CONSTRAINTS AFFECTING OIL SEED CROPS PRODUCTION AND MARKETING IN TANZANIA: A CASE STUDY OF SUNFLOWER IN IRAMBA DISTRICT.

BY

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ABSTRACT

The study attempts to investigate the constraints facing the oil seed crops production and marketing with special emphasis on sunflower. The specific objectives of the study were to investigate factors limiting sunflower production and marketing, to describe the marketing channels and the roles of institutions involved in marketing of sunflower, to assess the relative net returns of crops enterprises competing with sunflower for resource use in the district.

Eleven sampled villages in Iramba district were selected based on differences of climate, transport problems, and accesibility to sunflower markets. From these villages, 110 farmers were selected as a source of primary data. In addition, 20 sunflower traders and 20 oil millers were also selected for primary data in the surveyed area.

Secondary data were collected from Singida regional and Iramba district agricultural offices, Tanzania Food Nutrition Centre (TFNC), Institute of Production Innovation (IPI), Marketing Development Bureau (MDB), Agricultural Research Institute - Ilonga, Sokoine National Agricultural library, and Library of University of Dar es Salaam.

Descriptive, gross and market margins, regression and probit analyses were used to analyse the data. Survey results revealed that there were a number of constraints to sunflower

production and marketing. The most significant constraints identified were poor marketing arrangements and low price of sunflower produce.

It was found out that there were mainly six marketing channels of sunflower in the study area. The study showed that competing crops for resource use was not a factor limiting sunflower production and marketing.

In this study, the following recommendations were made:

(1) Effective extension services should be in place to enable farmers improve crop husbandry practices.

(2) Policies to induce the establishment of an economically viable credit system for agricultural inputs need to be designed and given to farmers.

(3) Improvements in the marketing system in terms of prices and participants in sunflower marketing is needed.

(4) A massive investment in roads, storage, processing and other rural infrastructure facilities is required.

DECLARATION

I MUSSA MARTIN MADADI, do here by declare to the Senate of Sokoine University of Agriculture that this dissertation is my original work and that it has not been submitted for a higher degree in any University.

Signature .....

Date 04/12/1998

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DEDICATION

This work is dedicated to my parents, Mr. Martin Madadi and Mrs. Juliana Madadi who shaped my career with their affection, love, diligence and encouragement.

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BOT:	Bank of Tanzania
CETCU:	Central Zone Tobacco Cooperative Union
CUT:	Cooperative Union of Tanzania
DALDO:	District Agriculture and Livestock Development Officer - refers to Iramba district.
Df:	Degree of freedom
ERP:	Economic Recovery Programme
FAO:	Food and Agriculture Organisation
GAPEX:	General Agricultural Products Export Corporation
GDP:	Gross Domestic Products
GM:	Gross margin
IPI:	Institute of Production Innovation
MD:	Mandays
MDB:	Marketing Development Bureau
MLE:	Maximum Likelihood Estimation
NAPB:	National Agricultural Products Board
NBC:	National Bank of Commerce

NGOs:	Non Governmental Organisations
NEOP:	National Edible Oil programme
OLS:	Ordinary Least Square
RALDO:	Regional Agriculture and Livestock Development Officer - refers to Singida region
SIDO:	Small Industries Development Organisations
SIFACU:	Singida Farmers Cooperative Union
SUA:	Sokoine University of Agriculture
SNAL:	Sokoine National Agricultural Library
TFNC:	Tanzania Food and Nutrition Centre
TLMC:	Tanzania Livestock Marketing Company
UPE:	Universal Primary Education
URT:	United Republic of Tanzania

CHAPTER I

INTRODUCTION

1.1 Review of performance of the agricultural sector.

1.1.1 Performance of cash and food crops

High proportion (about 85%) of Tanzania population depend on agriculture but a minimal proportion (16%) of the suitable arable land (39.5 million hectares) are cultivated (URT, 1988). Statistical abstract indicates that food and marketed cash crops form nearly 50 percent of the Gross Domestic Product (GDP) and more than 80 percent of the total nation's foreign exchange earnings are derived from agricultural commodities (MDB, 1993). Apart from the traditionally known crops like coffee, cotton, tea, tobacco, and cashew, oil seeds have of late gained a significant role in the Tanzania economy.

Todate, Tanzanian's efforts towards the development of agriculture has not put the country in the state of food self sufficiency. Available statistics (BOT, 1996) indicate that the food crop production has been increasing at an average rate of 5.0 percent per annum between 1982 - 1994, while that of cash crop declined by 3.5 percent thus giving an average growth rate of 3.8 percent per annum.

Generally, the increase in crop production is primarily based on area expansion, while yield per unit area for food crops have been declining at the rate of 1.4 percent and 1.2 percent for cash crops. This gives an average total yield decline of 1.3 percent annually (URT, 1991; MDB, 1993). For example between 1984 - 87 there was an expansion of cultivated area of about 22.5 percent which caused production increase of 56.8 percent and yield of 15.8 percent for food crops. This revealed that increase of output is mainly determined by the increase of cultivated acreage.

Available statistics on food production performance show that very small volume of food was imported during the 1960s and 1970s as compared to 1980s. This means that in the 1960s and 1970s performance of food production was relatively good. Johnson (1989) observed that the level and trend of food production in Tanzania is linked with political and macro-economic policies prevailing in the country. This situation was considered as one of the factors which caused deterioration of food crop production in the late 1970s and early 1980s.

With regards to marketing system of food and cash crops, it seems most of major export crops have been controlled by the government, which used more parastatal marketing boards and cooperative unions. Operators of tea and sisal crops were given autonomy in running their estates and marketing their crops. Under supervision of marketing boards, the

present marketing system has been clearly inefficient. Its costs were too high for its scale of operations and this led to problems of both decreasing farm-gate prices and losses in the marketing system. However, there has been some improvements due to effect of structural adjustments programmes which are proceeding in the country (MDB. 1993).

Under the liberalized food crops marketing system, the private traders are free to participate in the marketing of these crops alongside the public marketing agencies. The changes have been at least partly responsible for encouraging higher levels of production (MDB. 1994).

1.1.2 Performance of livestock sub-sector

Most of the livestock are found in the pastoral and agro-pastoral production systems. Cattle, sheep and goats are kept under traditional production systems and are predominantly of indigenous breed. An exception to this is in the dairy sector in which cross breeds are favored by small-holders and larger scale mills producers including the state and cooperate owned farms.

The National Ranching Company has recorded successively decreasing annual production for many years and are now not dominant in the sector (MDB, 1992). In the traditional systems some changes are discernible. The pastoralism of the past is giving way in some areas to agro-pastoralism. This is not withstanding stimulation of increased commercial offtake from the traditional sector is a long held government aim (MDB, 1993).

Livestock marketing is handled entirely by the private sector. Tanzanian Livestock Marketing Company (TLMC) was disbanded in 1984. However, marketing chain is made up of local and national licensed traders, butchers, wholesalers and retailers.

1.1.3 Role of non-traditional crops in recent years

Tanzania has a chronic and growing trade gap. The data for 1991 show that the country imported three and a half times what it exported. The gap is largely bridged by aid on which the government is also heavily dependent to finance its budget (MDB, 1993). Due to less willingness of donors to assist the Country since the adoption of the Economic Recovery Programme phase II (ERP II). The trade gap has actually grown steadily during this period of adjustment.

As the country continues to be heavily dependent on the traditional crops like coffee, cotton, sisal, tea, tobacco, cashew nuts and cloves of which the International market prices are generally falling. For example, in 1990 these traditional crops accounted for only about 50 percent of export value (MDB, 1992). With these data, lack of diversification makes the country very vulnerable to commodity price changes. Therefore non-traditional crops like oilseeds, grapes and sugar cane have gained significance for the country's economy. However, appropriate emphasis on production and marketing of these crops have not been in place (MDB, 1993).

1.1.4 Performance of oil seed sub-sector in Tanzania

Accurate data on the level of production of oil seeds is difficult to obtain due to the high proportion of the crop that is traded on the open market. But data on the official purchases is however, available in table 1.1. Tanzania exported considerable quantities of oil seeds and oil seed products, the amounts peaked in 1989. Since then the quantity of exports has declined markedly. The amounts of oil seeds, oils and cakes imported were also significant especially oils peaked in the same year like exports (MDB, 1993). However, due to increased domestic consumption (table 1.2) special emphasis has been given to oil seed sub-sector. It should be noted that the imports trend shown in table 1.1 differs slightly with the one indicated in table 1.2, probably because of different data sources. However, both trends indicate the same direction.

