecting flue-cured tobacco production in Iringa District, Tanzania. The emphasis is on factors which are responsible for wide fluctuations in tobacco yield in both small-scale and large-scale farms.

Two types of data namely primary and secondary were collected. Structured questionnaires were used to collect most of the primary data from two selected samples of small-scale and large-scale farmers. Discussions with relevant authorities and use of relevant office documents were the main sources of secondary data. Descriptive analyses, multiple regressions, budgeting and direct programme planning are the techniques used in the analyses.

Results indicate that working capital, areas under tobacco and maize production were statistically significant in influencing tobacco production on individual small-scale farms. Total tobacco yield is highly associated with both tobacco planted area and the amount of working capital spent for tobacco inputs used. Positive correlation exists between tobacco area planted, tobacco yield per ha and the amount of capital employed while negative correlation is observed between tobacco yield per ha and maize area planted.

For large-scale farms, tobacco farming experience and total tobacco area planted are important parameters

explaining the variations in tobacco yield per hectare. Tobacco yield per ha is highly correlated with tobacco farming experience. Also, tobacco planted area is positively correlated with farmer's experience. Shortage of firewood, inaccessibility of credit facility from banks and low soil fertility particularly in large scale farmers were the common problems.

Recommendations include Government policies that encourage cultivation of manageable farm sizes and intensification of agricultural extension services. Others include prompt payment of sold tobacco, introduction of special credit scheme to tobacco farmers, liberalization of tobacco market and encouragement of research that aims at solving the firewood problem.

DECLARATION

I, THEOPHIL RUTTASHUBANYUMA MWIKILA, do hereby declare to the Senate of the Sokoine University of Agriculture that this dissertation has not been submitted to any other University and that it is my own original work.

Signature *Th Mwikila*
Date *12/11/92*

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DEDICATION

To my beloved wife and children, Wilhelmina Grace, Gilbert Mujuni and Gaspar Muganyizi who stayed alone during my time of study.

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LIST OF ACRONYMS

ACA	Agricultural Credit Bank
AISCO	Agricultural and Industrial Supply Company
CRDB	Cooperative and Rural Development Bank
IDA	International Development Agency
IDC	Iringa District Council
IMUCU	Iringa/Mufindi Cooperative Union
MDB	Marketing Development Bureau
NBC	National Bank of Commerce
NCB	National Co-operative Bank
NDCA	National Development Credit Agency
NMC	National Milling Corporation
RCU	Ruvuma Co-operative Union
SHTGA	Southern Highlands Tobacco Growers Association
TAT	Tobacco Authority of Tanzania
TET	Tanzania Economic Trends
TFA	Tanganyika Farmers Association
TRDB	Tanzania Rural Development Bank
TTPMB	Tanzania Tobacco Processing and Marketing Board
URT	United Republic of Tanzania

CHAPTER I

INTRODUCTION

1.1 Background

Agriculture in Tanzania is the largest sector that provides food, foreign exchange, savings and Government finance (Amani et al 1984). The sector contributes 75 percent of total expenditure earnings and 85 percent of nation's employment (URT 1990). According to URT (1990), agricultural sector contributed over 46 percent of nation's Gross Domestic Product (GDP) during 1987-88 financial year. Tobacco is one of the major agricultural industries in Tanzania. In 1988 it was reported that it ranked the fifth as a foreign exchange earner after coffee, cotton, cashewnut and tea with export sales worth Shs 1 187.97 million viz. US \$ 15.03 million (Appendix A). In addition tobacco saved Shs 688.79 million (US \$ 8.9 million) through import substitution during 1987-88 marketing season (MDB 1988).

Fire-cured, flue-cured and burley are the three types of tobacco commonly grown in Tanzania. In the last decade, there has been a fall in both tobacco output and the average yield per ha (Appendix B). During the period between 1977-78 and 1987-88 tobacco output in Tanzania dropped from 18 342 to 12 921 tons. The average yield per ha dropped from 591 to 491 kg and the area under production fluctuated between 31 056 and 18 987 ha for the

period under review (MDB 1988). Bank of Tanzania (1990), reported that output of tobacco during 1989-90 marketing season amounted to 11 062 tons being lower by 15.8 percent when compared with the previous season's output.

Production of flue-cured tobacco for the period between 1977-78 and 1987-88 has been trending downwards with the exception of 1986-87 when it picked up to 15 010 tons (Appendix B). Decline started again in the following year. The decline of this crop is largely attributed to contraction in area planted and a fall in yield per hectare. During the period between 1977-78 and 1987-88 the total area under flue-cured tobacco production in Tanzania ranged between 25 248 and 14 511 ha per year. Yield per ha ranged between 515 and 824 kg, averaging about 635 kg per hectare. This yield of 635 kg per ha is low when compared with the average of 1 000 kg per ha obtained in the major producing countries (MDB, 1988). Major areas producing flue-cured tobacco in Tanzania include Iringa, Tabora, Urambo, Chunya, Mpanda, Kahama and Manyoni districts (Figures 1-1). About 80 percent of Tanzania tobacco is flue-cured (MDB 1988).

By use of farm surveys and secondary data, this study identifies and examines the nature and extent of economic, social and institutional factors influencing flue-cured tobacco production in Tanzania with specific reference to Iringa District.

1.2 World Tobacco Production and Trade

1.2.1 Tobacco production

There are seven types of tobacco produced in the world. These include; light air-cured, fire-cured, flue-cured, burley, dark-air/sun-cured, dark air-cured cigar and dark fire-cured tobacco. In 1970, world tobacco production was approximately 4.6 million tons and almost half of this output consisted of flue-cured and burley tobacco (FAO/UNDP 1971). Commonwealth Secretariat (1975) reported that tobacco production in the world grew at an annual rate of 1.9 percent between 1970 and 1974. In 1975, total output in the world rose up to 5.5 million tons (FAO/UNDP/ODG 1976). Thereafter, a growth rate of 2.5 percent in tobacco production was projected between 1975 and 1985 (Kanga 1977).

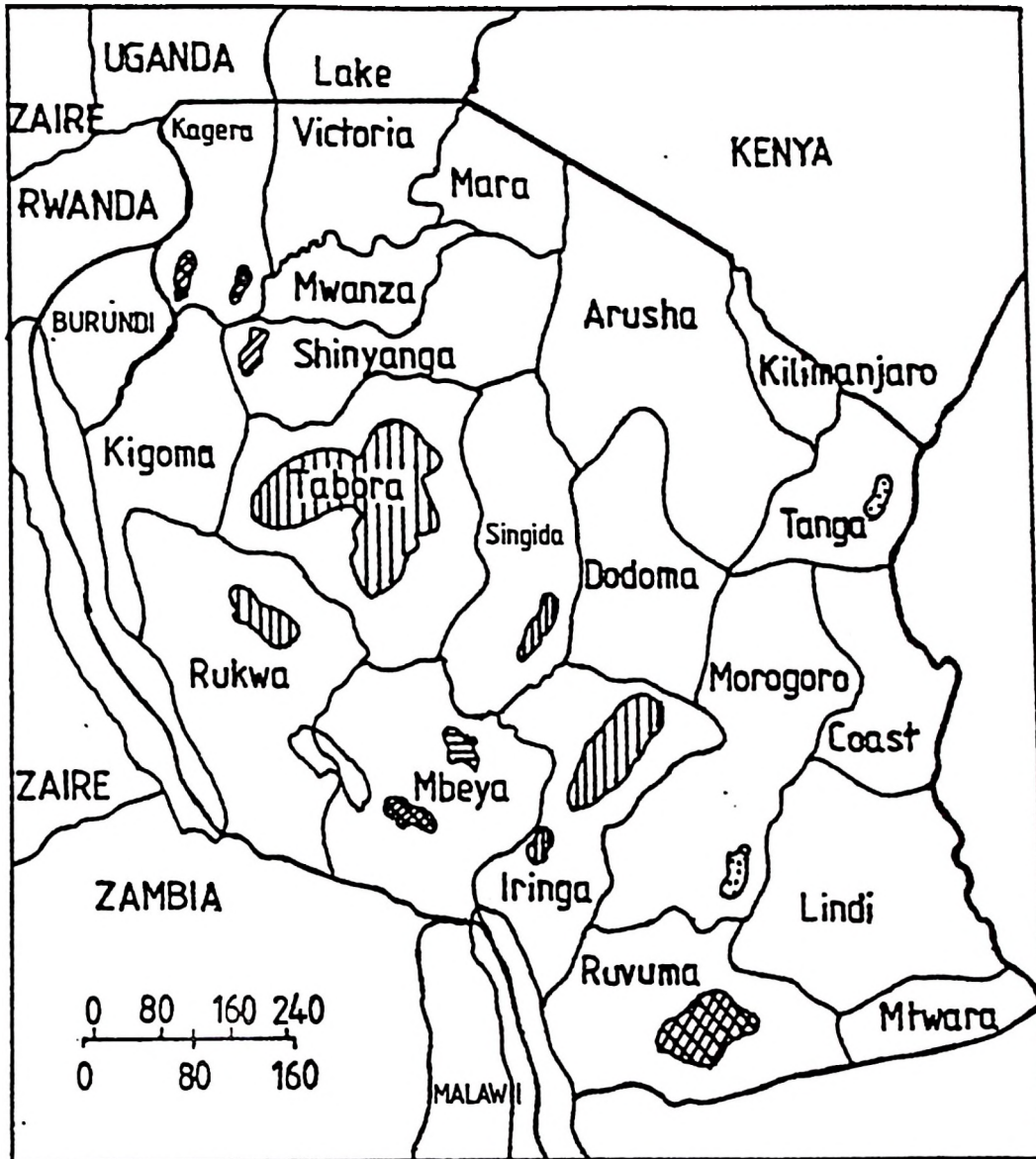
Tobacco production is an important source of employment and cash income in all countries where it is grown (FAO 1983). In the United States of America, flue-cured and burley tobacco account for more than 90 percent of the total tobacco production. Kunz and Purcell (1981) reported that Texas region in the southern part of the United States of America received US \$ 21.9 billion as value created by farm enterprises in 1979. The leading crops in value created were: Soyabeans US \$ 3.3 billion, cotton US \$ 2.3 billion, tobacco ranked the third with a value added of US \$ 1.7 billion. Grise and Clauson (1986)

reported world tobacco output in 1985 at 6.8 million tons. Out of this, 3.0 million tons consisted of flue-cured tobacco. Total tobacco production amounted to 6.5 million tons in 1986 which was 4 percent less than the previous year's output (Appendix C). MDB (1988) reported that total area under tobacco in the world rose from 4.27 million ha in 1986 to 4.33 ha in 1988. However, the increase was insignificant global wise. Major tobacco producing

countries include China, United States of America, Brazil, India, Zimbabwe, Argentina and Turkey.

1.2.2 Tobacco trade

World tobacco export, consumption and stocks for the period between 1982 to 1987 were as follows: Unmanufactured world tobacco export dropped from 1.4 million tons in 1982 to 1.3 million tons in 1987 (Appendix D). Substantial reduction in shipment was recorded in the United States of America, Greece, India, Malawi, Thailand, Canada and South Korea. According to Grise (1984), consumption of tobacco in the United States of America stabilized for the period between 1983 and 1984 due to higher prices and health concerns. In addition deliberate policies were formulated to discourage tobacco growers in USA. For instance, growers rather than tax payers had to bear most of production costs. World tobacco exports in



Source URT, 1976




- National boundary
- Regional boundary
-  Flue cured tobacco areas
-  Fire cured tobacco
-  Barley tobacco

Figure 1-1. Tobacco producing areas in Tanzania

1988 were estimated at 1.39 million tons being higher than the previous year by 2 percent.

World imports of raw tobacco in 1988 were estimated at 1.39 million tons, 1.4 percent lower than in the past year. The decline was largely due to large stocks held by traders and manufacturers stemming from past years. Reduction in tobacco imports were recorded in the following countries: United States of America, Japan, the United Kingdom, Switzerland Hongkong and Sweden. Others included France, West German, the Irish Republic, Australia and Norway. In 1989 world tobacco imports were expected to increase to 1.4 million tons.

World tobacco consumption amounted to 6.0 million tons in 1987. However, there was a decline in tobacco consumption in the year under review when compared to previous year's consumption. Reasons for the decline include the following: There was an increase in the awareness of risks associated with tobacco use; anti-smoking campaign such as bans on smoking in public places including offices, buses and trains. As regards tobacco stocks there was a fall from 7.6 million tons in 1986 to 5.7 million tons in 1988 (MDB 1988).

During 1989, world tobacco production was 7.21 million tons which was an increase of 7 percent over last year's harvest. In many countries this increase was attributed to favourable weather conditions and increase

in area of tobacco planted due to attractive producer prices. Countries that increased their production include United States of America, Yugoslavia, Brazil, China, India, Argentina, Greece and South Africa. Also, some countries experienced lower harvests than in previous year. These included Mexico, Italy, Indonesia, South Korea, Pakistan and Turkey. Nevertheless, total decline in production in the latter countries was outweighed by aggregate production increase in the former countries. Generally, production of all types of tobacco grown in the world increased during 1989.

1.3 Historical Perspective of Tobacco Production in East Africa With Special Reference to Tanzania

East African countries have been expanding tobacco production and consumption since their independence in the early 1960s. In 1970, Uganda received a soft loan of 1.4 million from the International Development Agency (IDA) for constructing curing barns, storage and marketing facilities for tobacco. The scheme intended to increase production of flue-cured tobacco from 3 million kg in 1971 to 6.5 million kg by the mid of 1970s. In Kenya, tobacco was a minor crop until in 1975 when the Government started planning for expanding production with particular attention to flue-cured tobacco. Kenya has been importing tobacco from Tanzania (largest tobacco producer in East Africa) in order to meet her domestic demand.

During the colonial times, almost all flue-cured tobacco in Tanganyika (now Tanzania) was grown in plantations (Sheffler, 1968). Settlers mainly from Greece and religious missions started to grow flue-cured tobacco in the mid 1940s in Iringa Region where production was confined to large-scale farms. Immediately after independence (1963) tobacco production was established in selected villages within Iringa District under a programme called village settlement schemes. In Tabora Region, production of flue-cured tobacco was introduced by the Overseas Food Corporation (OFC) in the early 1950s. This was an attempt to find an alternative cash crop after the failure of the groundnut scheme in the Region (Boer 1974). In 1957, production of flue-cured tobacco was established in Chunya District and cultivation eventually spreaded to other areas including Mpanda, Kahama and Manyoni Districts.

The export opportunity of Tanzania's tobacco was brighter since 1965 when one of the major producing countries Zimbabwe (then Rhodesia) lost its markets due to the Unilateral Declaration of Independence and subsequent sanctions against her. Thus emphasis on tobacco production was documented in both the Second and Third Five Year Plans. In the Second Five Year Plan (1969-74) tobacco target was set at 21.7 million kg and out of these 15.9

million kg were expected to be flue-cured tobacco (URT 1969). This rather ambitious programme was facilitated by a soft loan from the World Bank through the International Development Agency (IDA). In 1975, a total of Shs 85 million was earmarked for the period of 1975 - 1980 (FAO/UNDP/00G 1976). However, despite these deliberate efforts to promote tobacco production, Amani et al (1984) and Lipumba (1984) reported that there was an annual 0.1 percentage decrease in tobacco output during the Third Five Year Plan period.

Knut (1985) examined the merits of the agricultural policy pursued in Tanzania since the early 1970s and concluded that this policy had not been conducive to an acceleration of Tanzania's development. He urged that policies ought to be reformed so that peasants can be induced to re-switch some of their resources back to cash crop production.

1.4 The Problem Statement

Iringa Region produces 12 percent of the country's total tobacco output and ranks the second largest tobacco growing region in Tanzania after Tabora which produces 53 percent (Appendix E). Tobacco is the most important cash crop of Iringa District. The District produces 89 percent of total Region's tobacco output. Flue-cured tobacco in this District apart from its major contribution towards

foreign exchange earnings for the country, has been an important industry in the economy of this Region. In addition to tobacco sales, the large labour force required by large-scale farms provides a source of cash income during the period before smallholders' surplus grain output can be sold for cash (FAO/UNDP/ODG 1976). In this District there are two categories of tobacco farmers. These include large-scale and small-scale tobacco farmers. Large-scale farmers produce 75 percent of total Region's tobacco production.

Production trend of tobacco in Iringa District as in the case of the country has been declining for the period of 1982-89 (Table 1-1). There has been a drop in both total area planted and output of tobacco. During 1982-83, 2 740 ha of tobacco were planted in the District. Tobacco yield per ha were on average 636 and 621 kg for large-scale and small-scale farmers respectively. In 1988-89, total tobacco area planted in the District dropped to 1472 ha and the average yield per ha for both large-scale and small-scale farmers were 692 kg and 435 kg respectively. These figures are low when compared with 1987-88 nation's average of 824 kg per ha (Appendix B) and 1000 kg/ha registered in major producing countries.

It is hypothesized that the fall in tobacco production is contributed by several factors. These include inadequate capital, general decline in tobacco

real producer price (Appendix F), competition in resource use between tobacco and alternative crop enterprises in the District, general weather conditions and changing roles of institutions involved in the production and marketing of tobacco (MDB 1988). It must be noted that tobacco is a labour intensive crop and demands large amounts of investments in terms of fixed and variable costs. Ishuza (1985) found that one ha of tobacco requires 738 man-days while a ha of maize needs 160 man-days. According to FAO/UNDP/ODG (1976), 15 bags of NPK fertilizer are recommended to be applied per ha of tobacco in Iringa District. On the other hand it is recommended to apply 2 bags of TSP and 4 bags of CAN fertilizer to a ha of maize. In addition suitable land for tobacco production in Tanzania and in particular, Iringa district is limited. Adequate information on resource availability and utilization are needed to assist farmers in planning in order to get better returns from their farms. Also information on economic, social and institutional factors affecting tobacco production in terms of their nature and extent of influencing the output are required by planners and policy makers in order to improve the economy of the District.

Table 1-1. Iringa District: Tobacco production trends,
1982-83 - 1988-89.

Year	Area planted	Total Production
	<u>ha</u>	<u>tons</u>
1982-83	2 740	1 833
1983-84	2 352	1 697
1984-85	1 636	1 413
1985-86	1 953	1 500
1986-87	2 014	1 326
1987-88	1 440	1 540
1988-89	1 472	1 480

Source: TTPMB Iringa branch, 1989.

1.5 Objectives

Broadly the study involves an analysis of availability, requirement and utilization of resources at the farm level and the role of institutions and Government policy in tobacco production in the District. Specific objectives of the study are to:

- i) Investigate the effect of the following factors on tobacco production; household factors such as farm sizes, family and hired labour, capital and farmers characteristics such as level of education, age and tobacco farming experience.
- ii) Examine the relative net returns of crops enterprises currently competing with tobacco for resource use in both small-scale and large-scale farms in the District.
- iii) Examine the past and current roles of institutions involved in production and marketing of tobacco in the District in an attempt to determine their effect on the tobacco industry.
- iv) Develop from findings suggestions and recommendations to improve tobacco industry both in the District and other areas producing tobacco in the country.

1.6 Summary

The chapter highlights the importance of tobacco crop world wide. Tobacco is documented to be one of the major sources of cash income in many countries where it is grown. Review on tobacco production indicates that generally in the world there has been a continuous increase in tobacco output since 1970s. Tanzania is recorded to be the chief producer of tobacco in East Africa. However, for more than a decade past the country has been facing a downward trend in tobacco production. Several reasons have been given to explain such trends. These include decline in constant producer price, competition between tobacco and other crop enterprises in resource use. Others are changing roles of institutions involved in production and marketing of tobacco and poor weather conditions.

CHAPTER II**LITERATURE REVIEW****2.1 Tobacco Producer Price**

Tanzania Government usually announces tobacco producer prices a year before a crop marketing season starts in order to enable farmers to make proper production decisions. Factors included in determining the producer prices are as follows: Farmers' production costs, the Board's and Cooperative Unions' operational expenses, crop volume and quality expected, sales realization and net foreign exchange earning capacity of the crop. However, based on 1986-87 constant prices and using national consume's price index (NCPI) tobacco producer prices have been declining for the period between 1976-77 and 1987-88 (Appendix F). Announced average nominal producer price for flue-cured tobacco for 1990-91 marketing, season is Shs 245.00 per kg (Appendix G) which is an increase of 47.75 percent from the previous year's price.

**2.2 Extension Services and Adoption of
Agricultural Innovations**

According to Hull (1972) and Moris (1975) there have been little achievements in increasing agricultural production in Tanzania through the use of new technology.

Saylor (1970) recommended that extension services should be directed to the most progressive farmers because such farmers are more motivated and easily supervised. However, he cautioned that crop yields are not necessarily improved by the advice of extension agents. Percy (1975) in the study on cotton production in Tanzania concluded that factors such as weather, soil fertility and competition with other crops had a greater effect in determining farmers' priorities than extension services. Bartlett (1979) pointed out that there must be a well designed package of agricultural innovations to small-scale farmers within the framework of the farming system before achieving agricultural development. Upton (1973) and Mbithi (1974) stressed that farm management planning and analysis involving small-scale farmers should include their background, attitude and abilities. They concluded that plans which do not take into account farmers' ideas, needs and their environment are likely to be rejected by them.

2.3 Tobacco Production and Marketing

Dean (1966) documented that the labour of tobacco grower and his family is the major production factor in small-scale farms. He observed that family labour is not only devoted extensively to production of tobacco but also used to attain self sufficiency in basic food requirements

for the family members. Messel and Johnson (1968) in their study in Zimbabwe observed that most peasants put more emphasis on subsistence food needs than producing tobacco for sale. Upton (1973) in Southwestern Nigeria, pointed out that the main goal of the small-scale farmer was survival rather than maximization of surplus benefits over costs. Minde (1978) noted that apart from profitability of the farm enterprise, decision making in small scale farming may be influenced by other social factors such as various amount of leisure time gained and relative increase in family comfortability. Ishuza (1984) suggested that in order to improve tobacco production, farmers may be provided with better extension, credit and marketing services and producer price must cover production costs incurred by farmers.

Albhai (1968), found that tobacco marketing in Tanzania presented a major problem in development of the crop. He pointed out that tobacco marketing constraints included low producer prices, inadequate curing and storage facilities, late price announcement by the Government and delayed tobacco purchases.

Feldman (1969) in his study on the importance of cost economies associated with increasing scale in Iringa tobacco production concluded that labour was the major problem in small- scale farms. He proposed that growers should work in teams to reduce labour bottlenecks on

tobacco farms.

Tobacco in Tanzania is mostly produced by small-scale holders (MDB 1987). Feldman and Fieldman (1969) encouraged peasants to work in teams (agricultural co-operation) as a solution to many social, economic and technical problems. Attraction on the idea of agricultural co-operation necessitated experimenting with different forms of co-operation but to their disappointment the final results were bad. In 1970, Feldman produced a report on the study about the alternative policy strategy for conducting tobacco programmes in Iringa Region. In his study he compared financial returns on individual small-scale farms with those of village settlement schemes. He concluded that family small-scale farms of 0.6 ha - 1 ha were most efficient.

Scale effect exists in tobacco production and can be expressed in three dimensions. According to FAO/UNDP/ODG (1976), firstly tobacco yield declines with an increase in tobacco planted area. The report under review reported that the average yield per ha in farms with sizes greater than 25 ha of tobacco is only 60 percent of the average yield per ha in farms with size ranging between 4-25 hectares. Secondly, the quality of tobacco is negatively related to the number of ha of tobacco planted. Thirdly, output per unit area increases at an increasing rate for additional unit of inputs in tobacco farms with the size

ranging between 4-25 hectares. On the other hand nearly constant returns to scale exists in tobacco farms with size less than 4 hectares.

Norman (1973) highlighted the problem of family labour allocation among various enterprises during the busiest months. He suggested that off-farm activities should be left aside thereby increasing farm labour during peak time. Nevertheless, the latter alternative would be effective if there was an idle labour due to lack of land in rural areas and if cash for hiring is available.

Kanga (1977) revealed that the issue of labour constraint in tobacco production in Tabora Region was realized by the World Bank Project Preparation Team when it was appraising the tobacco project in that Region. The team recommended that growers should restrict themselves to 2 acres (.8 ha) of tobacco. The recommendation was adopted by almost all farmers in the project. As regards social aspects, Simpton, Wilson and Young (1988) argued that farm size, family and individual characteristics influence the differentiation and integration of husbands and wives on off-farm operations.

2.4 Summary

In this chapter, factors taken into account when determining tobacco producer price have been reviewed. Although there has been a continuous increase in tobacco

nominal producer prices, constant producer prices have been falling for the past fifteen years. As regards provision of extension services emphasis is placed on farmers participation in developing their development programmes. Briefly land, labour and capital resources have been reviewed. Most of the studies regarding those factors of production indicated that labour and capital were the more limiting factors than land in small-scale tobacco production. Therefore in order to improve tobacco production in the country more studies on crop profitability nature and extent of economic factors affecting tobacco production are required.

CHAPTER III

DESCRIPTION OF THE AREA OF STUDY

3.1 Area, Population, Administrative Boundaries

Iringa District is one of the six Districts of Iringa Region. Others include Njombe, Mufindi, Ludewa, Makete and Iringa Urban (Figure 2-1). The District has an area of about 28 619 km². Based on 1988 census the District had a population of 363 605 people (women 174 624 and men 189 981). The population growth rate was 2.8 percent. Administratively, the District is divided into 9 divisions which are subdivided into 26 wards and further divided into 165 registered villages. As regards occupation, about 90 percent of able bodied people in the district depend on crop production. Crops grown include tobacco, maize, beans, vegetables, potatoes and cowpeas. Some of the population keeps livestock along side with crops. Some are also involved in small- scale industries including black smithing, mansonry carpentry and tailoring. The District has 4 national forest reserves covering an area of 245 369 hectares. There is also one big dam which is man-made and is used for generation of hydro-power and fishing.

3.2 Climate

The district is divided into three ecological zones. These include the upper zone which is over 3 000 m above

sea level. This zone has reliable rainfall exceeding 1 200 mm per annum and temperatures range between 0-8⁰C during cold months of May - July. The second zone is the middle part of the District. This zone lies between 1 000 - 1 800 m above sea level. The annual rainfall in this zone ranges between 700 - 1 000 mm per annum. The third zone is located below 1 000 above sea level. This zone is usually hot throughout the year with temperatures ranging between 26⁰C - 29⁰C. The mean rainfall per year in this zone is between 600 - 700 mm. According to the National Soil Service (1986), the rainfall regime in the District is typically unimodal falling from November to May.

Annual transpiration ranges between 1 450 and 1 500 mm (Ngasongwa 1988). In most of the areas growing tobacco in the District, the mean annual rainfall for a period of ten years was found to range between 500 - 3 000 mm (URT, 1987). Tobacco is grown in the middle part of Iringa district.

3.3 Agriculture and Livestock

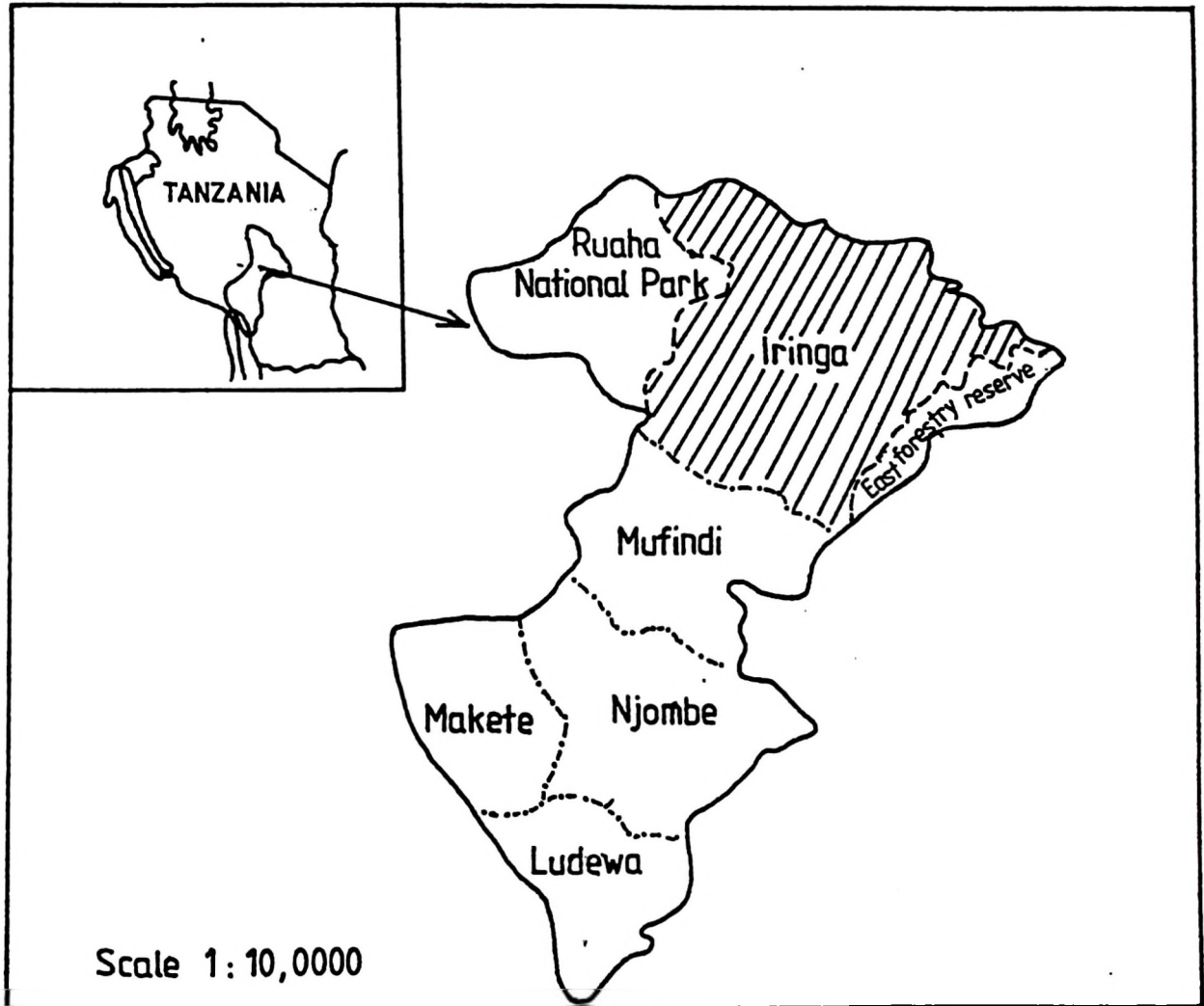
Agricultural activities play a key role in the economy of this District. According to Iringa District Council (IDC) (1990), the District has about 1 419 500 ha suitable for both agriculture and livestock production. Currently only 112 539 ha or 7.9 percent of total land suitable for agriculture and livestock is under

utilization. Most of the tobacco growing areas are found in the upper zone to the north west of Iringa town. Generally, soil fertility in the district is very low necessitating the use of fertilizers in crop production. During 1990-91 cropping season, the District had the following agricultural machinery and equipment: 125 tractors, 130 ploughs, 56 harrows and 4 combine harvesters (IDC 1990). Most of these are owned by private farmers and Government institutions.