Table 1.1 Official seed purchases, exports and imports trends for 1986 - 93 ('000' tonnes)

	1986	1987	1988	1989	1990	1991	1992	1993
Oil seed official purchases	83.5	158.7	177.5	131.6	81.8	99.8	108.0	121.0
Exports of oil seed	2.3	4.9	2.1	129.1	15.5	12.8	7.8	8.3
Imports of oil seed	0.7	0.1	4.6	1.7	0.3	0.4	0.4	0.9
Exports of oils	0.1	0.0	16.8	151.7	1.7	0.2	0.0	NA
Imports of oils	9.1	27.4	43.0	156.2	4.6	6.0	12.1	NA
Exports of cakes	18.3	46.5	178.5	276.0	38.5	17.9	41.5	NA
Imports of cakes	NA	NA	NA	NA	NA	NA	NA	NA
Total exports	18.7	50.9	197.5	567.1	57.9	90.8	59.3	NA
Total imports	9.8	27.4	47.5	157.6	4.8	6.4	0.4	0.9

Note: NA = not available. - = no imports. 0 = negligible.

Source: Bureau of Statistics/ Customs Department (1994/95), Review of Oil Seeds (MDB, 1995) and Cooperative Unions, 1993.

1.2 Oil seed crops production in Tanzania

Tanzania is endowed with diverse but conducive climatic conditions for the production of various types of oil seeds. The major oil seed crops produced in Tanzania are cotton seed, sunflower, groundnut, soya bean and sesame. Oil seed crops are grown in a number of regions in Tanzania. Major producers of sunflower are Singida and Dodoma, others include Morogoro, Iringa, Arusha, Shinyanga, and Ruvuma regions. The leading regional producers of groundnut are in Mtwara, Ruvuma, Dodoma, Lindi, Tabora and Rukwa. Groundnut are produced by small holders for home consumption as commercialization is still at a lower level. The main producer of cotton seed are Mwanza, Shinyanga, Mara and Kagera. It is produced to a less extent in Singida, Kigoma, Mbeya, Morogoro and Kilimanjaro regions. Cotton seed is mainly produced as a fibre crop, therefore cotton seed for oil production is a by product. Soya bean is mainly produced in Dodoma and Morogoro regions (TFNC, 1993). This is grown as a rotational crop allowing farmers to grow two crops on the same field during one calendar year, where as sesame is mainly produced in Lindi region (MDB, 1993).

The production of oil seeds is mostly undertaken by smallholder farmers and production levels vary from crop to crop and between years (TFNC, 1994). However, the production of other oil seeds with exception of cotton has been on the decline in recent years, as a result, the growth rate of domestic requirement has been higher than the production rate.

and therefore the substantial imports of cooking oil using the country's meagre foreign currency is high (MDB, 1994).

Sunflower is an important source of high quality cooking oil. It offers a good potential for increasing cooking oil, it has the potential for expansion to many agro-climatic conditions and also has the potential for expansion to meet much of the current deficit in vegetable oil provided that certain constraints can be overcome (TFNC, 1994).

According to Temba (1987), some of the main constraints to sunflower production were related to socio-economic, environmental, technological and biological in nature. These are the predominant factors which encounter sunflower production. Major constraints include lack of capital investment at farm level, lack of government support in provision of facilities for farming activities. Other constraints include lack of equipments and machines for production processes, especially ploughs, tractors and sprayers.
Lack of improved seed varieties, lack of markets and low produce price at farm level (MDB, 1993).

According to Mbiza (1989), some of the causes of low productivity of sunflower in Tanzania include the use of local and low yielding varieties of seeds and low production techniques employed by farmers in the production of these oil seeds. Ndossi (1993), argued

that lack of access to sufficient raw materials combined with inadequate financial resources to finance working capital and lack of access to technical know-how are the major constraints facing sunflower processing industries. From the above evidences, the researcher hypothesized that there were a number of constraints to oil seed crops production and marketing in Tanzania. These have been identified in this study.

1.3 Description of the study area

1.3.1 Description of location

Iramba district is located North of the Singida region between latitude 3^{00} 50's and longitude 34^{0} 35'E. The district borders Meatu district to the North and Igunga district to the West, Singida district to the South and South East, Hanang and Mbulu district to the East. The Iramba district has an area of 7,900 km^2 (RALDO, 1997). Administratively, the district is divided into 7 divisions namely Nduguti, Kinyangiri, Kinampanda, Ndago, Shelui, Kisiriri and Kirumi (fig 1.1).

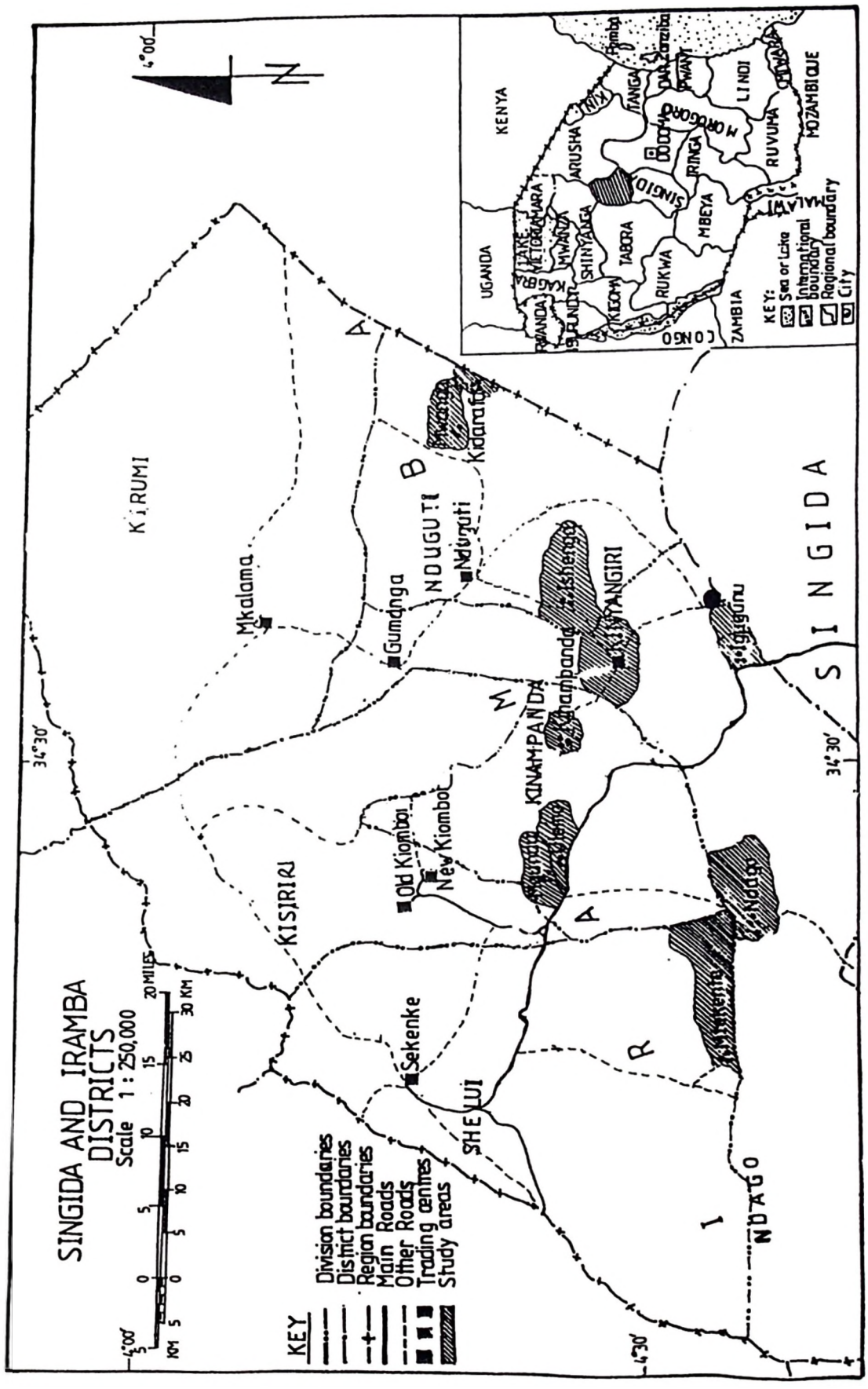

Fig.1 A map of Iramba district showing communication and location of study areas.