Livestock kept in the District include cattle, goats, sheep donkeys and poultry. According to URT (1984), the District has a total of 684 563 livestock. Cattle and goats amounted to 253 264 and 94 221 respectively. Poultry number was 285 687 while sheep, donkeys and pigs amounted to 51 391.

3.4 Cooperatives

After the Government decision to re-introduce the cooperative unions in 1984, the District established one union for both Iringa and Mufindi Districts. The union is called Iringa/Mufindi cooperative union (IMUCU). Iringa District has 48 registered primary societies. These societies undertake several economic activities such as marketing of agricultural crops, running consumer shops and distribution of agricultural inputs. Others undertake small-scale projects such as hammer mills.



Key

- Regional boundary
- - - - - District boundary

 Area of study

Source IDC's Office Iringa 1990

Figure 1.2. Location of study area in Iringa region

3.5 Infrastructure

The district has a road network covering a length of 1 779 km. Out of these 100 km, 534 km and 1 145 km are nationally, regionally and districtly administered respectively. Most of the District roads are impassable during rainy season. Consequently input distribution and crop haulage activities in most areas of the District stop during the rainy season. This partly explains why most of areas suitable for agriculture in the District are not fully utilized.

3.6 Education

The district has 184 primary schools with a capacity of enrolling 60,137 pupils. About 98.4 percent of all village in the District have a primary school of the level of standard 1-7. About 88 percent of school aged children are in schools. The District needs 2 371 primary school teachers but has only 1 413 teachers.

There are 5 technical schools in the District. These schools offer technical subjects such as masonry, carpentry, plumbing, tailoring and domestic science. The District has only one folk college which is used to train farmers on how to improve production in both agriculture and livestock. Also there are 3 private secondary schools owned by IDC. These schools offer secondary school education of the level of ordinary level certificate.

As regards health activities, there are currently 53 dispensaries in the District of which 35 are managed by the District council and 18 by non-profit organizations. Besides curative activities, these dispensaries administer immunization, sanitation and health education to District members. In addition the District has 4 health centres and one hospital. Despite those efforts aimed at improving the health of people in Iringa District, the infant mortality rate in the District is still 15.2 percent (IDC 1990).

CHAPTER IV

METHODOLOGY

4.1 Study Design, Questionnaire Formulation
and Pre-survey

Two questionnaires were formulated for collecting farm data from large-scale and small-scale tobacco farmers in Iringa District. The data collected in both cases included type of crop enterprises and their returns, farm sizes, production costs, availability and utilization of land, capital and labour and availability of supporting services such as extension and credit facilities. Pre-survey was done in order to establish farming practices in the District; to determine likely problems in the acquisition of the relevant data required in the study and also to identify data sources. This process took about two weeks before developing the final questionnaires. Pre-survey results indicated that most of small-scale farmers did not have records of the production process. Also they had no paper records for farm returns obtained from different enterprises operated. On the other hand, large-scale farmers had good records. Few of them had ledger books with different types of data pertaining to farming activities since 1960s. It was also noted that some businessmen and civil servants in Iringa District are engaged in tobacco production.

4.2 Selection of the Survey Area

The survey was conducted in three divisions among the four growing tobacco in the District. The survey area for small-scale farmers covered six villages located in Kalenga Division. The reason for the selection is that more than 75 percent of the small-scale tobacco farmers in the District are found in this Division. Villages included in the survey were as follows: Mgera, Kiwere and Mfyome in Kiwere Ward and Nzihi, Mangalali and Kidamali in Kalenga Ward. The survey for large-scale farmers covered two divisions namely Kalenga and Ismani. The reason behind this choice was that all large-scale farmers under Southern Highland Tobacco Growers Association (SHTGA) are found in these two divisions. In order to obtain.

4.3 Data Collection

4.3.1 Primary data

Most of the primary data were collected by administering two structured questionnaires. The first was administered to ninety small-scale tobacco farmers and the second questionnaire was administered to twenty eight large-scale tobacco farmers. In addition, personal observations particularly on crop marketing and input distribution assisted in collecting some of the needed information.

4.3.2 Secondary data

These were obtained from the following organizations: Tanzania Seed Company (TANSEED) Iringa branch, Tanzania Fertilizer Company (TFC), Tanganyika Farmers Association (TFA) Iringa branch, Agricultural and Industrial Supply Company (AISCO) Iringa branch, Southern Highland Tobacco Growers Association (SHTGA), Tanzania Tobacco Processing and Marketing Board (TTPMB) Iringa branch, National Milling Corporation (NMC) Iringa branch, Iringa/Mufindi Cooperative Union (IMUCU), Cooperative and Rural Development Bank (CRDB) Iringa branch, National Bank of Commerce (NBC) Iringa Regional Office and Iringa District Council (IDC).

There was no formal questionnaire for the major part of the secondary data. Instead, guidelines were prepared before-hand and discussed with the relevant authorities of the data sources. In most cases authorities were found to be conversant and well experienced in interview-like discussions. Some of them volunteered to give a lot of details and useful information which had not been thought possible to get before-hand. Sometimes, files were used to extract the needed information.

4.3.3 Sampling procedures and sample selection

In the case of small-scale farmers, a sample of ninety households growing tobacco were selected from a

population of small-scale tobacco farmers registered by IMUCU for 1989-90 cropping season. This number was 1 598 for Iringa District. One Division was purposively selected because of its importance in tobacco production in the District. Then two wards among three comprising Kalenga Division were randomly chosen. There after six villages were randomly selected, three from each ward. Randomly 15 farmers were chosen from every village included in the sample. The procedure involved the following steps: A register of small-scale tobacco farmers was provided by IMUCU's management. The register contained tobacco farmers in each village for the whole District. Then 15 farmers were randomly taken from every village included in the sample. There was no regard given to spatial distribution of farmers in the selected villages.

For large-scale tobacco farmers' sample, purposive random sampling was used to obtain twenty eight farmers for inclusion in the survey. This number covers 75 percent of total tobacco farmers registered under SHTGA. Selected farmers were scattered in the following villages: Nyamihuhu, Nzihi, Nduli, Kidamali, Mgongo, Itamba and Mgera. The population for large-scale farmers was taken to be the total number of tobacco large-scale farmers registered under SHTGA. During 1989-90 cropping season the number was 37. It must be noted that all large-scale tobacco farmers in the District are registered under this

association. Both small-scale and large-scale tobacco farmers' samples were chosen randomly from each of the populations such that their sizes exceeded 5 percent of their respective populations (Freese 1962; Boyd et al 1981 and Bailey 1987).

4.4 The Formal Survey and Questionnaire Administration

The main method used to collect primary data for both small-scale and large-scale tobacco farmers was a formal survey. Two structured questionnaires were administered by the researcher. There were two enumerators over a continuous period of 3 months (July - September 1990). Each enumerator was able to interview at least two farmers per day and a maximum of four farmers a day depending on the farmers' willingness and ability to answer questions quickly. Where selected farmers were absent during the visit, arrangements were made to call back again at some other time. Interview for large-scale tobacco farmers was done by the researcher. At least one farmer was interviewed depending again on the ability of farmers to answer question and the distance between one farmer and another.

4.5 Analytical Methods

4.5.1 Descriptive analysis

In this study, an attempt was made to describe factors affecting production of flue-cured tobacco in Iringa District. Factors described include farmers' education, availability of extension services to small-scale farmers, farm size and locations. Others are tobacco barns, availability of fire-wood, soil fertility, rainfall and other natural disasters affecting agricultural production.

4.5.2 Regression analyses

In order to analyze the extent and nature of factors affecting flue-cured tobacco production in the study area, multiple regression analyses were applied. The procedure involved an estimation of the following models:

- 1) For small-scale farmers the model is

$$Y = a + b_1L + b_2A + b_3Ed + b_4K + b_5Z + ut$$

where;

Y = Average yield of tobacco in kg
obtained for the past three marketing
seasons

L = Labour available within the family
measured in adult equivalents as
explained in section 4.5.3

- A = Average area in ha of tobacco planted
for the past three years
- Ed = Level of education of farmers in years
- K = Average of working capital in Shs used for
purchase of tobacco seasonal inputs
per ha for the current two years
- Z = Average area in ha of maize planted
for the post three years
- a = Intercept (constant) term
- b_1-b_5 = Partial regression coefficients
- ut = Error term

2) For large-scale tobacco farmers the following model was estimated:

$$Y_0 = a_0 + b_{01}E_p + b_{02}K_0 + b_{03}A_0 + b_{04}L_0 + b_{05}Z_0 + ut_0$$

where;

Y_0 = Average tobacco yield in kg per ha
obtained within the past three years

E_p = Farmers' experience in tobacco
production measured in years

K_0 = Average value of variable costs in Shs
per ha incurred for purchase of
tobacco inputs for the past two years

A_0 = Average area in ha of tobacco planted
for the past three years

L_0 = Average hired labour per ha in man-days for the past three years

Z_0 = Average area in ha of maize planted for the past three years

a_0 = Intercept (constant) term

b_{01} - b_{05} = Partial regression coefficients

ut_0 = Error term

4.5.3 Enterprise budgeting

Production for self sufficiency in both food and cash is necessary if families are to be properly nourished, clothed and well housed. In order to achieve the above goal, farmers in Iringa District grow various cash and food crops. These include tobacco as the major cash crop and maize, beans, sunflower, groundnuts and tomatoes as food crops. For the purpose of this study only major crop enterprises that compete with tobacco in resource use are considered. These were identified as maize, beans and sunflower. Using enterprise budgeting technique, gross margin per ha for the selected enterprises were established. As regards assumptions underlying key variables used in determining net returns per ha of major crop enterprises in the study, the following were adopted:

1. Yield and area measurements

In this study yield indicator for all crop enterprises is kg per hectare.

However in the survey the common yield indicator used by most farmers was bags per acre for all crops except tobacco which was reported in kg per acre. Thus for the purpose of this study the following weight conversions were made with respect to one bag of different crops; maize 100 kg; beans 90 kg and sunflower 75 kg.

2. Labour

The following assumptions were made as regards labour variable. It is assumed that farmers in the survey area work for 25 days per month. This was after discounting all Sundays and one day allowance in every month in the calendar year. It is assumed that most farmers use Sundays and an addition of one day per month to perform other necessary social activities. These may include attending to church, marriage ceremonies, traditional dances, festivals and funeral activities. Other public holidays included in the calendar year were ignored because most of the farmers in the survey area do not observe them.

Labour units are measured in man-days and one man-day is equivalent to 8 hours of work of an adult person. Men and women aged between 17 - 55 years of age were categorized as adults.

Those above 55 and between 10 - 16 of age were made equal to 0.5 man-day equivalent. Since there is no division of labour in most of the farm operations in the study area, it was assumed that there are no significant differences between men and women in performing farm activities. In addition to performing farm operations it was expected that women had to attend fully to home based activities such as fetching water, cooking and rearing of children. Given the above assumptions, labour availability was determined on a monthly basis by multiplying the mean adult equivalent per family by the number of working days in the specific month. Brief outline on the limitation of budget enterprise. It must be noted that enterprise budgeting as a planning technique has the following limitations. It assumes that there is linearity between the resources used in the production process and the output obtained. Thus it ignores the fact that diminishing returns exists in the production process. Also it does not take into account the existence of complementary relationship among enterprises. However, if necessary information is available allowance can be provided for these mentioned aspects. Other problems include difficulties in estimating both the in estimating both the prices and yields especially by new farmers or those establishing new enterprises.

In addition, due to existence of uncertainty sometimes this planning technique becomes less meaningful for forecasting future events. Nevertheless, making calculations based on the best estimates is better than having no guidelines at all. Budgeting is also considered an inefficient technique if a profit-maximising plan is being sought. Many budgets may be required before a high profit plan is established, and still there would be no guarantee that substantially more profitable plans did not exist.

4.5.4 Direct programme planning

Direct programme planning technique was used in this study in order to establish an alternative farming systems that allow small-scale tobacco farmers in the survey area to optimize their family labour utilization. Labour is considered to be the most limiting factor of production. Land under small-scale farming is assumed to be enough in relation to the existing average family labour. However, in large-scale farming, fertile land is a limiting factor in the District. This analysis also assumes that most of the inputs needed for production of different crops are available to farmers through crop production credit obtained from farmers' primary societies.

Brief outline on limitations for programme planning technique programme planning has the following limitations: The technique depends heavily on trial - and

- error process of seeking an optimal solution. Also the lack of complete rigour is indicated by the fact that several alternative ways are tried for establishing the starting point of the calculations and the action to be taken when a resource is exhausted. Further more for a complex problem it becomes very difficult to establish the optimal plan. Thus there is a danger that complex problems may be deliberately over simplified in an attempt to contain the arithmetic with manageable proportions. This techniques requires more data than budgeting, but cannot easily deal with problems like 'lumpy' inputs, interdependence of enterprises and non linearity.

Nevertheless, the technique is capable of providing optimal or near optimal plans in relatively simple cases such that it offers the planner a means of making preliminary summary review of a complex problem, before deciding to use other advanced techniques for the purpose of getting more detailed solutions.

CHAPTER V

PAST AND CURRENT ROLES OF INSTITUTIONS INVOLVED IN TOBACCO
PRODUCTION AND MARKETING

5.1 Financial Institutions

Evidence exists to indicate that Tanzania has been putting effort to establish institutions to cater for rural finance and the agricultural sector in particular. For instance Local Development Fund and African Productivity Loan Fund were formed in 1947 and 1955 respectively in order to provide special credit facilities to small-scale farmers. Unfortunately complex procedures for loan disbursements impaired the efficiency of those organizations. Also in 1948, the Land Bank of Tanganyika started operations. The main clients of this bank were large-scale farmers including those growing tobacco in Iringa rural District. Credits to small-scale farmers were poorly organized. Thus the main shortcoming of this financial institution was inadequate credit to small farmers' needs.