1.3.2 Climate of the district

The mean annual rainfall range between 510-980 mm. The district monthly rainfall distribution was generally lower. The general rainfall pattern is unimodal, the earliest commencement for rains was in September. The maximum amount of rain was in March and the lowest was in September. In relative terms as compared to other Tanzanian districts, the area receives fairly little rainfall. The area is also known for irregular number of rainfall days and unexpected droughts. Wind velocity range between 10 km per hour in January and February to 22.5 km per hour in September and October. Temperatures are between 21°C and 27°C. Vegetation is mainly of two types. On one hand Iramba is a plateau covered by scattered trees and bush land. On the other hand, the Wembere plains is covered by shrubs and tall grasses.

1.3.3 Topography

The district has the following features: The Wembere plains of low land which comprises the shores of lake Kitangiri which have black red and loam soils; The Central plateau, which is covered by hills and plains and the Eastern zone with lowland along the rift valley characterized with scattered hills. It is covered with red, black and sandy loam soils.

The district has also the following zones: The Northern and North east zone, covering Nduguti and Kirumi divisions. This has red brown soil with fairly high fertility, loam to

sandy loam type: The Central Iramba plateau zone, the zone covers the high altitude areas of Iramba district, it comprises divisions of Kisiriri, Kinyangiri, and part of Ndago and Kirumi. The last zone is Western rift valley zone, this zone covers the whole of Shelui and partly of Ndago divisions (RALDO, 1996).

1.3.4 Demography

The district's population as per 1988 census was estimated to be 290,390 people (URT, 1988), but estimated population at the end of 1996 was 353,000 people with a population growth rate of 2.8, giving a population density of about 45 people per square kilometer. The district's population is composed of Ramba and Sanzu ethnic groups. Others are Taturu, Kimbu, and Barbaig. It is estimated that 90% of the regions' population depends on agriculture for both subsistence and cash generation (Singida Regional Statistical Abstract, 1996).

1.3.5 Infrastructure and transportation

Villages in the district are connected with rural roads which are poorly constructed. During seasons, rural roads turn out to be too muddy, hence almost impassable making transportation from villages extremely difficult. The reason for this is largely due to inadequate routine maintenance.

The district has a total of 85 Km of trunk roads of which 82 Km are of graveled surfaced road and about 3 Km are bitumenized surfaced road. Regional roads are 271 Km and 530.5 Km are district and feeder roads. Most of the farmers use oxen carts for carrying sunflower and other produce to buying centers. They either own oxen carts or hire the service from other farmers. The payment depends on the distance covered from the farmers place to buying centers or from farm to farmer's resident. A few farmers use tractors or vehicles for transportation of produce. The district has several markets in various village centers, apart from the rural market centers. Sunflower and other crops are also sold along the road side.

1.3.6 Cooperative development

Cooperative movement in Singida region is fairly developed. During the survey time there were 82 registered societies of which most were agricultural marketing societies affiliated into the Singida Farmers Cooperative Union (SIFACU) which include 27 agricultural primary cooperative societies in Iramba and Singida districts and Central Zone Tobacco Cooperative Union (CETCU). The CETCU was restricted to Manyoni district only. Singida Farmers Cooperative Union (SIFACU) dealt with the purchasing of cash and food crops from primary cooperative societies and individual farmers (RALDO, 1996).

The potential for economic development in cooperative sector arises from its ability to create a conducive base upon which, interests of people, with limited resources are combined in force for bringing about socio-economic development. Therefore, given the limited resources available to the majority of the people, it is obvious that one of the most suitable option of development, rests on the development of cooperative societies.

The problem of unawareness which the people have, about their collective option and how to disengage from problem of weak capital, lack of entrepreneurship can be solved by dispensing co-operative education and recapitalization programmes. This was intended to create an environment in which individuals are encouraged to improvise their own resources in order to improve their socio-economic development (TFNC, 1994).

1.3.7 Crop production and Animal husbandry

Agricultural production in the district has been fluctuating over time, the yield levels do differ among different crops and over years mainly due to soil fertility and rainfall availability. Other factors include variations due to socio - economic, cultural and environmental factors (RALDO, 1996). The arable land area is about 350,000 ha but only 200,000 ha was under cultivation. Food production pattern varies with soil type and rainfall from mixed farming to nomadic herding.

Deforestation and soil erosion are acute problems throughout the district. In general, Iramba is a district of low and uncertain precipitation where increase in human and

livestock population have occurred without compensatory changes in traditional land use practices. Large tracts have become badly degraded and less and less capable of supporting their population (RALDO, 1996). In time of drought which occurs periodically, the dangers of famine and diseases are very significant.

Prior to independence and even later in the early 1980s, Iramba district was ranked high in the list of food deficient areas in the country. Each year, the government had to buy food from other areas and distribute it to the hunger stricken people. In 1981/82 the government leadership in the region decided to launch a serious campaign where by farmers were urged to grow drought resistant crops, use Farm Yard Manure, plant early fast as the rains started and adhere to the advise from the extension services. Since mid 1980s, the district has been able to feed herself and sell a little surplus to neighboring districts. However, there have been variations of production levels of both food and cash crops throughout 1985/86 - 1995/96 (DALDO, 1996). Although farmers plant early in mid November, inadequate or uneven distribution of the rain tends to cause a drop in the overall production.

There was a livestock population of about 514,740 cattle by September, 1994 and various small ruminants (DALDO, 1996). Animals which are reared in the area include cattle, goats, donkeys and sheep, the main uses of animals include beef for household consumption, farm operations, transportation, bride price, as a form of saving, wealth accumulation and insurance. It is also used as a source of prestige and social power.

1.4 Rationale for the choice of the study area

The area chosen for the study is Iramba district. The selection of the study area was based on two main reasons: Firstly, the significance of Iramba district is its location in Singida region which together with Dodoma constitute the major sunflower producing regions in Tanzania (Appendix IV). Secondly, the researcher found it advantageous to conduct the research in the area where he was aware of the general farming practices in the area of study.

Lastly, besides its remote location, the socio-economic development of Iramba district is also influenced by its lack of any significant export commodity. This implies that the trade off between households' other competing crops like maize and oil seed crops for cash needs and food requirements merits scientific analysis.

1.5 Justification of the study

The fact that sunflower is one of the major oil seed crops in Tanzania and the potential for the country to produce large quantities of this crop suggest that Tanzania has a comparative advantage in sunflower production, which in turn not only can it increase the utilization of the available processing capacity, it can also be a source of foreign exchange (TFNC. 1994). The facts that sunflower can grow well even in areas with little amount of rainfall, production increase of sunflower can make use of land resource which would have otherwise been left idle and would in turn increase the value of land as well as incomes of

households have made this study important. Evidence also suggest that import volumes of crude and refined vegetable oils to supplement domestic production are on increase (table 1. 2). Improvement in sunflower production and marketing can save the meagre foreign exchange used to import vegetable oils, the scarce foreign resources could then be used where it can have greater returns or a better comparative advantage. It appears that proper identification of sunflower production and marketing constraints can significantly reduce vegetable oil import bill. Improvement of sunflower production and marketing would increase employment opportunities and nutritional status of the population, particularly in rural areas where vegetable oil shortages have been identified to be the main cause of vitamin A deficiency (Lukmanji and Tanner, 1985).

Table 1.2 Trends of Imports and their values in Million T.Shs; output; consumption and home extraction of vegetable oils in ton for 1985/86 - 1992/93

	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93
Domestic output	5.78	6.46	7.19	8.61	8.02	7.99	8.34	8.61
Imports	15.26	14.02	22.42	28. 23	32. 13	33.45	NA	36. 15
Value of imports	241	411	2 154	1 512	2 072	1 798	2 157	2 332
Home extraction	6. 60	7. 23	8. 03	8. 80	9. 12	9. 32	9. 82	10.52
Domestic Consumption	27.04	27.71	37.84	45.64	49.27	50.75	52.68	55.28

Source: Ministry of Industries and Trade, Rehabilitation of Edible Oil Sector, January, 1990, Bureau of Statistics, 1991 and MDB, 1994

Agricultural data for Iramba district shows that crop production has been fluctuating both in acreage cultivated and output. Table 1.3 shows crop production levels for the major crops and that productivity has been fluctuating year after year and well below national averages (RALDO, 1996). As shown in the table, the area cultivated under sunflower has

not been increasing steadily and even the amount of yield in tons per ha of sunflower generally show non - increasing trend for 1991/92 to 1995/96.

Table 1.3 Major crop production levels for Iramba district, Singida (tons/ha)

Crop	1991/92	1992/93	1993/94	1994/95	1995/96
Sunflower	0.71	0.65	0.73	0.66	0.67
	(3 295)	(8 409)	(5 165)	(8 971)	(6 132)
Maize	1.2	1.31	1.25	1.1	1.34
	(21 605)	(23 917)	(23 841)	(22 717)	(19 380)
Beans	0.6	0.69	0.7	0.62	0.68
	(4 010)	(4 802)	(4 880)	(4 950)	(4 650)
Sorghum	0.3	0.5	0.45	0.6	0.4
	(7 396)	(7 851)	(8 842)	(10 720)	(4 110)
Cotton	0.6	0.71	0.65	0.60	0.59
	(3 721)	(3624)	(641)	(2 429)	(2 080)

Source: RALDO, 1996

Notes: Figures in parentheses are areas cultivated in ha.

The study will therefore inform policy strategies aimed at developing oil seed industry in
The study will therefore inform policy strategies aimed at developing oil seed industry in
the study area in particular and Tanzania in general.

1.6 Objectives of the study

The general objective of this study is to investigate constraints facing the oil seed crops production and marketing with special emphasis on sunflower and identify strategies for improving the industry. More specifically, the study is concerned with the following:

(a) To investigate factors limiting sunflower production and marketing.

(b) To describe the marketing channel and the roles of institutions involved in marketing of sunflower in the district.

(c) To assess the relative net returns of crops enterprises currently competing with sunflower for resource use in the district.

1.7 Organization of the dissertation

The dissertation is divided into five chapters. Chapter I is Introduction. Chapter II is literature review and gives the theoretical concepts of markets, marketing and production of a firm. It provides a historical background of marketing institutions involved in the marketing of oil seed in Tanzania. It also reviews literature concerning constraints of production and marketing, research works conducted in Tanzania and other countries on oilseeds and sunflower in particular.

Chapter III deals with the methodology. It gives the data sources, including primary and secondary data sources. It discusses the questionnaire design and sampling procedures. It also presents the methods and models to be used for empirical analysis and their utilization to address research questions. Lastly the chapter presents problems encounted in the data collection. Chapter IV presents analytical results and discussion, while Chapter V provides a summary of main findings and recommendation based on research results.

CHAPTER II

2.0 LITERATURE REVIEW

2.1 Introduction

In order to understand the position of this study, a review of literature is important. This section reviews literature concerning theoretical concepts on production and markets in broad perspective, an overview of research work conducted in Tanzania on oil seeds, history of oil seed crop marketing institutions and marketing channels. It also reviews the major constraints or factors affecting production and marketing of agricultural crops and the oil seed improvement policies in Tanzania.

2.2 Production, markets and marketing and farmer's decision making in broad perspective

2.2.1 Production and markets

Markets can potentially contribute to the development process of crops or other commodities in two ways. Firstly, they can provide a way to allocate resources ensuring the highest value production and maximum farmer/ consumer satisfaction. Secondly, and more controversially, they may stimulate growth by promoting technological innovation and increased supply and demand. Where research is particularly concerned with the nature and

implications of the relationship between markets and production, a more systematic approach is required. Timmer et al. (1983) suggest that, aspects of farming systems research can be used to assess the structure of production, and to analyze the effects of markets and marketing on farmers' decision making. The data required for the representative farming systems analysis include combinations and sequences of crops grown, farm size distributions, local price and yield data and information on non-farming economic activities. There are complexities of the relationships between markets and production. For example, Suthworth (1979) found that, in West Africa, the timing of farmers' sales and their storage practices were influenced by a set of forces. These include the timing of harvests of different crops, own consumption needs, expectations about future prices and supplies. Others include the timing of producers' cash needs, transport availability, levels of trader demand, access to storage facilities, fears of theft, and the timing and size of monetary income from other sources. In addition, proximity to market places, land size, the nature of tenancies and family sizes are likely to influence in this single decision.

2.2.2 Marketing channels or chains

Defining marketing chains for one or different commodities, regions and seasons indicate the links connecting one price series with another knowing when and where crops are sold. Their transport and storage destinations and who the ultimate consumer/user is, permits the analyst to specify the likely causal direction of markets connections (Timmer et al. 1983).

This is crucial for subsequent market margin analysis if they are to provide meaningful assessments of marketing efficiency.

Marketing chains are important in understanding which firms/ dealers are engaged and they can be used to illustrate and clarify not only the movement of commodities, but also financial, credit and information flows, and the location of storage and processing facilities in the system. The patterns revealed through such illustration may shed light on opportunities and constraints faced by traders, consumers and /or producers. In order to define the flow of commodities, the different types of marketing channels have to be identified and all the participants in the market categorized. The criteria used to establish meaningful classes of participants will be specific to the objectives of the research. Functional categories, like rural assemblers, wholesalers, wholesaler-retailers, retailers, processors, transporters, farmer-traders, commission agents and money lenders are to be universally used.

Functional categories will often not be mutually exclusive though, because individuals or firms may combine several market roles. But through identifying the various functions' undertaken, and the exchange relations between the institutions responsible for them, marketing chains can be built up and the means by which commodities move from producers to consumers more clearly understood (Timmer et al. 1983).

2.2.3 Conceptual framework of market efficiency studies

Agricultural Marketing has been defined in various ways by different authors depending on the schools of thought. For the purpose of this study the definition by Gittinger (1982) has been adopted. Gittinger (1982) defined agricultural marketing as the performance of all business activities involved in the flow of goods and services from the point of initial agricultural production until the same goods are in the hands of ultimate consumer. By this definition it means the performance of marketing system will depend very much on the efficiency by which the marketing functions are carried.

Some theoretical framework to guide tools used in studying marketing efficiency have been given by Scarborough and Kydd (1992). These are the internal productive efficiency of marketing enterprises, the structure - conduct - performance model (S-C-P), and the food system framework. The first one, is a measure of firm level economic efficiency which is a combination of technical and operational efficiency. It is a good theoretical framework for measuring costs, and analyzing the efficiency of individual firms. Under this school, the method of descriptive analysis of accounting data is commonly used.

Secondly; the structure - conduct - performance model (S-C-P), This emphasizes on the relationships between functionally similar firms and their market behavior as a group, that is, given certain basic conditions the performance of particular industries depends on the

conduct of its sellers and buyers which in turn is strongly influenced by structure of relevant market (Timmer et al. 1983). The model is not the internal organization of firms.

Lastly, the work by Shaffer (1983) emphasizes that the food systems framework emerged from the concern that the internal productive efficiency model and S-C-P model could horizontal relationships between firms in assessing market performance. Further more, it fails to identify binding constraints in the system, and opportunities for enhancing its productivity and performance.

As a result the food systems framework combines elements of both the previous tools. It looks at the constraints on and opportunities for markets to contribute to improved economic performance (Scarborough and Kydd, 1992). Such constraints and opportunities are defined either through interviews with the market participants, or through classical market analysis tools.

2.3 An overview of Tanzania crops production and marketing

A report by MDB (1989), indicates that the main cause of oil seeds production decline was from the relative profitability side and the major factor is due to its lower relative profitability when compared to main crops like maize which are grown on the main oil seed producing areas. It is argued that although oil seed production has relatively lower variable cost outlays, the crop has low returns to labour hence it competes unfavorably with

crops like maize. These arguments are based on the fact that labour is increasingly becoming a constraint in household agricultural activities and hence 'significantly determine the types of investments and production activities to be done. The returns to labour therefore indicate the farmers likely production response, as these show the extent to which both the household labour and variable inputs are paid in the farm production process (MDB, 1992).

Theory suggests that there is no single factor which determines the farmers decision in the production and resource allocation process (Jones and Muttura, 1989). Under similar argument, Ellis (1982) argues that, it is not price policy alone that should be considered in explaining marketed output trends in Tanzania. Hence he denied the use of purely quantitative relationships in explaining the trends. However, he agreed that the evolution of marketed output in Tanzania broadly followed trends in relative producer prices.

Minde (1991) indicated that produce prices were among the most important and effective tools for influencing agricultural output. His analysis on the factors affecting agricultural marketable surplus in Tanzania concluded that, a complex web of economical, social, institutional, structural and environmental factors interact to determine the amount of marketable surplus.

Lipumba (1977) in his study on price responsiveness of pyrethrum supply in Tanzania argues that, although peasant farmers respond normally and efficiently to price changes;

the cultural and institutional framework in which these farmers are working are limiting to the extent that there is no significant response to price changes.