In 1961, the Agricultural Credit Agency (ACA) was formed under Act No. 65 of 1961 in order to replace the Land Bank of Tanganyika (Collinson 1975). The ACA was established by the Government following an advice from the World Bank team and it was structured as a Government institution responsible for overall development of

agricultural sector. The Agency in its attempts to decentralize and reach many African farmers placed loan processing and approval under the District Loan Committees. This goal of disbursing loans to small-scale farmers was attained at a considerable cost due to the fact that there was no qualified staff to scrutinize the financed project and this led to adoption of non-feasible projects. Further the cost of administering thousands of disbursed loans placed a burden to the Agency beyond its financial ability.

Because of the thrust in Cooperative Unions in the mid 1960s and building upon the experience acquired from financing rural areas a decision was made by the Government that the Co-operative Unions should serve as basic units of distributing loans to the rural sector. To facilitate this move the National Co-operative Development Bank (NCDB) was formed. This bank was established under normal control of the Cooperative movements and became the holding company of the National Co-operative Bank (NCB) and the National Development Credit Agency (NDCA). In 1970, the NCB was absorbed by the National Bank of Commerce and NDCA was succeeded by Tanzania Rural Development Bank (TRDB). Binhammer (1975) pointed out that financial operations under NCDA were generally insignificant. Mwakilasa (1986) reported that there was no significant difference among financial operations

performed by both NCA and NCDA. One of the major reasons for dissolving NCDA in 1970 was its failure to assist the rural population in solving problems related to development (Mabele and Msambichaka 1979).

In 1971, the Government established TRDB with a mission to provide a comprehensive credit system for transforming subsistence farming into modern cash economy. Large clients of this bank were Co-operative Unions. With the abolishment of Co-operative Unions in 1976, the lending policy of TRDB was mainly tied to Ujamaa villages and other communal agricultural/development projects. However, lending to villages apart from rising overhead costs of the bank through an increasing loan administrative costs, loan repayments by those villages were poor since most of the villages who got loans were unable to run the project financed profitably. In 1984, the Government re-introduced Co-operative Unions and TRDB was transformed into the Co-operative and Rural Development Bank (CRDB). In addition to financing crop production CRDB started to operate commercial branches with the objective of mobilizing savings from rural areas and using them to finance rural sector.

Iringa region has two financial institutions that deal with rural credit. These include CRDB and the National Bank of Commerce (NBC). Tobacco production in the region is financed by CRDB. In 1985-86 cropping season,

15.2 percent of the total loans disbursed by the Bank was utilized in Iringa region (Appendix H and I). Tobacco farmers in Iringa District are among the big customers of CRDB. During 1988-89 and 1989-90 cropping seasons, those farmers received crop production credit amounting to Shs 146 600 000 and Shs 243 824 900 respectively (Appendix H).

Regarding availability of tobacco credit to farmers, survey results indicate that 89 percent (Table 5-1) of the large-scale farmers who apply for credit do not get it in time. This is because some of the applicants do not apply for the loan well in advance before cropping season starts. Also most of those farmers request for large amount of loans which require approval from the bank's head office and thus such long procedures result into delay of loan disbursements. On the other hand 54 percent (Table 5-1) of small-scale survey farmers indicated that they do not get seasonal input credits in time. One of the reasons for such delays is late loan applications by the Co-operative Union. Sometimes the bank may approve the loan in time but subject to certain conditions that may need to be fulfilled before effecting loan disbursements. These may include repayment of previous loans to reach a certain specified percentage of the outstanding loan arrears; provision of an audited balance sheet of the union for the last two years and borrowing ceiling certificate (maximum liability certificate) from the

relevant authorities. Co-operative union in most cases fail to meet the above mentioned conditions in time and thus farmers face the problem of getting the required inputs on time. Because of Co-operative union weaknesses in loan administration and recovery, villages which have fully paid their previous credits become the victims of circumstances. Also it must be noted that after the establishment of CRDB and re-introduction of Co-operative union in 1984, some of soft loans which were available to villages through TRDB ceased to exist and generally borrowing regulations for villages were tightened.

Currently the procedure for getting tobacco input loans for small-scale farmers involves an application for funds by viable primary societies to CRDB. No primary society is considered viable by the bank unless it has repaid at least 75 percent of previous outstanding loan arrears. IMUCU is getting working capital only for the purpose of purchasing a given amount of input stocks. Those stocks are supposed to be sold on cash basis to farmers and primary societies who do not qualify for getting credit from the bank.

On the other hand, until 1986, SHTGA on behalf of its members used to apply for tobacco input loans to CRDB. These loans were both in cash and in kind. After the establishment of commercial branch in the region (1987) tobacco input loans have been given in cash terms only.

Table 5-1. Iringa District: Credit availability to sample farmers

	Amount of credit		Time taken to get credit		Reasons for inadequate credit	
	Adequate	not adequate	delayed	no delay	lack of security	Others
Small-scale						
No.	41	49	27	63	48	1
percent	45.6	54.4	30.0	70.0	98.0	2.0
Large-scale						
No.	3	25	22	6	5	20
percent	10.80	89.20	78.60	21.40	20.00	80.00

Source: Survey data, 1990.

Farmers are required to open an account with the bank in order to facilitate loan disbursements. Depending on the farm operations, the farmer uses loan funds to meet farming costs under bank's supervision.

The above system of loan disbursements appear to be convenient to both the bank and farmers. This is because it reduces physical handling of fertilizers and other tobacco inputs by the bank. In this case farmers are able to purchase the required inputs at their convenient time and place. However the system has resulted into farmers complaining about high interest rates on loans arising from monthly compounding procedures used by the bank. Most of farming projects and particularly tobacco production generates revenues once per year after selling harvested crops. Thus charging interest of 31 percent per annum which is the same as that charged over commercial business loans puts the farmer at a disadvantage.

5.2 Agricultural Extension Services

According to Maunder (1973), agricultural extension is a service or system which assists farm people, through educational procedure, in improving farming methods and techniques, increasing production efficiency and income, better their level of living and lifting the social and educational standards of rural life. Tanzania has been practising conventional extension system inherited from

the colonial Government. Generally the main objectives of conventional agricultural extension approaches were centred around increasing national agricultural production, including food and export crops (Swanson and Claar 1984). The approaches included Balanced Extension and Focal Point systems. In the Balanced Approach, extension services were geared towards the availability of export crops and maintaining stability in the colony. Thus in this approach the colonial Government established programmes aiming at preventing famine and maintaining soil fertility. Attempts were made to resettle people in sparsely populated areas and to promote cash crops through settlement schemes. In this approach the extension philosophy emphasized on control and coercion. Consequently this approach was hated by the indigenous and resulted into Government opposition. Focal point approach was used in order to ensure optimization of resources. Thus resources were concentrated in high agricultural potential areas such as those in northern, western and southern parts of the country.

After Independence in 1961, both Balanced and Focal Point extension approaches were modified in order to introduce educational and persuasive methods. Thus agricultural extension approaches included Transformation and Improvement; Frontal; and other approaches which were specific to certain projects being undertaken by them.

For instance Farming System Research and Extension; Participatory Approach and Planning Rural Development at Village level projects.

According to Bunting (1986) a full accountable extension system must provide farmers with services they require and be able to convey new technological information appropriate to farmers. In order to achieve this goal there must be a good policy deliberately formulated to serve specific farmers. Thus lack of clearly defined, officially recognized philosophy to guide extension services and staff training at all levels is one of the major problems which was faced by Tanzania since her Independence (URT 1984).

In 1976, when the Government decided to dissolve Cooperatives, Tobacco Authority of Tanzania (TAT) was given responsibilities of advising, supervising and regulating all development in tobacco industry in the country (MDB 1987). Tobacco farmers continued to get extension services from TAT. After the establishment of National Agricultural Policy (1982) extension services were again transferred from TAT to the Ministry of Agriculture and Livestock Development by then. Centralization of agricultural extension services as claimed by tobacco farmers in the study area, reduced the availability of those important services to farmers. However it must be noted that among other objectives, the

National Agricultural Policy was formed in order to improve agricultural extension services in the country.

In 1986 the Training and Visit (T & V) system identified by Benor and Baxtor (1984) was introduced in Tanzania. The T & V system was strongly advocated by the World Bank as the most suitable system for developing countries like Tanzania. The system is an incentive approach in extension organization and management and it requires among other things adequate funds and clear line of command in the extension services. Regular and tight supervision of field staff by their supervisors; regular training of extension staff and frequent visits to contact farmers are among major features of this extension approach. The system is very expensive to run and sometimes contact farmers might not communicate new innovations and hence the assumed two stage diffusion process fails to take place as expected.

5.3 Tobacco Marketing Institutions

Until 1975, tobacco in Tanzania was purchased from producers and transported to factories for processing by Co-operatives and then marketed on behalf by the Tobacco Marketing Board (TMB). During 1976 when the Government dissolved the Co-operatives, TMB was transformed into Tobacco Authority of Tanzania (TAT). Thus TAT was given responsibilities for procuring, transporting, processing

and marketing of Tobacco.

Contrary to the general negative characterization of the Co-operative as exploitative middlemen, the Co-operative were not as inefficient as many researchers during 1960s and early 1970s had led the Government to believe (Odigaard 1985). The re-organization of the marketing system that followed these negative assessments, led to increase in marketing costs and also it appears that the reorganizations of the marketing system during the mid 1970s made farmers in the country to lose faith in the newly formed system. Partly for this reason farmers decided to grow food crops that could be sold in the traditional food markets. The amount of produce marketed in the official marketing system consequently declined and thereby the financial viability of the new formed marketing system was undermined.

In 1984, the Government re-introduced Co-operative Unions in the country. In 1985, TAT was replaced by Tanzania Tobacco Processing and Marketing Board (TTPMB). TTPMB is responsible for transporting tobacco from marketing centres to the factory for processing and thereafter marketing of the crop. Tobacco procurement at village level is done by the respective Cooperative unions in the Region/District.

The procedure involves purchase of crops by primary societies on behalf of co-operative unions.

The union is also required to transport all purchased tobacco to the marketing centres where it is handled over to TTPMB. Usually tobacco marketing season starts in March and ends in August every year. Flue-cured tobacco is transported from marketing centres to Morogoro factory where it is processed. Fire-cured tobacco is transported to Songea factory and processed under the care of Ruvuma Cooperative Union (RCU) before being handled over the TTPMB for marketing.

Other problems related to tobacco marketing in Tanzania include lack of good curing barns at farm level, poor marketing centres in the villages especially in the study area and inadequate storage facilities at village level and factories. As a result of these problems there was a marked increase in deterioration in tobacco quality at different stages of handling during tobacco processing and marketing in the country. For instance it was estimated that about 25 percent of total value of tobacco produced by small-scale farmers in the country was lost during handling from the barn to processing factories during 1979-80 marketing season (Kaaya 1981).

In an attempt to minimize these losses in the country, two projects were identified and implemented. These included Tobacco Processing Project 658-TA and Tobacco Handling Project 802-TA.

Both projects were financed by the International

Development Agency under the World Bank Aid Programmes. Funds were channelled through TRDB now CRDB. Major components of those projects included construction of new storage facilities and infrastructures at Morogoro tobacco processing factory and construction of grading, bailing and marketing centres at village level with particular attention to Tabora Region.

Despite these deliberate efforts for improving tobacco marketing, there are still numerous tobacco marketing setbacks in the rural areas. In Iringa District for instance, survey results indicate that about 50 percent of small-scale tobacco farmers do not get tobacco payment immediately after delivering their tobacco to co-operatives. Some of tobacco farmers complained of not receiving their tobacco payments for the last six months. Others reported that they have problems related to low producer price, low tobacco grade offered at the marketing centres, poor system of tobacco payments to farmers and delay in starting tobacco marketing season. It must be noted that apart from causing unnecessary financial constraint to farmers such delays in tobacco buying results into tobacco losses since the farmer is forced to store cured tobacco for a considerable period of time before selling.

5.4 Input Delivery Institutions

The use of the Co-operative movements in Tanzania as a vehicle for the distribution of input to farmers dates back to 1960s. In 1971, TRDB was established and since then in collaboration with Co-operatives it started distributing tobacco inputs in the country. TRDB was mainly responsible for distributing fertilizers while other tobacco inputs were distributed by Co-operatives and then by TAT after abolishing the Co-operatives in 1976. Sometimes activities under those institutions were not synchronized and consequently one could deliver the required inputs in time while the other made late delivery. For instance, delay of tobacco fertilizer was common in most of tobacco growing areas during the period of 1976-77 to 1984-85. As a result there was late tobacco planting. Because of this reason leaf curl and bushy top diseases occurred and caused tobacco losses. In certain places late supply of tobacco packing materials by TAT caused late harvest of the crop.

After re-introduction of co-operative unions in the country (1984), physical handling of tobacco inputs particularly fertilizers was transferred to Unions. Also TRDB was changed into CRDB and since then it is involved only in financial aspects of crop inputs. In 1985, TAT was replaced by TTPMB and hence all input distributing

activities which were handled by TAT were taken over by TTPMB.

In Iringa District since 1984 tobacco input distribution activities particularly fertilizer handling are supposed to be performed by IMUCU. Due to the following reasons IMUCU has failed to perform this important role in the District: Lack of qualified staff needed for estimation and identification of specific inputs required by farmers; the Cooperative had no proper administrative procedures to trace the flow of credit to the final borrower and back in terms of loan repayments; and sometimes at primary society level there is a sheer lack of documentation of issues regarding input disbursements to farmers and loan repayments. Also it is claimed that there is corruption and irresponsibility among senior staff of the co-operative. Because of the above reasons and also due to high interest (31 percent) rate on borrowed money and compounded on monthly bases, IMUCU has failed to repay previous loans. Consequently, CRDB refused to continue financing seasonal input projects undertaken by the union. Instead, IMUCU is supposed to apply for an overdraft from the bank. The overdraft approved by the bank is supposed to be used to purchase inputs which are sold on cash terms and it is renewable after every six months.

5.5 Summary

Basically there are four types of public institutions that are involved in tobacco production and marketing in Tanzania. These include financial, agricultural extension, input distribution and marketing institutions. Generally, these institutions have been changing their roles over time since Independence (1961). Those changes aimed at improving performance of respective organizations in terms services they provide to Tanzania farmers. Several problems have been facing tobacco industry in the country. Certain problems were common to all sectors of the economy and others were specific to tobacco.

CHAPTER VI

RESULTS AND DISCUSSION

6.1 Descriptive Analysis of Factors Affecting Tobacco Production**6.1.1 Farmers' education**

Education is one of the major long term strategies that may be used to improve agriculture in the developing countries like Tanzania. Amani et al (1984) reported that education at earlier stages of development in agriculture contributes about 50 percent of the variation in total agricultural output. Education is a factor of growth and productivity (Odigaard 1985). Thus a prosperous agricultural development requires a broad base of education of the rural population.

In this study survey results indicate that about 74 percent (Table 6-1) of total small scale farmers have education level which is less or equal to standard four. Approximately 20 percent of those farmers have completed primary school education. This implies that most of the children who finish primary school education are not involved in tobacco production. Reasons for this may include the fact that tobacco enterprise is less attractive to new farmers than other crop enterprises grown in the area. Also tobacco production requires large amounts of cash of which most of young farmers do not have. In addition the results show that 5.5 percent of

small-scale farmers have secondary education or more. Most of those farmers are civil servants particularly primary school teachers and agricultural extension agents.