Mwamfupe (1987) studied the factors which affect agricultural decisions making and observed that, the choice of a crop was to a greater extent influenced by the "quest for security" and hence risk aversion took precedence over profit maximization. He further noted that, farmers view production for the market as a source of additional risk due to lower producer prices, poor supply of inputs and the inefficient marketing and transport systems. He then concluded that, these in total had made farmers abandon or lower the cash crop production in favor of food crop production. These findings concur with prediction by Ellis (1982) that under various farm production constraints, it was not surprising if Tanzania peasants were observed to retreat into the subsistence economy where at least their interaction with the state is minimized.

Adesimi (1990) reports that farmers could not proportionately devote more of their land to those crops which resulted in the highest gross margin. Further the analysis indicated that, crop enterprises which had the highest gross returns and gross margins were the ones which had the highest fixed and variable cost outlays. In some areas therefore, farmers opted to plant maize and cassava, which gave lowest gross margins per hectare. He thus concluded that, other considerations such as food security and availability and costs of

inputs played a significant role in production decisions and hence on the general level of output.

Although price can be the main machinery which account for the production trends of agricultural products, much needs to be worked on non-price attributes. It is because of this, that apart from dealing with price factors (like relationships of production and producer price and return per hectare) special attention is paid on effects of non-price factors on oil seed production by the smallholder producer in Iramba district.

2.4 Previous studies on constraints of oil seed crops production

Little economic research has been carried out on oil seeds production and marketing in Tanzania. This is because of high concentration of research work and funds on the major export crops, leaving the marginal export crops like oil seeds unattended. Although these have a role to play in the economy as far as foreign exchange generation is concerned. Studies on factors affecting production and marketing of oil seed, and sunflower in particular have not been carried out sufficiently in the country (Richard et al. 1990).

Temba (1987) pointed out some factors restricting sunflower production and hindering the realization of full genetical potential. These include: differences in production practices on small scale farms compared to recommended practices account for much of the difference. For instance, average yield by small scale farmer is below 600 Kg/ha while the potential

yield is more than 2,000 Kg/ha; decline in yield due to lack of improved seed makes farmers keep seed from the previous crop to plant the following season; poor stands due to poor land preparation and disease prevalence among the locally grown sunflower types. Other factors include lack of government support in provision of facilities for farming business, unavailability of resources at farm level, low level of income by peasants or shortage of capital either in terms of cash or credit, insufficient markets, unstable prices and lack of improved seed which are high yielding and resistant to diseases.

Kabyemera (1993), reported that factors affecting sunflower production include competition from subsistence crops, farmer's age, education, wealth and extension services and farming hazards of rainfall failure, pests and diseases. Most recently rats have found to be among the most important factors which have aggravated the poor production of sunflower. Lamboll and Nyanga (1986) suggested that in order to improve sunflower production, farmers must be provided with better extension, credit and marketing services and also produce price must cover production costs incurred by farmers.

According to Hull (1977) and Moris (1975), there have been little achievements in increasing sunflower production in Tanzania through the use of new technologies. Moris (1975) recommended that extension services should be directed to the most progressive farmers. 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 (1979) in the study on oil seeds production in Tanzania concluded that factors such as weather, soil fertility and competition with other crops had a great effect in determining farmers' priorities than extension services.

Bartlett (1979) stressed that farm management planning and analysis involving small-scale farmers should include their background, attitude and abilities. He concluded that plans which do not take into account farmers' ideas, needs and their environment are likely to be rejected.

According to Feder (1985) the major constraints to sunflower production for small holder farmers were lack of seed for improved varieties, scarcity of necessary inputs such as fertilizer and pesticides, low prices, lack of alternative official markets for sunflower and lack of extension advice on sunflower technologies. In this context, access to information could be improved by level of farmers' education because it could improve their communication with extension agents who supply technological information (Feder, 1985).

Pannel (1995) identified factors affecting farmers decisions on crop production in Australia. These factors comprise short-term profit factors, risk factors and whole farm factors. The short-term factors include yield performance of the crop, output prices and associated input costs reflecting profitability of the crop. Other short-term factors include

yields and output prices of competing crops for the same resources with the crop in question the farmer wants to grow. The risk factors comprise yield and price variability, flexibility of the enterprises in response to changed conditions and farmers attitude towards risk. The yield and price variability influence farmers to diversify production in order to reduce income risk because a mix of enterprises has a lower variation in total net returns. Different farmers will therefore, be differently affected by these factors depending on their personal degree of risk aversion.

The whole farm factors include total crop area; finance availability and cost; labour availability, quality and cost; farmers' objectives such as profit, risk reduction, sustainability, leisure and farmers knowledge and experience (Pannel, 1995).

The total crop area appears to be an overriding factor in determining the required trade-offs a farmer has to make. Farmers can not manage individual crops independently of the rest of the farm so they have to arrange their limited resources of land, labour, and finances to maximize returns over the farm as a whole. These trade-offs can influence farmers' decisions whether to grow a certain crop and to what extent or not to grow (Pannel, 1995).

2.5 Other studies on oil seeds conducted in different countries.

Analysis was made in Brazilian and Argentinean agricultural and macro economic policies and in production systems which have resulted in a high level of competitiveness on

international markets on oil seed crops. Both countries experienced difficulties in terms of indebtedness and high inflation, but in 1990 Brazil became the main world exporter of soya bean cake, while Argentina was the main exporter of soya bean oil, and is now a leading exporter of cereals and sunflower oil.

In relation to the USA, the production costs in the two countries are low, although transport and marketing costs are high (Bertrand and Hillcoat, 1996). Access to subsidized credit and agricultural support prices in Brazil, and the progressive abandonment of export taxes in Argentina are major important factors in their achievements and high level of competitiveness.

Agricultural policy has played an important role in shaping the patterns of oil seed production in USA. The growing concern for the decline in world market share of oil seed and oil seed products trade, and the associated decline in USA oil seed acreage have led to more aggressive policy measures. The Food, Agriculture, Conservation and Trade Act of 1990, signed in November 1990, made significant changes in USA Agricultural Policy as it pertains to the oil seed sector. Establishing a new price support loan programme with marketing loan provisions, and allowing participants more flexible use of these programmes has increased the attractiveness of oil seeds.

Recent surveys of farmers' planting intentions for the 1991/92 crop year and the preliminary results of the programme sign up suggest that farmers have taken advantages of the programmes and that oil seed acreage has increased. These programmes may be applicable even in less developed countries.

Studies done on factors contributing to sharp declines in the volume of sunflower production marketed through official and parallel channel in Zambia, indicates that price policy has increasingly favored maize at the expense of traditional food crops (Katyamba and Mbatia, 1996). Farmers tend to sell sunflower informally to the small traders who will pay less but promptly. Increased supply of sunflower will be largely dependent on a change in competing crop, price policy to bring a balance to the relative profitability of sunflower to maize. Research and extension should expand their efforts to improve the innovations to the farmers (Katyamba and Mbatia, 1996).

Before structural adjustment policy measures, including liberalization and devaluation, pricing policy which had been complemented by the marketing policy in Zambia had not created enough incentives for sunflower production, hence the low production. Data from small- and medium- scale farmers, who are the major producers of sunflower during 1990 within Kalomo district showed that in both small- and medium- scale, sunflower production were privately unprofitable. The policies had not created incentives for sunflower production (Katyamba and Mbatia, 1996). The lack of incentives was mainly

due to the depressed producer price, sunflower is producer price responsive (Katyamba and Mbatia, 1996).

Data on sunflower seed production in Russia in 1995/96 indicates that price and trade liberalizing reforms have affected this crop, as exports of sunflower seed climbed and was the highest in over 20 years (Hoskin, 1996). However, sunflower seed oil import growth moderated as domestic production raised, but not by enough to fulfil domestic demand. It is the inefficiencies in the processing industry that explained the scale of sunflower seed exports and vegetable oil imports (Hoskin, 1996).

An economic analysis on self sufficiency in oil seeds production in India revealed that trends in area, production, and yields of oil seeds, using the data for the period 1988/89 - 1991/92 were falling (Akupa, 1992). The government policy on oil seed sector was revised, one of strategies was through a reduction in cereal area. Later, in 1994/95 sizeable amount of oil seed production was realized and currently a lot of foreign exchange is saved by curtaining imports of edible oils and this has enhanced earnings of foreign exchange through increased exports of oil seed cake (Hoskin, 1996).