Contrary to small-scale farmers, most of large-scale farmers have secondary school education (Table 6-2). Because of this reason and also due to long experience they have in tobacco production, large-scale farmers find it unnecessary to make use of the extension agents.

6.1.2 Extension services

Results show that about 20 percent (Table 6-3) of small-scale farmers do not completely get agricultural extension services. Also about 30 percent of small-scale tobacco farmers get extension agent visits for not more than 3 times per year. It is claimed by farmers that most of those agents visit them during planting and harvesting seasons for the purpose of collecting data on acreages of different crops grown and crop yields obtained after harvest. Normally such information is required by the Ministry of Agriculture, Livestock Development and Cooperatives. In addition the results indicate that 20 percent of small-scale farmers get extension visits frequently (more than 10 times) every year. It was observed that most of the farmers who get frequent visits are progressive farmers. Those farmers are easily motivated and supervised and some of them claimed that they provide transport facility to extension agents during

those visits. However, the general trend of extension agent visits to farmers as shown in the Table under review reveals that there is a decline in the number of visits to small-scale farmers. Reasons for such trend may include lack of reliable transport for extension staff and inadequate extension agents to meet the demand in the District.

As regards tobacco yield per ha and farmers' education, research findings indicate that about 50 percent (Table 6-4) of small-scale tobacco farmers with education level of not more than standard four obtains 300 - 900 kg of tobacco per hectare. Also 24.7 percent of the small-scale farmers get tobacco yield exceeding 900 kg per hectare.

Table 6-1. Iringa District: Frequency distribution of
education level for small-scale sample farmers

Level of education	No.	Percent	Cumulative percent
No formal education	9	10.0	10.00
Adult education	15	16.70	26.70
Standard 1-4	43	47.80	74.40
Standard 5-8	18	20.00	94.40
Standard 9-14	3	3.30	97.80
Colleges/University	2	2.20	100.00

Source: Survey data, 1990

Table 6-2. Iringa District: Education and yield per ha for large-scale farmers

Education Level	----- kg per ha-----								T o t a l	
	0 - 300		301 - 600		601 - 900		> 900			
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Non formal	0	0	0	0	0	0	0	0	0	0
Adult education	1	3.6	0	0	0	0	0	0	1	3.6
Standard 1 - 4	0	0	0	0	3	10.7	0	0	3	10.7
Standard 5 - 8	0	0	0	0	4	14.3	3	10.7	7	25.0
Standard 9 - 14	0	0	5	17.9	2	7.1	7	25.0	14	50.0
Colleges/University	0	0	2	7.1	0	0	1	3.6	3	10.7
Total	1	3.6	7	25	9	32.1	11	39.3	28	100.0

Source: Survey data, 1990

Table 6-3. Iringa District: Extension agent visits to small-scale sample farmers during the period of 1988 - 1990.

No. of visits	1988		1989		1990	
	No. of respondents	percent	No. of respondents	percent	No. of respondents	percent
0	16	17.8	17	19.2	23	25.6
1-3	31	34.5	30	33.3	26	28.9
4-6	12	13.3	18	20.0	14	15.5
7-10	15	16.6	7	7.8	9	10.0
> 10	16	17.8	18	20.0	18	20.0

Source: Survey data, 1990

Table 6-4. Iringa District: Tobacco yield and small-scale farmers' education

Farmer's education	----- kg per ha-----								T o t a l	
	0 - 300		301 - 600		601 - 900		> 900			
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Non formal	0	0	2	2.4	4	4.6	2	2.4	8	9.4
Adult education	1	1.2	4	4.7	6	7.1	4	4.6	15	17.6
Standard 1 - 4	2	2.4	11	11.8	24	27.0	6	7.0	43	48.2
Standard 5 - 8	0	0	4	4.7	7	8.2	6	7.1	17	20.0
Standard 9 - 14	0	0	0	0	0	0	2	2.4	2	2.4
Colleges/University	0	0	0	0	1	1.2	1	1.2	2	2.4
Total	3	3.6	21	23.6	42	48.1	21	24.7	87	100.0

Source: Survey data, 1990

6.1.3 Farm locations and tobacco yield

Survey results indicate that about 73 percent (Table 6-5) of small-scale tobacco farms are located within 2 km from the homesteads. Farms very close to the homesteads are planted with maize and beans which are preferred crops to most of the farmers in the study area. Minde (1985) and Odigaard (1985) reported that normally the land cultivated by small-scale farmers forms a set of concentric rings radiating from their shelters. This implies that most of small-scale farmers do have farms located around their homesteads. With respect to tobacco yield about 50 percent (Table 6-5) of the farms located within 2 km from the shelters get yields between 300 - 600 kg per hectare.

6.1.4 Tobacco barn and tobacco quality

The kind of barns possessed by small-scale tobacco farmers differ in size and type of construction (Table 6-6). Most of the farmers have curing barns built of poles with thatched roofs. These barns have a life span of six years. The commonest barn size has dimensions of 4 m x 4 m. The cost of constructing such a barn is estimated at Shs 35,000.00. Two barns are required for curing 1 ha of tobacco.

Table 6-5. Iringa District: Farm location and tobacco yield in kg per ha for small-scale farmers

Farm distance from the household	0 - 300		301 - 500		501 - 900		> 900		Total	
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
----- km -----										
0 - 2	2	2.4	14	15.3	31	34.1	19	21.1	66	72.9
2.01 - 3	0	0	1	1.2	7	8.2	1	1.2	9	10.6
3.01 - 4	1	1.2	4	4.7	2	2.3	0	0	7	8.2
> 4	0	0	2	2.3	3	3.6	2	2.4	7	8.3
Total	3	3.6	21	23.5	43	48.2	22	24.7	89	100.0

Source: Survey data, 1990

Often the sizes of these barns are not correlated with the volume of tobacco crop to be cured. Due to this reason tobacco barn is either overcrowded or half-filled and consequently the crop is spoiled in case of overcrowding and sometimes the barn catches fire resulting into total loss of the crop. On the other hand, under-utilization of the barn capacity results into woodfuel wastage. Apart from good quality barn, the farmer is required to have curing skills in order to get good quality tobacco. Barns constructed by bricks with iron sheet roofs are recommend for tobacco curing in the District.

6.1.5 Availability of fire-wood

Wood is an important raw material in tobacco processing. It is a source of fuel for curing tobacco and provides construction materials for tobacco handling structures. These requirements are obtained from 'miombo' woodlands. Available data show that 1 ha of woodland is required for curing of 1 ha of tobacco (Temu 1979).

Cost of procuring fire-wood are increasing annually because of an increase in fuel prices in the country and increasing distance of the wood source as more land is cleared for wood and cultivation. Most of the small-scale farmers in the study area indicated that they cut fire-wood 30 km or more away from their curing barns.

In addition transport facilities are not adequate and sometimes the roads to the forest are impassable because of rains. This results into delay in fire-wood haulages. Kaaya (1981) reported that 45 percent of the amount of fire-wood needed to cure tobacco during 1979-80 crop season was still in the forests by the end of 1980-81 tobacco marketing season.

6.1.6 Soil fertility

Soil fertility in large-scale farms in Iringa District is very low (UDSM 1980). Small-scale tobacco farmers in certain villages in the District face similar problems as they have been allocated land which was formerly farmed by white settlers. Large-scale tobacco farms have been in use since 1940s and were initially set up for growing 20-75 ha of tobacco per annum under the system of crop rotation. However, since returns from tobacco production were large, farmers decided to expand their tobacco farms and abandoned crop rotation. This caused a decline in soil fertility since all organic matter in the soil was depleted and there was no replacement. Due to declining soil fertility, farmers have been using intensively chemical fertilizers with a consequent imbalance of major minerals in the soil resulting into soil acidity.

Table 6-6. Iringa District: Type of tobacco curing barns, construction costs and average life span

Type of wall construction	Thatched ^{a/}		Iron sheets	
	Cost	Life span	Cost	Life span
	<u>Shs</u>	<u>Years</u>	<u>Shs</u>	<u>Years</u>
Bricks	25,000	6	50,000	15
Mud	10,000	6	35,000	6
Poles	15,000	6	40,000	6

Source: Survey data, 1990

^{a/} Thatched roofs are replaced after every 3 years.

6.1.7 Rainfall and other natural disasters

Most of the sample farmers indicated that they have been getting good weather for their crops. Rainfall on average was good for the past four years. The most common natural disaster experienced by tobacco farmers was hailstorm. About 25 percent of large-scale tobacco farmers indicated that they face this problem. Crop damage due to hailstorm may reach 75 percent of the total yield expected.

6.2 Estimation and Interpretation of Multiple Regression Models

Multiple regression analyses have been used in order to provide a more detailed picture of the nature and extent of important variables on tobacco yield. Two regression equations for both small-scale and large-scale farmers as indicated in section 4.5.2 were estimated using SPSS computer package and the following prediction equations were obtained.

6.2.1 Prediction equation and interpretation of multiple regression results for small-scale farms

$$Y = -264.0591 + 15.7165L + 387.9035A + 16.1019Ed + 0.0248K - 41.7448Z$$

(-1.592) (0.586) (6.315)** (1.039) (3.500)** (4.022)**

$R^2(\text{adjusted})=0.67$. Standard Error of Estimates (SEE)= 4372.42

** Significant at P = 0.01

Where;

Y = Predicted average tobacco yield in kg per hectare

L = Available family labour in man-days

A = Area under tobacco production in hectare

Ed = Level of education of farmers in standards

K = Amount of money in Shs used in tobacco production per hectare

Z = Area under maize production in hectare

The t-statistic values of the estimated coefficients are in parentheses.

As indicated in the above prediction equation, only three variables were statistically significant in influencing tobacco production on individual farms. These factors are area under tobacco production the amount of working capital used to purchase physical tobacco inputs per hectare and the area under maize production. An increase in tobacco area by one ha on average is expected to increase total tobacco yield in an individual farm by 387.9 kg after allowing other factors in the equation to

be constant. Similarly, an increase in working capital by Shs 100.00 per ha is expected to increase tobacco yield by 2 kg worth (245 x 2.5) Shs 612.50. This implies that there is a return on investment amounting to (612.50 - 100) Shs 512.50 resulting from working capital of Shs 100.00. Again allowing other factors in the model to remain unchanged, an increase in one ha of maize is expected to reduce tobacco yield per ha by 42 kg. This is likely to be true because the existing resources under the household level in particular labour and capital are spread to meet the requirements of both crops.

The multiple correlation coefficient R^2 (adjusted), indicate that 61 percent of variation observed in tobacco output obtained by small-scale farmers is explained by the variables included in the estimated model. The F-test for the obtained R was statistically highly significant $F = 33.9111***$ (Appendix J). This implies that it is unlikely to find out that the factors included in the above multiple regression model do not explain the variation observed in tobacco yield obtained by small-scale farmers in the study area. The most important single variable determining those variations is the area of tobacco planted. If this variable was to be removed from the analysis, the value of the multiple correlation coefficient R^2 (adjusted) falls from 0.61 to 0.40 (Appendix J).

As regards simple correlation coefficients between the regressed variables (table 6-7), results indicate that:

- 1) Total tobacco yield in an individual farm is highly associated with both tobacco planted area and the amount of working capital spent for purchase of physical inputs used in tobacco production and area under maize production. This again confirms the results obtained in the above multiple regression analyses.

- 2) Positive correlation exists between tobacco area planted, tobacco yield per ha and the amount of working capital used in tobacco production. This is logical since working capital is a limiting factor in small-scale tobacco production. An additional unit of working capital used in tobacco production is expected to increase tobacco yield per hectare. Also an increase in tobacco planted area is expected to increase tobacco yield obtained in that specific individual farm but such an increase in tobacco production is usually associated with the use of more working capital.

Table 6-7. Iringa District: Simple correlation matrix
for factors influencing tobacco production
under small-scale farms, 1990

Correlations	Yield	Area	Working capital	Education	Family labour	Maize area
Yield	1	0.7475***	0.6606***	0.1631	0.1469	0.5888***
Area		1	0.6167***	0.0967	0.1166	0.4856***
Working capital			1	0.1387	0.1633	0.3091**
Education				1	-0.1081	0.1532
Family labour					1	0.3498***
Maize area						1

Source: Computer print out of survey data

*** Significant at P = 0.001 (1 tailed test)

** Significant at P = 0.01 (1 tailed test)

6.2.2 Prediction equation and interpretation of multiple regression results for large-scale tobacco farms

$$Y = 527.9254 + 20.2658Fe + 0.0894L - 6.1852A + 4.2892 \times 10^{-5}K - 1.8008Z_0$$

(3.958) (5.366)** (0.238) (-2.317)* (0.428) (0.629)

$$R^2 \text{ (adjusted)} = 0.56 \qquad \text{SEE} = 212.4099$$

* Significant at P = 0.05

** Significant at P = 0.01

Where;

Y = Predicted average tobacco yield in kg per hectare

Fe = Farmer's experience (years) in tobacco production

L = Hired labour in man-days per hectare

A = Total tobacco area in ha planted

K = Amount of working capital used per ha to purchase tobacco physical production inputs.

Z₀ = Area under maize production in hectare

The t-statistic values of estimated coefficients are in parentheses.

The results in the above prediction equation show that there are only two variables which are statistically significant at P = 0.05 and 0.01 in explaining the observed variation in tobacco yield per ha under large-scale farms. These factors are total tobacco area planted by an individual farmer and farmer's experience in tobacco farming respectively. According to the above results, an increase in one year in tobacco farming for any given large-scale farmer on average is expected to increase tobacco yield per ha by 20.3 kg after allowing other

factors included in the model to remain unchanged. Also an increase in one ha of tobacco within an individual farm is expected to decrease the yield per ha by 5 kg. This is due to the fact that scale effect exists in large-scale tobacco production. It must be noted that the average farm size for large-scale tobacco farmers in the study area is 34.5 hectares. Since tobacco is a labour intensive crop, increase in tobacco planted area implies that more labour must be used in tobacco production. Because hired labour is one of the limiting factors under tobacco large-scale farms, an increase in tobacco area reduces available hired labour per ha for a given specific tobacco farm and hence a reduction in yield. FAO/UNDP/ODG (1976) reported that the average yield per ha in farms with sizes greater than 25 ha of tobacco is only 60 percent of that obtained in farms with size ranging between 4-25 hectares.

The multiple correlation coefficient, R^2 (adjusted) indicates that 56 percent of the variation in tobacco yield per ha observed among individual large-scale farms is explained by the variables included in the estimated regression model. The F-test for the obtained R was highly statistically significant $F = 7.3669^{***}$ (Appendix K). This means that it is unlikely that the factors included in the estimated model do not explain the observed variations in tobacco yield per ha in large-scale farms. However, the most important variable determining those variations is

the farmer's experience in tobacco farming. This appears to be logical since some important farm operations such as construction, maintenance and use of tobacco barns require skill acquired from tobacco farming. It must be pointed out that some of large-scale farmers started tobacco production in the study area since 1950s and thus they have long experience. If the above discussed variable was to be removed from the analyses R^2 drops drastically from 0.648 to 0.149 (Appendix K).

With respect to simple correlation coefficients between the regressed variables in case of large-scale farms (Table 6-9), result show that:

- 1) Tobacco yield per ha under large-scale farms is highly correlated with farmer's experience in tobacco production.
- 2) Tobacco planted area in ha is positively correlated with farmer's experience in tobacco farming. Again this is true because most experienced tobacco farmers have large farms of tobacco. These farmers have employed permanent farm workers and hence they face relatively less problems of labour supply to their farms.

Table 6-8. Iringa District: Simple correlation matrix for factors influencing tobacco yield per ha under large-scale farms, 1990

Correlations	Yield/ha	Area /ha	Labour /ha	Working capital /ha	Farmer's experience	Maize area
Yield/ha	1	-0.0375	0.3247	0.3090	0.6681***	0.0639
Area/ha		1	-0.1257	0.1058	0.4633**	0.8074**
Labour/ha			1	0.8347***	0.0978	0.1492
Working capital/ha				1	0.1809	0.1103
Farmer's experience					1	0.4291
Maize area						1

Source: Computer print out of survey data

** Significant at P = 0.01

*** Significant at P = 0.001

- 3) Labour use in man-days per ha is highly correlated with amount of working capital used in tobacco production per hectare. This is sensible because the more working capital applied to purchase tobacco inputs per ha the more one would require labour for using those inputs in the production process.

6.3 Enterprise Budgeting and Direct Programme Planning

6.3.1 Enterprise budgeting

For more than a decade past, Tanzania has been undertaking measures that encourage food production particularly maize. Efforts were centred on expansion of maize acreages planted annually, use of biological innovations and continuous increase of annual maize nominal producer prices. These policies make maize production more attractive not only as a subsistence food crop but also as an additional source of income (Kaaya 1981). As regards labour allocation, an increase in maize production implies reduction of labour available for tobacco production in areas where both of these crops are important.

There is evidence to indicate that crop enterprise competition exists in Iringa District. For the purpose of this study three crop enterprise competing with tobacco were studied and the following results were obtained.

The most profitable enterprise was maize resulting in a gross margin per ha of Shs 52 095.00. It was followed by beans that resulted into a gross margin of Shs 39 500.00 per ha, tobacco ranked the third with a gross margin per ha of Shs 23 494.00. Sunflower ranked the fourth with a gross margin per ha of Shs 10 000.00.

Considering labour requirements and return on labour, beans have the highest return on labour followed by maize and then sunflower. Tobacco has the lowest return on labour (Table 6-9). The values of return on labour per man-day were Shs 415.80, 323.60, 134.70 and 44.75 for beans, maize, sunflower and tobacco enterprises respectively (Table 6-10). As indicated in the table under review, tobacco crop demands largest amount of man-days (525) per ha when compared to other crops grown together in the study area. Due to high net return on labour accruing from beans, maize and sunflower and also because of their relative low demand of labour, tobacco farmers in the District have been allocating their resources in production of maize, beans and sunflower at the expense of tobacco crop.

6.3.2 Direct programme planning

In this section the main objective is to establish an alternative farming system that in addition to allowing small-scale tobacco farmers to produce food for their

subsistence, they will optimize their family labour in order to get maximum cash income from crop sales. Programme planning technique is employed to determine the best combination of existing crop enterprises. As in the case of enterprise budgeting, the analyzed enterprises are identified as those which adequately predict the major production opportunities available to small-scale farmers in the study area. Crops such as groundnuts, cowpeas and potatoes with relatively low competition nature were not considered in this analysis.

Based on the findings, land is freely available to small-scale farmers in the District. Also farm mechanization in the sense of use of tractors, planters, etc. and hired labour are omitted in this analysis because most of surveyed small-scale farmers depend on family labour for most of farm operations.

Assumptions underlying yield, area and labour in determining monetary returns per unit area of each of major crop enterprise are described in section 4.5.3 and Appendices L, M, N and O. With respect to family labour, surveyed households had an average of 5.8 family members with a range from 1-15 people per family. There were 3 adult equivalents per household throughout the year with an exception of December and June months when most of the schools are closed for holidays.

Table 6-9. Sample farmers: Gross margins for various crop enterprises

Item	Tobacco	Maize	Beans	Sunflower
Yield per ha (kg)	776	5500	1300	765
Price per kg (Shs)	97.25	11.30	33.00	20.00
Gross returns (Shs) per ha	75 446.00	62 150.00	42 900.00	15 300.00
Costs for physical inputs in Shs per ha	51 972.00	10 055.00	3 400.00	5 200.00
Gross margin in Shs per ha	23 494.00	52 095.00	39 500.00	10 100.00
Man-days per ha	525	161	70	75
Net cash return per man-day	44.75	323.57	564.30	134.66

Source: Survey data as indicated in Appendices L, M, N and O.

During those months the available adult equivalents per family is four. This is because there are two pupils on average in each family with age between 10 - 16 years of age. Labour demand on monthly basis per ha of each major crop enterprises grown in the survey area was established as indicated in Table 6-11.

6.3.2.1 Production of food crops for subsistence requirements

Due to the fact that food markets in the rural areas are unreliable, farmers tend to depend on their own food production for their food requirements. Based on the consumption patterns in the district obtained from IDC, food requirements for an average family of 6 people were estimated at 1 150 and 100 kg of grain (carbohydrates) and protein respectively. For the purpose of this study, the major source of protein is taken to be beans. Maize is considered to be the chief source of carbohydrates. Thus each family is supposed to grow at least 0.25 ha of maize and 0.1 ha of beans in order to get food for its subsistence requirements. Labour use for the proposed crop production for food requirements is indicated in Table 6-10.

6.3.2.2 Maximum cultivatable land for each of major crop enterprises grown in the survey area

For the purpose of this study, the maximum cultivatable land is determined by the amount of labour requirement and remaining family labour (Table 6-11). The amount of maximum cultivatable land is obtained by dividing the remaining family labour in the given month by labour requirement for specific crop in that particular month. Thus the initial maximum area for a given specific crop becomes the smallest ratio obtained. Possible feasible changes in crop husbandry that result into higher gross margins for those analyzed enterprises are also discussed in this section. Maximum gross margin is established by multiplying the gross margin per ha of analyzed crop enterprise times maximum crop area obtained after considering labour constraints. Gross margins for each crop enterprise analyzed were obtained as indicated in Appendices L, M, N and O. The optimum sole crop is the one resulting into the largest gross margin.

Solution 1: Growing tobacco only

Based on crop labour requirements indicated in Table 6-11 the most labour critical month for tobacco crop is November. During this month 84 man-days are needed per ha of tobacco as compared to the remaining family labour of 65 man-days available for crop production.

Table 6-10. Iringa District: Monthly family labour use in man-days for suggested production for food requirements in the survey area

Item	Area	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	---ha---	-----man-days-----												
Maize	0.25	3.0	3.0	0	3.0	0	3.5	3.5	3.5	3.5	3.5	7.0	6.75	40.25
Beans	0.1	0	3	0.3	1.5	1	1	0	0	0	0	0	0	7.0
Available labour ^{1/}		72	66	75	72	72	98	72	72	72	72	72	102	917
Remaining labour		69	60	74.8	67.5	71	94.5	69.5	69.5	69.5	69.5	65	95.25	875

Source: 1. Computed from crop requirements indicated in table 6-11.

2. ^{1/} Developed as described in section 4.5.3

Table 6-11. Iringa District: Monthly remaining family labour after meeting subsistence requirements in man-days per ha of each major crop enterprise grown in the survey area

Item	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Remaining labour	69	60	74.8	67.5	712	94.5	69.5	69.5	69.5	69.5	65	95.25	875.05
Labour requirement per ha:													
Tobacco	30	30	44	44	55	31	31	40	55	18	84	63	525
Maize	12	12	0	12	0	10	10	10	10	27	28	30	161
Beans	0	30	2	15	10	10	0	0	0	0	0	0	70
Sunflower	0	55	5	20	0	15	0	0	0	0	0	0	75

Source: Survey data, 1990

Thus the maximum tobacco area is $65/84 = 0.77$ hectare. According to previous discussion, the maximum tobacco gross margin expected ($23\,494 \times 0.77$) is equal to Shs 18 090.40. Allowing late planting and hence transferring 19 man-days work to December month when labour needed for tobacco production is not a limiting factor, still the limiting labour month remains November. In this case, a maximum tobacco area becomes $65/65 = 1$ hectare. Allowing a reduction of 5 percent in yield due to late planting, the expected yield per ha is 737.2 kg. This results into a gross margin of Shs 19 720.70.

Solution 2: Growing maize only

For maize enterprise the most limiting labour month is November permitting $65/28 = 2.32$ hectares. Such an area of maize, will result into a gross margin of ($52\,095 \times 2.32$) equal to Shs. 120 860.00.

Solution 3: Growing beans only

The most limiting labour month for bean production is February and the possible maximum area is $60/30 = 2$ hectares. Thus based on previous discussion the maximum gross margin to be obtained is Shs 79 000.00. Permitting part of weeding operation to be done in March and transferring 10 man-days needed in February to March, again the most limiting labour month for bean production

is February. The maximum bean land cultivatable becomes $60/20 = 3$ hectares. The resulting gross margin of $(39\ 500 \times 3)$ equal to Shs 118 500.00.

Solution 4: Growing sunflower only

As indicated in Table 6-11 the limiting labour month for sunflower is February permitting $60/55 = 1.09$ hectares. Based on the established gross margin per ha of this crop (Appendix O) such an area results into a gross margin of $(10\ 100 \times 1.09)$ equal to Shs 11 000.00.

6.3.2.3 Optimum sole crop enterprises

With respect to crop enterprises considered in the above solutions, maize with maximum cultivatable land of 2.32 ha and resulting into a gross margin of Shs. 120 860.00 is the most profitable enterprise. Bean enterprise ranks the second with part of first weeding operation rolled forward to next month, giving a family income of Shs. 118 500.00. Allowing late planting activity in December enables tobacco enterprise to rank the third in terms of gross margins and the resulting gross margin is Shs. 19 720.70. The last crop is sunflower which results into a gross margin of Shs. 11 000.00 when grown as a sole crop.

6.3.2.4 Combining crop enterprises in order to maximize labour returns

This section attempts to combine the possible crop enterprises for the purpose of maximizing remaining family labour after subsistence use. As indicated in solution 2 above, the initial maximum cultivatable maize land is 2.32 ha resulting into a gross margin of Shs. 120 860.00. Considering the remaining family labour in February (Table 6-10 and 6-11) after meeting both production of food for subsistence and initial maximum maize area, 32.16 man-days remains as unused labour. Since the limiting labour-month for bean is February, this implies that 1.07 ha of beans can be grown along with maize giving gross margin of (39 500 x 1.07 equal to Shs. 42 265.00. This assumes that there is no intercropping of the two crops. Such a combination ensures optimum use of existing family labour and the resulting total gross margins are 120 860.00 + 42 265.00) equal to Shs 163 125.00.

6.3.2.5 Producer price for tobacco required to include tobacco into an optimal plan

This section attempts to establish the minimum producer price required in order to make tobacco crop an economic viable enterprise and thus attracting the existing family labour for production. As demonstrated in the previous alternatives in section 6.3.2.2 the maximum

area of tobacco is based on labour requirement and available family labour indicated in Table 6-11. Thus maximum area of tobacco that can be grown after meeting subsistence food requirements is $65/85 = 0.77$ hectare. Based on Appendix L such as area requires $(51\ 972 \times 0.77)$ equal to Shs 40 018 as cost of physical tobacco inputs. Using an average tobacco yield of 776 kg per ha, the maximum expected tobacco output is 597.2 kg. Considering gross margin obtained from maximum cultivable maize land of 2.32 ha which is Shs 120 860.00 as indicated in section 6.3.1.2 (solution 2), gross returns amounting to $(120\ 860 + 40\ 018.40)$ equal to Shs 160 878.40 from tobacco sales are necessary in order to make tobacco enterprise as attractive as maize enterprise. Thus with $(776\ \text{kg} \times 0.77\ \text{ha}) = 597.2\ \text{kg}$ of tobacco being maximum expected yield, the minimum price per kg of tobacco required to make tobacco enterprise as economic viable as maize enterprise is obtained by dividing minimum required gross returns by maximum expected tobacco yield viz $\text{Shs } 160\ 878.40/597.20 = 269.40$.

Taking into account the remaining family labour in February month (Table 6-11) after meeting both production of food for subsistence and initial maximum tobacco area, 30 man-days remains as unused labour. Since the limiting labour-month for bean is February, this implies that only one ha of bean can be grown along with tobacco giving

gross margin of Shs 39 500.00 (Appendix N). Therefore such a combination ensures optimum use of existing family labour and the expected minimum total gross margins are $(269.40 \times 597.2 - 40\ 018 + 39\ 500)$ equal to Shs 160,360.00.

6.4 Summary

The results indicate that several factors have been responsible for the decline in tobacco production in the District. For small-scale farmers, tobacco planted area and the amount of money used to purchase tobacco physical inputs are the most significant variables that explain the observed variation in tobacco yield. Other factors behind decline in tobacco yield include low education level among tobacco farmers and poor tobacco marketing procedures.

In case of large-scale tobacco farmers, tobacco farming experience and total tobacco area planted within specific cropping season are the most important parameters that explain the differences in tobacco yield per hectare. Other factors include shortage of fertile land and hired labour for large-scale farms. Common problems faced by tobacco farmers in the District include relatively low gross margin from tobacco enterprise caused by both low producer price and higher input costs than other crops grown in the area, lack of fire-wood for tobacco curing and inadequate credit facility.

CHAPTER VII

CONCLUSION AND RECOMMENDATIONS

7.1 Tobacco Production in Iringa District

Tanzania is recorded as the major tobacco producer in East Africa. However, the country has been facing a downward trend in tobacco production. Several reasons have been pointed out to explain such trends. According to this study, factors explaining variation in tobacco yield have been categorized into three major groups. These include households, institutional and environmental factors.

Regarding household factors, results indicate that available capital to finance tobacco production and tobacco farm size are highly significant in explaining variation in tobacco yield under small-scale farms. Therefore an increase in tobacco farm size by encouraging small-scale farmers to expand their farms and provision of enough working capital through tobacco credit schemes can tremendously improve both tobacco yield and quality on small-scale farms. Also results reveal that most of small-scale farmers have low education level of not more than standard four. This implies that most of the youths who complete primary school education are not fully involved in tobacco production. Therefore there is an urgent need for the Government to find methods for involving youths in the District in this important agricultural activity of

tobacco production.

With respect to large-scale farmers, variation in tobacco yield per ha is explained by existing differences in both tobacco farming experience among farmers and tobacco farm sizes. Tobacco farming experience apart from assisting the farmer to acquire some important farm operations such as construction, maintenance and use of tobacco barns, experienced large-scale farmers have established farms and employed many permanent farm workers. According to the results obtained in this study, efforts to increase tobacco output in large-scale farms may be centred on increasing tobacco yield per ha rather than expanding tobacco farms. In addition because tobacco quality and quantity from those farms is largely depending on farmers' experience, and most of those farmers are old with an average of 51 years of age, there is a danger in future of facing a drastic fall in tobacco output in the District.