2.6 History of oil seed crops marketing institutions in Tanzania

In 1963, the post independence government established the National Agricultural Products Board (NAPB) to handle commercial purchases of different crops. Together with the

cooperatives unions, NAPB was responsible for marketing some agricultural products including oil seeds, Until 1973. That year NAPB was replaced by two parastatals: National Milling Corporation (NMC) and the General Agricultural products Export Corporation (GAPEX). They were both fully owned parastatals under the Ministry of Agriculture. GAPEX was given the mandate to market oil seeds as well as exporting all agricultural products previously handled by NAPB, including oil seeds. However, procurement from producers remained the responsibility of the cooperatives, who would then sell to GAPEX (MDB, 1993).

Following the dissolution of the cooperatives in 1976, oil seed marketing became fully confined to GAPEX, which was responsible for all operations from the farm gate to the port of export or a domestic oil miller. Due to its increased role in procurement, marketing and export of agricultural products, GAPEX established zonal offices which in turn maintained buying posts at strategic locations. The GAPEX and other authorities were given additional responsibilities for supplying agricultural inputs, storage and processing facilities and provision of extension services. The cost of the extra services widened marketing margins and reduced producer returns (Maliyamkono and Bagachwa 1990).

Over the years GAPEX became increasingly unpopular due to inefficiencies in the marketing system, overhead costs and operational expenses were staggeringly high resulting in serious liquidity problems. Crops from farmers were bought on credit but payment was not made until after several months. Transport and storage facilities were also

inadequate (MDB, 1993; TFNC, 1994).

The consequence of high indebtedness of the authorities and inherent liquidity problems was reflected in the poor services to the farmers. Farmers' crops were purchased on credit and at times remained unpaid for, for a long period of time. Most authorities lacked efficient transportation capacity. This greatly affected their ability to collect produce from villages on time (MDB, 1994; TFNC, 1994).

The prolonged pillage of crops in village resulted into losses, considering also the fact that storage facilities in the villages were poor and inadequate. Inputs required for improved production were either not available or unaffordable by farmers. The effect of this general state of affairs was loss of interest, among farmers, in the production of food and cash crops. Consequently a law was enacted in 1982 to re-establish the cooperative unions and they became operational in 1985/86 marketing season (MDB, 1992). The Unions were organized in the Cooperative Unions of Tanzania (CUT) but responsible to the Ministry of Local Governments and Cooperatives. The Unions were linked to the farmers by the primary societies.

The revival of the cooperatives reduced the role of GAPEX in oil seed marketing. The reduced role of GAPEX in oil seed marketing coupled with inefficiency led to the dissolution of the organization in September, 1986. However, Many of the problems faced

GÁPEX were inherited by the Unions.

After the dissolution of GAPEX in 1986, the Cooperative Unions were left to be the sole buyers until 1988/89 season when private traders were allowed to purchase the crop (MDB, 1992). The dissolution of GAPEX had an adverse effect on the marketing of oil seeds, with no exception to sunflower and hence the overall production.

Although it was assumed that the cooperative unions would have taken over the responsibility of purchasing oil seeds after the demise of GAPEX, these expectations were not met. Most of the Cooperative Unions were financially unprepared to purchase oil seeds and other major food and cash crops at the same time (Ndossi, 1993). Instead Cooperative Unions concentrated in purchasing the traditional food and cash crops and neglected oil seeds to the detriment of the oil seeds industry (TFNC, 1994).

Despite the introduction of the second phase of the structural adjustment programme to the crop marketing system in 1988/89 season, whereby private traders were allowed to purchase crops from farmers alongside cooperative societies/unions, there has been no significant improvement in oilseed marketing efficiency and sunflower in particular (Ndossi, 1993).

To carry out their roles, the unions had to buy the crops at officially announced pan-territorial producer price set by the central government to last for an entire season. The relationship between Cooperative Unions and crop marketing boards was that, Cooperatives Unions procured crops from farmers and sell them to the crop marketing boards whose role were to export. The selling price by the unions to the boards were into-store prices which were annually negotiated between the two sides. This system was abandoned in 1990/91 for an agency fee system. The reason for abandonment was the cooperative unions' desire to maintain produce title to the point of sale in the export markets.

The financial sector desired to cut down money supply lent to the parastatal marketing institutions through the into-store price system which was characterized by double financing of export crops to both the unions and boards. Since the re-establishment of the cooperative unions, their performance has been poor. This has largely been blamed on government control of marketing activities of cooperative unions. By 1992, cooperative unions had accumulated a debt of more than Tshs. 38 billion from National Bank of Commerce (NBC).

Criticism on agricultural sector was that the agricultural marketing institutions had been inefficient and became a burden to the tax payers. As a result reforms were carried out by government (Maliyamkono and Bagachwa, 1990). These reforms were spelled out in detail

in the National Agricultural Reforms Programme, agreed between Tanzania and the World Bank in 1990 (BOT, 1996).

In recent years, the government has reaffirmed its commitment to market liberalization, agricultural marketing system has changed significantly. The key element in the new system is competition at every stage of the marketing chain. The aim is to improve agricultural marketing efficiency.

Private sector has been encouraged to participate at all stages of the marketing system. Inefficient participants are gradually eliminated giving way to efficient ones to grow (MDB, 1994). However, Cooperative Unions continue to have an important role to play in the agricultural marketing system in Tanzania. With limited number of available private traders, it is likely that only the cooperatives will be able to provide real competition to avoid private monopsony in some areas of the country. Roles of cooperative unions may be limited due to their general financial constraints (MDB, 1993).

The crop marketing boards are playing regulatory role on behalf of the government. Their functions includes licensing and registration of crop traders, monitoring of sale prices, quantities and quality attributes. Of particular importance is the maintenance of respective industry database and regular publications of industry statistics (TFNC, 1994).

2.7 Oil seed crops improvement policies in Tanzania

There have been a number of programs as regard to improvement of oil seed production in Tanzania, among them include the National Edible Oil Programme (NEOP) of 1987 and the National Non-traditional Export Crops Programme (NNECP) of 1988. These programs were designed to promote oil seed sub-sector in the country and reducing the quantity of imported oils and also improvement of the national status of the people, particularly in the rural areas (Kabyemera, 1993). Despite the well structured policies, the anticipated development of the oil seed sub-sector has not been realized, rather there has been gradual and in some areas intermittent decline in the production and processing of oil seeds in the country.

While this review may not be exhaustive, but it gives a representation of the most related work that help to shed light or direct the path of this research. The major observation made from this review is that constraints to a certain crop production differs across socio-economic groups and over time and thus, it is unrealistic to expect uniform constraints of a crop production.

CHAPTER III

3.0 METHODOLOGY

3.1 Introduction

The chapter outlines the methodology which was used to collect and analyze data. Part one presents the data sources, including primary and secondary data sources. The second part presents questionnaire design and sampling procedures. Third part discusses the methods and models to be used for empirical analysis to address research questions. The last part presents problems encountered in data collection.

3.2 Data sources

The data needed for analysis were collected from both primary and secondary sources. Primary data were collected from farmers in Iramba district during March to May, 1997. A structured questionnaire was used as the main instrument of data collection from farmers through interviews. The data collected include farm sizes, area cultivated to various crops, crop yields, availability of extension services, credit facilities, labour input supply and use, input and producer prices market location and costs of production. Other data collected include sunflower marketing participants and traders marketing costs.

The secondary sources were from Singida Regional and Iramba District Agricultural Offices, Institute of Production Innovation (IPI), Tanzania Food and Nutrition Center (TFNC), Small Industries Development Organization (SIDO), Sokoine National Agricultural Library (SNAL) and from Library of the University of Dar es Salaam.

3.3 Questionnaire design and sampling procedure

The questionnaire was designed to collect primary data from farmers, sunflower traders and oil millers within the district. The questionnaires were administered by the researcher in swahili although they were designed in English, the language well understood by the farmers, sunflower traders and oil millers in the study area. Apart from the questions already prepared the researcher made field observations especially when assessing farm acreage of different households and other variables for the purpose of cross checking the obtained data.

Four divisions were purposively selected because of their importance in sunflower production in the district, these are Nduguti, Kinyangiri, Kinampanda and Ndago. Thereafter three villages from the first three divisions and two villages from Ndago division were randomly selected. Finally 10 farmers were randomly chosen from every village included in the sample, stratified random sampling technique was employed to select sunflower traders and oil millers in the district based on their capital potentials.

In order to obtain unbiased responses, the criteria used in question construction has been observed on the issues of specificity and objectivity as Peterson (1982) mentioned that these are the main problems towards obtaining a biased response.