There are four major public institutions that deal with production and marketing of tobacco in the District. These include agricultural, financial service, marketing and input delivery institutions. These institutions have been facing several difficulties and changes over the years and consequently there have been shortfalls in services expected to be offered by them. For instance from this study evidence exist to show the following:

There has been late delivery of agricultural inputs; farmers not getting good extension services; lack of prompt payment to farmers' produces; low producer price and inadequate credit facilities. Where credit is available the interest on loan is very high thus discouraging farmers from taking crop loans.

Considering environmental factors, results indicate that lack of fertile land for large-scale farmers and shortage of firewood for tobacco curing are among the limiting factors for tobacco production in the District.

7.2 Tobacco Price Situation

According to MDB (1988) the auction prices for all types of tobacco during 1988 in most of exporting countries were higher than previous year. Strong demand for better quality tobacco is anticipated in future because of rise in healthy concerns. Thus in order to get higher tobacco export price and more foreign exchange from tobacco sales, Tanzania must improve both tobacco quality and quantity.

7.3 Proposed Optimal Resource Use

An improved crop combination was determined by using both enterprise budgeting and direct programme planning techniques. Family labour available for cash crop production was determined by first meeting full family

food subsistence requirements. Thus maize, a crop that gives the highest total gross margins from 2.32 ha permitted by the labour limiting month was selected. Then after considering labour requirements for beans which is the second most paying crop, the plan permitted an additional of 1.07 ha of beans. Therefore the above proposed plan ensures optimum utilization of the existing family labour and is expected to result into total gross margins of Shs 163 125.00.

On the other hand, tobacco enterprise relatively have less gross margin per ha than maize and beans. Results show that in order to allow tobacco enterprise to enter the optimum farming plan, a minimum price of Shs 270 per kg is necessary. Taking into account tobacco labour requirements, a maximum of 0.77 ha of tobacco may be cultivated using the existing family labour. Based on an average yield of 776 kg per ha as indicated by the survey results and allowing the proposed minimum price of Shs 270 per kg, then the maximum tobacco area may result into a gross margin of Shs 120 860. In addition, since beans require relatively less labour per ha than other crop enterprise considered in this study, the remaining family labour after the maximum possible area allow to grow 1 ha of beans. Such combination again results into a gross margin of Shs 160 360.00. Therefore in order to attract tobacco farmers to allocate their labour efficiently in

tobacco production, the minimum nominal producer price should be Shs 270 per kg. With the current tobacco producer price of Shs 245 per kg, it is likely that farmers may resist to switch their farm resources into tobacco production.

7.4 Policy Recommendations

Based on the findings of this study, it is proposed that future plans aiming at improving tobacco industry in the District may include the following: With respect to household factors, youths with primary school education can be attracted to participate in tobacco production if the Government offers a competitive tobacco producer price. Also special credit programmes may be introduced in the District.

As regards institutional and environmental factors, it is proposed that the Government makes efforts to ensure that tobacco farmers get the required inputs in time. Considering marketing problems, farmers have to receive direct payments after selling their produce. Legal measures may be taken against any marketing institution that fails to make prompt crop payments after procuring farmers' crops. Also it is proposed that the Government reviews tobacco producer price taking into account the cost of input and the opportunity cost of labour in terms of producing other more paying crops.

A minimum producer price of Shs 270 per kg is suggested. As pointed out earlier, the existing tobacco marketing systems has resulted into high marketing costs and given unnecessary delay of tobacco payments, farmers have lost faith in it. Thus considering the on going crop market reforms in Tanzania, marketing of tobacco should be liberalized. All individuals, public and private companies which are willing and able to buy tobacco direct from farmers, the Government should permit them. Farmers' associations such as SHTGA Ltd. should be allowed to market their tobacco to other interested parties and not only to TTPMB.

Regarding extension services it is proposed that the Government may take measures aiming at increasing agricultural extension agent visits to small-scale farmers. These measures may include increase of number of extension agents and improving their mobility in their area of operations. The overall objective of agricultural extension programme to tobacco farmers may be to improve tobacco quality and quantity per hectare. Thus emphasis should be on the use of improved crop husbandry and curing techniques. Further more, extension agents need to advise farmers on how to construct better tobacco curing barns that provide maximum efficiency in tobacco curing in terms of minimizing heat loss and hence minimizing the amount of fire-wood required to cure one hectare of tobacco.

The Government has to encourage researches that aim at substituting fire-wood by other alternative sources of energy for tobacco curing.

REFERENCE CITED

- Albhai, N. 1968. "Tobacco Marketing in Tanzania" Rural Development Research (R.D.R.) No. 6. University of Makerere, Kampala.
- Amani, H.K.R.; Mabele, R.B.; Rugumisa, S.; Msambichaka; L.A. 1984. Agriculture in Economic Stabilization Policies Perspectives. In Economic Stabilization Policies in Tanzania (Edited by Lipumba, H.I.N.; L.A. Msambichaka and S.M. Wangwe) Dar es Salaam, Tanzania; Economics Department and Economic Research Bureau, 112-127.
- Boer, K. 1974. Urambo, Tanzania: The Administrative and Social Development in Tobacco. University of Microfilms International Ann Arbor, Michigan, U.S.A. London England.
- Bartlett, C.D.S. 1978. Farm Information in the Design of Improvement of small-scale Agriculture, With Special Reference to Bean in Lowland Areas of Morogoro Region. Rural Economic Research paper No. 6, University of Dar es Salaam. p. 22.
- Bank of Tanzania. 1990. Economic Bulletin for the Quarter ended 31 March, 1990 Vol. XX No. 1 Dar es Salaam, Tanzania.

- Bailey, K.D. 1987. Method of Social Research. Third Edition. The Free Press. A Division of Macmillan, Inc. New York. Collier Macmillan Publishers London.
- Binhammer, H.H. 1975. The Development of Agriculture in Tanzania. Bank of Tanzania, Dar es Salaam, Tanzania.
- Boyd, H.W.; Westfall, R.; Stasch, S.F. 1981. Marketing Research: Text and cases. Homewood, Illinois, Richard D.; Irwin, Inc.
- Bureau of Statistics. 1988. Population census: Preliminary report. Ministry of Finance, Economic Affairs and Planning Dar es Salaam, Tanzania.
- Collinson, M. 1975. Tanzania Cooperative Movement and Farmer Credit in 1960s. In Rural Cooperative in Tanzania (Edited by L. Cliffe; P. Lawrence; W. Luttrell; S. Migot Adholla and J.S. Saul) Tanzania Publishing House, Dar es Salaam. 255-277.
- Commonwealth Secretariat. 1975. Tobacco Intelligence; Commonwealth Secretariat Vol. No. 27 IV. p173.
- Dean, E. 1966. The Supply Response of African Farmers Theory and Measurement in Malawi. North Holland Publishing Company, Amsterdam. p25.
- FAO/UNDP. 1971. Marketing Development Bureau (SF 27) Marketing for Tanzania Crops. Ministry of Agriculture, Dar es Salaam, Tanzania.
- FAO. 1983. The Economic Significance of Tobacco. Food and Agricultural Organization. Rome.

FAO/UNDP/ODG. 1976. Iringa Region Tanzania. Intergrated Five Year Plan, 1976-81. Overseas Development Group University of East Anglia UK Vol. 2.

Feldman, D. 1969. "Decreasing cost in peasant tobacco farming: An application of separable programming - Iringa". University of Dar es Salaam Economic Research Bureau (ERB) Vol. 2 paper No. 68.20.

Feldman, D. 1970. "An Assessment of alternative policy strategies in Agricultural Development in Tanzania and their application to tobacco in Iringa". East African Journal of Rural Development Vol. 3 No. 3.

Feldman, D. and Fieldman R. 1969. "Cooperation and Production Environment: Some exploration among social and economic factors affecting agricultural cooperation." Economic Research Bureau (ERB) paper No. 16.12 University of Dar es Salaam, Tanzania.

Freese, F. 1962. Elementary Forestry Sampling. Agriculture Handbook No. 232. U.S.A. Department of Agriculture O.U.S. Book Stores Inc. Corvallis, Oregon Litho U.S.A. p87.

Grise, V.N. 1984. Tobacco background for 1985 farm legislation (468). Washington D.C. U.S.A. 45p.

- Grise, V.N.; Clauson, A. 1985. Cost of production and selling flue-cured tobacco: 1983, preliminary 1984 and Projected 1985. In Outlook and Situation Report TS: Tobacco U.S.A. Department of Agriculture, Economic Research Service. Washington D.C.: The Service 36-38.
- Hulls, R.H. 1972. An Assessment of Agricultural Extension in Sukumaland, Western Tanzania, Economic Research Bureau paper No. 71.7, University of Dar es Salaam.
- Ishuza, S.L. 1984. An Economic Analysis of Tobacco Production Constraints in Tanzania: A case study of Tabora Region, Tanzania. MSc. Thesis, University of Dar es Salaam.
- Iringa District Council (IDC). 1990. Social Economic Data for Iringa Rural District. A Document in District Planning Office, Iringa - Tanzania.
- Jamhuri ya Muungano wa Tanzania. 1990. Hali ya Uchumi wa Taifa katika mwaka 1989. Tume ya Mipango, Dar es Salaam.
- Kaaya, A.N. 1981. An Economic Analysis of substituting Coal for Wood in the Production of Flue-cured Tobacco in Tanzania. MSc. Thesis. University of Virginia Morgantown U.S.A.
- Kanga, S.N. 1977. An Economic assessment of smallholders Tobacco Village Project in Tabora Region. MSc. Thesis University of Dar es Salaam.

- Kunz, J.J.; Purcell, J.C. 1981. Value added in Southern Region of Limited States in U.S.A. Agriculture. IR. 6 Information report. International Cooperation Publication, State Agricultural Experiment Stations 34-38.
- Kurt Odegaard. 1985. Cash Crops Versus Food Crops Production in Tanzania: An Assessment of Major Post-Colonial Trends. Lund Economic Studies number 33 Printed in Sweden. Student literature Land p. 265.
- Lipumba, H.I.N. 1984. Economic Crises in Tanzania. In Economic Stabilization Policies in Tanzania (Edited by Lipumba H.I.N.; Msambichaka L.A. and S.M. Wangwe) Dar es Salaam, Tanzania. Economic Department and Economic Research Bureau 19-45.
- Mabele, R.B.; L.A. Msambichaka. 1979. Agricultural credit and the Development of Ujamaa Village In Paper of The Political Economy of Tanzania (Edited by Kwan, S.K.; R. Mabele and M.J. Schulthesis). Heimenan Educational Books Limited.
- Marketing Development Bureau (MDB). 1987. Annual Review of Tobacco R5/87. Ministry of Agriculture and Livestock Development. Dar es Salaam, Tanzania.
- Marketing Development Bureau (MDB). 1988. Annual Review of Tobacco. Ministry of Agriculture and Livestock Development. Dar es Salaam, Tanzania.

- Massel, B.F.; Johnson, R.W.M. 1968. "Economic of Small-scale Farming in Rhodesia: A Cross-section Analysis of two Areas." In Food Research Institute Studies paper No. 8 Supplement.
- Maunder, A.H. 1973. Agricultural Extension: A Reference Manual. Food and Agricultural Organization (FAO). Rome. p. 270.
- Mbithi, P.M. 1974. Farm Decision Making With Respect to Social Psychological Elements and Human Factor in Agricultural Management. 16th International Conference of Agricultural Economics, 26 July - 4 August.
- Minde, I.J. 1978. Decision Making on Farms. Can the Bernoullin's Principle Really Serve as a Blue Print for Decision Making on Farms? Seminar Paper, Department of Rural Economy, University of Dar es Salaam, Morogoro.
- _____ 1985. Economic Analysis of Farm and Non-farm Rural Employment in Morogoro District, Tanzania. Unpublished Ph.D Thesis Michigan State University. p.164.
- Moris, J.R. 1977. Extension Effectiveness. In Rural Sociology and Rural Development Lecture Series, University of Dar es Salaam, Morogoro.

Msambichaka, L.A.; Ndulu, B.J.; Amani, H.K.R. 1983.

Agricultural Development in Tanzania: Policy Evolution, Performance and Evaluation. The First Two Decades of Independence. Friedrich-Elbert. Shifting. Fedal Republic of Germany. p.155.

Mwakilasa, B.A. 1986. Credit to Small Farmers in Tanzania. MSc. Thesis University of Reading, England.

National Soil Service. 1986. Reconnaissance Land and Resource Survey for the Selection of Suitable Land for Tea in the Southern Highlands. TARO-Agricultural Research Institute, Mlingano Tanga, Tanzania. p.55.

Ngasongwa, T. 1988. Evaluation of External Funded Regional Integrated Development Programmes (RIDEPS) in Tanzania. Ph.D. Dissertation University of East Anglia UK. p.459.

Norman, D.W. 1973. Methodology and Problems of Farm Management Investigations: Experiences from Northern Nigeria. East Lansing, Michigan State University Department of Agricultural Economics, African Rural Employment Paper No. 8.

Percy, H.C. 1975. Factors That Affect Production in Western Cotton Growing Areas. Cotton Growing Review Vol. 52 (4). 253-277.

- Simpton, I.H.; Wilson, J.; Young, K. 1988. The Sexual Division of Farm Household Labour. A replication and extension in Rural Society. In Rural Sociological Society Publication. Montana State University. 145-165.
- Sunday News, Tanzania. 30, September 1990.
- Swanson, B.E.; Claar, J.B. 1984. The History and Development of Agricultural Extension. In Agricultural Extension: A Reference Manual Second Edition. (Edited by Burton E. Swanson) Food and Agricultural Organization (FAO)-Rome. 1-19.
- Tanzania Economic Trends (TET). 1988. A Quarterly Review of the Economy Vol. 1 No. 2 July, 1988. Economic Research Bureau. University of Dar es Salaam, Tanzania.
- Temu, A.B. 1979. Fuel Scarcity and Other Problems Associated With Tobacco Production in Tabora Region, Tanzania. Division of Forestry Record No. 12 Morogoro, Tanzania; University of Dar es Salaam.
- TTPMB, 1989. Annual report for Iringa Branch.
- United Republic of Tanzania (URT). 1969. Second Five Year Plan for Economic and Social Development, 1st July 1974 - 30th June, 1974. Vol. 1 Government Printer, Dar es Salaam, Tanzania.

- United Republic of Tanzania (URT). 1976. Tanzania Third Five Year Plan for Economic and Social Development, 1st July - 30th June, 1979. Government Printing House, Dar es Salaam. Tanzania.
- United Republic of Tanzania (URT). 1976. Atlas of Tanzania. Second Edition. Survey and Mapping Division, Ministry of Lands, Housing and Urban Development. Dar es Salaam, Tanzania.
- United Republic of Tanzania (URT). 1986. Fourth Five Year Plan for Economic and Social Development, Government Printing House, Dar es Salaam, Tanzania.
- United Republic of Tanzania (URT). 1984. National Livestock Count. Ministry of Agriculture and Livestock Development, Livestock Sectoral Planning Unit, Dar es Salaam, Tanzania. p.49.
- Upton, M. 1973. Farm Management in Africa: The Principles of Production and Planning Oxford University Press, London. p.341.