3.4 Methods of data analysis

3.4.1 Descriptive analysis

Descriptive statistics and tabular analyses have been used in order to group the raw data so as to be able to describe the general farming characteristics of the farmer. These analyses have also been used to assess the role of institutions involved in providing credit, extension services, input supply and marketing services in the study area.

3.4.2 Econometric analysis- Probit analysis

Probit model was used to determine the constraints which had a strong effect on yield of sunflower. The question investigated was what constraints were most significant in explaining the effect on sunflower yield in the study area. The analysis provides a measure of the relations among a set of variables for the purposes of predicting the dependent variables or estimation of specific coefficients.

3.4.2.1 Probit yield performance model

This study required a model which reflects a dichotomous variable, good or poor performance of sunflower yield. The study relied on the use of a special type of qualitative

3.4.2.3 Assumptions of the probit yield model

The dependent random variable, Y is assumed to be binary, taking on but two values, say 0 and 1. The outcomes on Y are assumed to be mutually, exclusive and exhaustive. In this model exogenous variables assumed to account for the variation in probability (p). This assumption is analogous to the standard regression model in which the exogenous variables account for variation in the mean of Y.

A particular form of the relationship between Y and X is assumed up to the unknown parameters b where as in OLS Y and X are linearly related. As in OLS regression, we assume that the data are generated from a random sample size N, with a sample point denoted by i, i = 1, ... N. This assumption requires that the observations on Y be statistically independent of each other, ruling out serial correlation.

As in OLS, the independent variables may be random variables, we require only that there be no exact linear dependence among the $X_{ik's}$. This assumption implies that N>K, that each Xk must have some variation across observations (apart from the constant term) and that no two or more Xk's be perfectly correlated.

The above assumptions may be summarised as follows

(i) $Y_i \in (0, 1), i = 1, ..., N$

(ii) $P(Y_i = 1/X_i) = \Phi(\sum b_k X_{ik})$

(iii) (Y1, ...YN are statistically independent

(iv) No exact or near linear dependencies exist among the $X_{ik's}$ across K.

The basic statistical problem is to estimate values for the

unknown bn parameters. The most suitable technique of estimation when using the binary choice model is Maximum Likelihood Estimation (MLE). Although, the technique requires the use of iterative algorithm; this procedure ensures the large sample properties of consistency and asymptotic normality of the parameter estimates so that conventional tests of significance are applicable. Thus, an analog of the t- test can be applied as a test of significance.

Evaluating a probit model requires examining both the goodness- of- fit measures and the estimated coefficients.one goodness- of- fit measures is the test for significance of all or a sub-set of coefficients of the variables included in the model. This makes use of the log-likelihood ratio test statistics. The likelihood ratio statistic is computed as:

$c = -2\log (L_0/L_1) = (-2\log L_0) - (- 2\log L_1) =$

$-2(\log L_0 - \log L_1)$

Where

$L_1 =$ the value of the likelihood function for the full model as fitted

$L_0 =$ the maximum value of the likelihood function of all coefficients except the intercept are 0. That is, the computed chi-square value tests the hypothesis that all

coefficients except the intercept are 0, which is exactly the hypothesis that is tested in regression using the 'overall' F statistic.

This ratio (i.e. c) is distributed as a chi-squared random variable with k-1 degrees of freedom, where k is the number of parameters to be estimated in the full model including the intercept. The formal test, then, is performed by comparing the computed statistic c to a critical value taken from a table of the chi-square distribution with k-1 degrees of freedom and significance level $\propto$.

Another measure is McFaddens' R^2 which is sometimes called pseudo R^2. This is calculated as: McFaddens' $R^2 = 1 - (\log L_1 / \log(L_0))$

where

L_1 = the maximum value of the log-likelihood function

L_0 = the value of log-likelihood function when all coefficients are set equal to zero except the intercept.

3.4.2.4 Selection and definition of model variables

The selection of variables to be included in the probit yield model was based on the assumption that there were constraints affecting sunflower yield in the study area. The probit analysis centers on the hypothesis that a set of independent variables influences the level of sunflower yield.

The dependent variable (Y) takes on the value of 1 if a farmer has a good yield (good performer) and 0 otherwise. The variables included in the model
were selected based on the intention of identifying constraints that could affect the performance of sunflower.

Dependent variable

Yield performance (YIELDP), this is the dependent variable for the probit yield model. Farmers who were found to have yield level above or equal to the threshold (critical value) were considered to be good performers and others as poor performers. Several independent variables were expected to affect this variable. The directions of effect of these variables to the dependent variables were hypothesized basing on how farmers perceived them. It was hypothesized that the variables were associated with yield performance.

Independent variables

Farmer's age (FARAGE = X_1), this was specified in years and is a continuous variable. This variable was assumed to be negatively related to the sunflower yield. It was assumed that older farmers are more risk averse than younger farmers and therefore do prefer to invest more on food crops and thus yield less in sunflower. This assumption is in line with argument that yield of crops is directly related to the farmer's age (Mkenda, 1997)

Total farm size (TFARMSZHA = X_2), this was measured in hectares and is a continous variable. The direction of effect to the dependent variable was not predetermined.

Sunflower area (SFAREA = X_3), this variable was specified in hectares put to sunflower production.

Extension service (EXTENS = X_4), based on the innovation- diffusion literature. it was hypothesized that extension service was expected to affect yield performance of sunflower positively because farmers are exposed to 'new information'. This variable was classified as a binary variable, 1 if the farmer had extension services and 0 otherwise.

Credit availability (CREDAVL = X_5), the variable for credit availability was assumed to have positive effect on sunflower yield. Because as a farmer is exposed to credit facility like improved inputs, the probability that he /she would get good yield increases. The variable is binary (i.e. 1 if the farmer obtained credit from either the formal or informal sources during the year and 0 otherwise).

Improved seed use (IMPSUS = X_9), the variable was specified as dummy with 1 if the farmer used any of the improved seeds and 0 otherwise. The variable was included in the model because its use affects per unit productivity and consequently affects yield. The direction of effect on yield was expected to be positively related.

Fertilizer use (FERTSE = X_{12}), this variable was specified as dummy with 1 if the farmers used any of the fertilizers in sunflower growing and 0 otherwise. The direction of effects to the dependent variable was expected to be positively related.

Poor market arrangements (MARKAR = X_7), This is a binary variable with 1 if the farmer perceived that the market arrangements were bad and 0 otherwise. This variable was expected to influence yield negatively. Price of sunflower (PRICESF = X_8), This variable was assessed whether price was among the constraints that affected sunflower yield. The variable was classified as a binary with 1 if the price was a constraint and 0 otherwise. The variable was expected to influence yield negatively.

Land problem (LANDPR = X_{11}), It was hypothesized that land problem was expected to affect yield performance of sunflower. The variable was specified as a binary with 1 if land is a constraint to sunflower yield and therefore a constraint to sunflower production and 0 otherwise. The variable was expected to influence yield negatively.

Pests and diseases (PDISES = X_{10}), this variable was classified as a binary in order to examine whether is a constraint that affect sunflower yield, with 1 if pests and diseases is a constraint to sunflower or sunflower production and 0 otherwise. The direction of effect on dependent variable was expected to be negatively related.

Bad weather condition (WEATHER = X_6), the ability to withstand weather fluctuations is important to yield because the rain pattern in the country is currently very unreliable. This variable was expected to affect yield negatively, and is a binary type, 1 if farmer identified weather as a constraint and 0 otherwise.

3.4.3 Gross margin analysis

Gross margin is used in the field of farm management as a guideline to selection of enterprises. It is used as a measure of enterprise profitability and as such a means of selecting farm plans. Phiri (1991) concluded that although gross margin is not an absolute measure of profitability, but it remains the most satisfactory measure of resource use efficiency available in small scale agriculture. Its main advantage is that it does not involve tedious calculation and is within the comprehension of any intelligent farmer, it is also more flexible in accommodating personal expectation and limitation of the particular situation. This analysis has been used to compare gross margins for different product types in the same or different times and places, to suggest relative efficiencies of different markets.

The size of gross margins may provide insights into other important characteristics, and can aid the formation of hypotheses concerning farming or market efficiency. If gross margins decline with increased raw material supply, economies of scale may be a factor, and if they rise with farm production, bottlenecks or constraints in the provision of marketing services may be implied.

It was useful to study the gross margins of various crops grown in the area of study in order to establish the relative economic profitability of the crops. It is generally known that due to scarcity of resources smallholder farm producers tend to allocate their resources more to

those enterprises which pay more returns. Thus more returns warrant future production of that crop as transferable resources are switched from the low paying enterprise to more paying one. This considers both the production costs and revenue.