APPENDICES

Appendix A. Tanzania: Volume of export crops, 1988.

Commodity	Quantity	Unit price	Value
	<u>Tons</u>	<u>US \$</u>	<u>Million</u>
<u>US \$</u>			
Coffee	38 674	2 493	96.70
Cotton	51 703	1 455	75.26
Row Cashewnuts	16 249	987	16.05
Tea	111 870	9 785	16.03
Tobacco	9 785	1 569	15.03
Sisal	111 915	435	4.86

Source: Tanzania Economic Trends, Vol. 1. No. 4. 1989.

Appendix B. Tanzania: Tobacco production and yield per hectare, 1977-78 - 1987-88

Year	Flue-cured		Fire-cured		Barley		Total	
	tons	kg/ha	tons	kg/ha	tons	kg/ha	tons	kg/ha
1977-78	14 670	681	3 650	387	22	256	18 342	591
1978-79	14 403	586	2 664	347	30	385	17 097	529
1979-80	13 005	515	4 018	434	34	472	17 057	493
1980-81	12 972	564	3 643	492	33	246	16 648	545
1981-82	12 164	547	4 027	473	50	562	16 241	572
1982-83	9 579	660	3 989	432	52	394	13 620	570
1983-84	9 007	568	1 957	260	55	420	11 019	469
1984-85	10 720	527	2 672	297	42	145	13 434	453
1985-86	12 113	733	415	182	24	129	12 552	661
1986-87	15 010	824	1 442	511	14	246	16 466	780
1987-88	1 111	536	1 802	328	8	119	12 921	491

Source: TTPMB cited by WDB, 1988

Appendix C. World: Tobacco leaf production, 1984 - 86

Type	1984	1985	1986
	million tons		
Flue-cured	3.35	3.70	3.47
Barley	0.77	0.69	0.62
Fire-cured	2.50	2.46	2.43
Total	6.52	6.85	6.52

Source: MDB Table 6, 1987 P. 18

Appendix D. World Tobacco: Unmanufactured world tobacco
 exports, consumption and stocks, 1982 - 1987.

Marketing year	Export	Consumption	Opening stocks
	<u>Million tons</u>	<u>Million tons</u>	<u>Million tons</u>
1982	1.4	5.5	6.5
1983	1.3	5.3	7.1
1984	1.4	5.6	7.1
1985	1.4	5.7	7.1
1986	1.4	6.0	7.6
1987	1.3	6.0	7.2
1988* estimates	na	6.1	5.7

Source: MDB, Tobacco Annual Review, 1988.

Appendix E. Tanzania: Tobacco production in tons by
Districts, 1984-85 - 1988-89

District	1984-85	1985-86	1986-87	1987-88	1988-89
a. <u>Fuel-cured</u>					
Tabora*	5 892	7 573	9 673	6 613	6 300
Kahama	585	400	776	641	650
Manyoni	332	430	557	459	310
Mpanda	700	855	1 062	801	1 000
Chunya	1 678	1 514	1 616	858	900
Iringa**	1 613	1 711	1 326	1 739	1 480
Sub-total	10 720	12 113	15 010	11 111	10 640
b. <u>Fire-cured</u>					
Songea***	2 672	415	1 376	1 802	1 500
<u>Burley</u>					
Handeni	34	9	3	3	10
Biharamulo	5	12	11	4	20
Liwale	3	3	-	1	5
Sub-total	42	24	14	8	35
Total	13 434	12 552	16 466	12 912	11 795

Source: MDB, 1988

* Including Urambo District

** Including Mufindi and Ludewa Districts

*** Including Tunduru

Appendix F. Tobacco price: Constant tobacco producer price, 1976-77 - 1987-88.

Type	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88
Flue-cured	73.84	66.18	57.03	53.14	50.27	48.36	51.55	42.55	42.81	50.18	49.25	50.40
Fire-cured	44.91	46.51	40.08	37.74	29.92	29.55	32.94	27.19	27.35	30.35	30.30	31.20
NCPI	95	106	123	157	198	247	331	401	558	716	948	1185

Source: Tanzania Economic Trend 1988

NCPI = National consumers price index used as deflators.

Appendix G. Tanzania: Tobacco producer price

1988-89 - 1990-91

Type of tobacco	1988-89	1989-90	1990-91
	-----Shs/kg-----		
Flue-cured	75.60	117.00	245.00
Fire-cured	48.75	91.00	168.00
Burley	39.60	47.00	na

Source: - MDB, 1988

- Sunday News 30 September, 1990

na = Not available

Appendix H. Iringa District: CRDB tobacco loan disbursements,
 repayments and balances in million shs,
 1985-86 - 1989-90

		A	B	Total
1985-86	Loan disbursed	103.8	16.4	120.2
	Repayments	54.7	9.3	55.0
	Balance	58.1	7.1	65.2
1986-87	Loan disbursed	65.0	10.6	75.6
	Repayments	30.0	5.3	35.3
	Balance	35.0	5.3	40.3
1987-88	Loan disbursed	68.5	0.7	69.2
	Repayments	36.6	0.3	36.9
	Balance	31.9	0.4	32.3
1988-89	Loan disbursed	100.0	46.1	146.6
	Repayments	50.0	17.1	57.1
	Balance	50.0	29.0	79.0
1989-90	Loan disbursed	140.0	103.8	243.8
	Repayments	80.9	33.0	113.9
	Balance	59.1	70.8	129.9

NB A = Large-scale farmers

B = Small-scale farmers

Source: CRDB Iringa regional office annual reports.

Appendix I. CRDB: Sectoral distribution of approved loans 1980-81 - 1987-88.

	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88
Seasonal inputs	74.0	92.33	136.9	87.5	211.9	1042.7	1272.2	1305.7
Farm machinery	13.0	10.94	20.3	15.2	84.8	60.5	116.4	45.1
Small scale industries	10.8	17.00	15.0	23.5	18.9	3.9	28.3	36.5
Rural transport	1.1	88.3	20.8	13.7	118.8	76.5	528.2	191.6
Livestock	1.2	46.62	6.3	5.4	13.8	24.8	24.9	87.7
Fisheries	0.6	3.61	1.6	1.6	10.1	5.1	12.7	12.2
Storage	0.4	3.94	6.0	0.3	0.9	0.1	-	-
Farm Development	0.1	0.67	0.7	0.2	1.4	22.0	27.8	16.9
Commercial enterprises	-	-	-	-	-	-	0.1	7.4
Total	101.2	263.4	207.1	147.5	460.6	1235.6	2010.6	2203.1

Source: CRDB Annual report and Accounts. 1987-88.

Appendix J. The multiple regression analysis of factors influencing tobacco yield under small-scale farms, 1990.

Prediction Equation

Dependent Variable	Y	= Tobacco yield in kg
Independent Variables	A	= Area under tobacco production in ha
	K	= Working capital (Shs)
	Ed	= Farmers education level in standards
	L	= Family labour available in man-days
	Z	= Area under maize production in ha
Multiple	R^2	.83191
	R^2	.69207
	R^2 (adjusted)	.67259

Analysis of Variance

	DF	Sum of squares	Mean squares
Regression	5	24626903.4079	4925380.6816
Residual	79	10957278.2862	138699.7251
F = 35.5111*** Significant		F = 0.0000	
*** Highly significant			

Variables in the equation

Variable	B	SE B	Beta	t	Sig t
L	15.7165	18.3978	0.0585	0.854	0.3955
Ed	16.1018	40.7036	0.0258	0.396	0.6935
A	387.9035	83.9738	0.4022	4.619**	0.0000
K	0.0248	0.0062	0.3226	4.0028**	0.0001
Z	167.9020	-41.7448	0.3102	4.022**	0.0001
(Constant)	-264.0591	154.1487		-1.592	0.1154

** Significant P = 0.01

-----Appendix J

Multiple Regression (Omiting Area of Tobacco planted)

Multiple	R^2	0.6878
	R^2	0.4641
	R^2 (adjusted)	0.4111
Standard Error		498.3208

Analysis of Variance

	DF	Sum of squares	Mean squares
Regression	4	19124075.3596	256134.4276
Residual	80	15678484.2326	4016571.6012

F = 15.9168*** Significant F = 0.0000

*** Highly significant

Variables in the equation

Variable	B	SE B	Beta	t	Sig. t
L	15.1877	23.1317	0.5697	0.657	0.5134
Ed	45.3368	53.6804	0.1064	0.845	0.4009
K	0.0482	6.6931×10^{-3}	0.0725	7.209**	0.0000
Z	160.0316	-42.6831×10^{-3}	0.0427	-3.208	0.2167
(constant)	-167.6492		0.6261	-1.299	0.1979

Appendix K. The multiple regression analysis of factors influencing tobacco yield per ha under large-scale farms, 1990.

Prediction Equation

Dependent Variable Y = Tobacco yield in kg per hectare

Independent Variables Fe = Farmers experience in tobacco production (years)

K = Working capital (Shs) used to purchase tobacco phisical inputs per ha

L = Average hired labour in man-days used per ha of tobacco

A = Total area of tobacco farm in hectares

Z₀ = Total area of maize farm in hectares

Multiple R ₂	0.8005
R ₂ ²	0.6481
R ² (adjusted)	0.5601
Standard Error	212.4099

Analysis of Variance

	DF	Sum of squares	Mean squares
Regression	5	1661903.2333	332380.6466
Residual	20	902359.7496	45117.9875

F = 7.3669*** Significant F = 0.0005

*** Highly significant

-----Appendix K

Variables in the Equation

Variables	B	SE B	Beta	t	Sig t
Fe	20.2658	3.7763	0.8228	5.366**	0.000
L	0.5345	0.22502	0.6155	0.238	0.8145
A	-6.1852	2.6689	- 0.5364	-2.317*	0.0312
K	4.2892×10^{-5}	1.0019×10^{-4}	0.1146	0.428	0.6731
Z ₀	-1.8008	2.8628	0.1467	0.629	0.5364
(Constant)	527.9254	143.1111		3.689	0.0015

* Significant P = 0.05

** Significant P = 0.01

Multiple Regression (Omiting Fe as independent variable)

Dependent variable Y = Tobacco yield in kg per ha

Independent variables L = Average hired labour in man-days used per ha of tobacco

A = Total area of tobacco planted in hectares

K = Working capital in Shs used in tobacco production per hectare

Z₀ = Total area of maize planted in hectares

Multiple R₂ 0.4021
R₂ 0.1490
R₂ (adjusted) -0.0105
Standard Error 419.7356

Analysis of Variance

	DF	Sum of squares	Mean squares
Regression	4	652856.4317	170701.9452
Residual	22	4247031.4032	183678.4560

F = 95540 Significant F = 0.4818

Appendix L. 6.3.1 Production costs and returns per ha of tobacco, 1990

Yield per ha ^{a/}		776 kg
Average price per kg ^{b/}	Shs	<u>97.25</u>
Gross return per ha	Shs	75 466.00

Input requirements and costs

i) Labour inputs (man-days)^{c/}

Operations

	<u>man-days</u>
Nursery work (sowing and watering)	43
Firewood collection	38
Barn construction and maintenance	15
Land preparation	60
Transplanting	30
Weeding	35
Fertilizer and pesticide application	10
Topping and desuckering	17
Harvesting	72
Curing	100
Sorting, grading, bailing and marketing	100
Clearing crop residues in the farm	5

Total	525

N.B ^{a/} Average yield per ha was computed from survey data

^{b/} Average price per kg was computed from survey data

^{c/} Labour requirement obtained from survey data

-----Appendix L.

ii) Physical input costs

<u>Item</u>	Unit	Qty	Life span (years)	Unit cost (Shs)	Total costs (Shs)
Seedbed packs	packs	1	1	6 000.00	6 000.00
Fertilizer NPK	kg	900	1	25.00	22 500.00
Fertilizer cups	no	4	2	3.50	7.00
Thiodan dust	kg	12	1	180.00	2 160.00
Barn flue-pipes	no	16	4	2 173.00	8 692.00
Transport costs for fire-wood	m ³	40	1	90.00	3 600.00
Empty drums	no	1	4	1 500.00	375.00
Barn thermometers	no	2	3	151.00	302.00
Tools (Hoe, axe and knife)	set	1	3	1 008.00	336.00
Barn	no	2	10	40 000.00	<u>8 000.00</u>
Total cost of physical inputs					<u>51 972.00</u>
Gross margin/ha					23 494.00
Return to labour (Shs per man-day)					44.75

N.B. Hessian cloths, jute twine, tanlined papers and tobacco seed inputs are provided freely to small-scale tobacco farmers by TTPMB.

Appendix M. 6.3.2 Production costs and returns per ha of
maize, 1990

Yield per ha		5 500 kg
Average price per kg	Shs	<u>11.30</u>
Gross returns	Shs	62 150.00

Input requirements and costs

i) Labour inputs (man-days)

<u>Operations</u>	<u>Man-days</u>
Land preparation	55
Planting	30
1 st weeding	12
Insecticides and fertilizer application	12
2 nd weeding	12
Harvesting	20
Crop haulage and marketing	<u>20</u>
Total	<u>161</u>

ii) Physical input costs

<u>Item</u>	Unit	Quantity	Unit cost (Shs)	Total cost (Shs)
Seeds	kg	25	66.20	1 655.00
Thiodan dust	kg	12.5	180.00	2 250.00
Fertilizer CAN bag		2	1 200.00	2 400.00
Fertilizer NPK bag		3	1 250.00	<u>3 750.00</u>
		Sub total		<u>10 055.00</u>
		Gross margin/ha		52 095.00
		Return on labour (Shs/man-day)		323.57

Appendix N. 6.3.3 Production costs and return per ha of
beans, 1990

Yield per ha		1 300 kg
Average price per kg	Shs	33.00

Gross return	Shs	42 900.00

Input requirements and costs

i) Labour input (man-days)

<u>Operation</u>	<u>Man-days</u>
Land preparation	55
Planting	5
Weeding	15
Harvesting	10
Shedding, packing and marketing	10

-	
Total	95

-	

ii) Physical input costs

<u>Item</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit cost</u> (Shs)	<u>Total cost</u> (Shs)
Fertilizer TSP	bag	2	1 200.00	2 400.00
Seeds	kg	12.5	80.00	1 000.00

Total				3 400.00

Gross margin/ha				39 500.00

Return to labour (Shs/man-day)				415.78

Appendix O. 6.3.4 Production costs and return per ha of
sunflower, 1990

Yield per ha		765 kg
Average price per kg	Shs	20

Gross return per ha	Shs	15 300.00

Input requirements and costs

i) Labour input (man-days)

<u>Operations</u>	<u>Man-days</u>
Land preparation	55
Planting	5
Weeding	20
Harvesting	15
Grading, packing and marketing	5

Total	100

ii) Physical input costs

Item	Unit	Quantity	Unit cost	Total cost
		(Shs)	(Shs)	
Fertilizer TSP	bag	2	1 200.00	2 400.00
Fertilizer NPK	bag	2	1 250.00	2 500.00
Seeds	kg	5	60.00	300.00

Total				5 200.00

Gross margin				10 100.00

Return to labour (Shs/man-day)				134.66