Principally, $GM = TRi - TVCi$

Where GM = Gross margin per ha (T.shs/ha)

TR = Total Revenue (T.shs/ha)

TVC = Total variable costs (T.shs/ha)

i = i^{th} crop

However, as Mwala et al. (1988) pointed out that in attempting such comparisons it is necessary to take into account of the differences in product perishability. Ishuza (1984) pointed out that this method of analysis has one major weakness in small scale farming. Farmers usually attempt to attain self sufficiency in food stuffs, thus a large portion of family labour is devoted to food production thereby affecting labour allocation to other enterprises.

3.4.4 Market margin analysis

Market margins are the difference between prices at two market levels. The term market margin is commonly used to refer to the difference between producer and consumer prices of an equivalent quantity and quality of a commodity. However, it may also

describe price differences between other points in the marketing chain, for example between producer and wholesale or wholesale and retail prices like the case of this study.

Market margin represents the price charged for one or a collection of marketing services. For example the difference between producer and consumer or retailer's prices is the amount charged for all the marketing services rendered between production and consumption or retail place, including buying, bulking, transport, storage, processing, market fees etc.. Under competitive conditions, the size of market margins would be the outcome of the supply and demand for marketing services, and they would equal the minimum costs of service provision plus 'normal profit'. The latter can be defined as the least payment the owner of an enterprise would be willing to accept for performing the entrepreneurial function including risk-taking, management and the like. It is the payment the owner must receive in order to keep him from withdrawing his capital and managerial effort and putting them into some other alternative (Mwenda, 1993).

The quality and quantity of marketing services depend on the demand and supply of marketing services and/or the degree of competition in the market place. The costs of providing such services, are influenced by factors exogenous to the marketing sub-system, like government policies; the price of fuel; the condition of roads; vehicle supply and demand; competitive conditions in factor markets; and endogenous factors, in particular the technical and operational efficiency with which marketing functions are carried out,

including the realization of potential scale economies. The efficiency with which marketing functions are priced in the absence of scale economies, will largely be determined by the extent of competition between marketing enterprises at each stage of the marketing chain, since this is the dominant factor in limiting levels of profit.

For the purpose of this study, the market margin analysis can be represented by

MM = SPrice - Bprice

Where MM = marketing margin of sunflower trade

Sprice = Selling price

Bprice = Buying price

Analysis on marketing services were examined in order to identify weather the trader was getting profit that would keep him performing the entrepreneurial function.

3.4.5 Problems encounted in data collection

Some farmers either showed an obvious interview fatigue or did not appear for the interview for reasons not known by the researcher. Some farmers had problems of memory recall and some could not estimate some of the research parameters like farm size, age, output harvested, amount sold, amount consumed etc. It was difficult to verify the farmers' memory. In some cases the researcher had to rely on their rough estimates.

Distance of the farms from homes was also a problem because it was difficult for the researcher to visit farms situated far away from home leads. Some of sample areas could not be reached on time due to impassable roads.

Problem related to price data collection. There is a possibility that prices reported do not apply to the same time (duration) in all markets, partly, because of differences in market times and the fact that there were generally no regulation as to the time when prices were to be collected. Data were collected for crops grown in the 1995/96 cropping season and which were harvested and utilized in the 1996/97 season. As for secondary data scarcity and unreliability of available data might have limited the accuracy of some conclusions derived from this study.

Inspite of the above limitations, the researcher is confident that the data which have been collected are relatively and have adequately addressed the objectives set forth for the study. The results could be cross-checked with findings that might be carried out in other locations in the country.

CHAPTER IV

RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, results of survey about household characteristics are discussed. These include marital status, age of farmers, education level, household size, household farm size, land acquisition, and household off-farm activities. Prior to actual discussion of the survey objectives, explorations on the existing farming practices, and socio-economical circumstances are briefly explained, including aspects such as structure of farming, livestock keeping, labour availability and farming schedule.

The chapter also presents survey results on farm input usages. These include farm implements for land preparations, fertilizer and insecticide application, improved seed usages, education and extension services. Descriptions on the agricultural productivity is covered in this chapter as well. These include cropping intensity and sunflower production characteristics.

Probit model analysis results are presented in this chapter. The chapter also described about the sunflower marketing, institutional factors and the roles of institutions involved in marketing of sunflower in the study area. Lastly, the chapter presents gross margins analysis results of major competing crops in the district.

4.2 Socio-economic and demographic characteristics of farmers

The household characteristics have essential implications on the socio-economic and farming practices, they also give the knowledge of the general behavior and attitudes of the people in the area. It is worth while for that matter to describe the socio-economic and demographic characteristics of the sampled households.

4.2.1 Marital status

Table 4.1. presents the data on the marital status of sunflower producers in Iramba district. From that table it is evident that most of sunflower farmers are married (88.2%) followed by separated (6.4%), widowed (1.8%) and divorced (1.8%).

Table 4.1: Distribution of farmers by marital status

marital status	no. of respondents	Percent
married	97	88.2
separated	7	6.4
widowed	2	1.8
divorced	2	1.8
Total	110	100.0

Source: Survey results, 1997

Due to problem of labour scarcity in the district marriage was used as a potential source of labour for production of such a crop in particular and other crops as a whole. The possible reason for those who are separated to be ranking second in the list is that most of men had left their wives at home while looking for wage paid employments at distant places such as Mbulu, Arusha and Shinyanga.

4.2.2 Age of sample farmers

Table 4.2 indicates the age of sample sunflower farmers in Iramba district. For the purpose of this study farmers were categorized into three age groups as follows: Younger farmers with age below 30 years, middle aged farmers ranging from 30.1 to 45.0 years and the last age group was the older farmers that is farmers with age above 45.1 years. Majority of farmers were between 30.1 to 45.0 years (47.3%).

Table 4.2 Distribution of farmers by age of household head

Age group	no. of respondents	percent
< 30	24	21.8
30.1 – 45	52	47.3
> 45.1	34	30.9
Total	110	100

Source: Survey results, 1997

The results of the surveyed data indicate that sunflower farming in the district was mostly performed by middle aged farmers. This may reflects that youth farmers either migrate to urban places where they engage in petty businesses and for other employments. While older farmers preferred to have more food crops rather than cash crops such as sunflower due to food security reason.

4.2.3 Education level of farmers

Survey results indicate that farmers seem to have low levels of education as shown in table 4.3., that 83.6% of farmers have attained primary education. About 8.2% of farmers have attained secondary education. A few farmers (7.3%) had not attended school.

Table 4.3 Distribution of farmers by education level

Education level	no. of respondents	percent
No formal	8	7.3
Standard 1 – 4	15	13.6
Standard 5 – 8	78	70.9
Secondary education	9	8.2
Total	110	100

Source: Survey results, 1997

The observation from the study is that majority of farmers had attended school and that they know how to read and write and thus information can be extended using written documents like booklets, posters, leaflets, bulletins etc.. This finding reflects on the impacts of government policy of Universal Primary Education (UPE).

4.2.4 Household size

Household size was classified as small size if members were below 5, medium size if between 6 and 10 and large household size if members were above 10. The survey results reveal that majority of households have medium family size (55.5%). Farmers with large family size was 30.9% and a few farmers seem to have small household size (13.6%) (table 4.4).

Table 4.4 Distribution of farmers by household size in Iramba district for 1995/96 season

Household size	no.of farmers	percent(HH)
< 5 (small)	15	13.6
6 - 10 (medium)	61	55.5
> 10 (large)	34	30.9
Total	110	100

Source: Survey results, 1997

The survey results on table 4.4 revealed the same situation as one found in the socio-economic survey done by DALDO 1994/95, where most of households had medium family size (61%) (DALDO, 1996). The family size has some implications on the family labour availability as explained in section 4.3.4.

4.2.5 Household farm size

Table 4.5 shows the land available for use in farm production. It can be observed from the table 4.5 that there is a difference in the size of the land at the disposal of the sampled farmers. This has a direct effect on the allocation to sunflower production. The researcher categorized farmers into three groups: Farmers with less than four hectares as poor, between 4.1 and 8 as medium income farmers and those with farm size above 8.1 as relatively rich farmers.

Table 4.5 Distribution of respondents by farm size in Iramba district for 1995/96 season

Farm size (ha)	No of respondents	percent (HH)
< 4 (poor)	46	41.8
4.1 - 6 (middle)	45	40.9
> 8.1 (rich)	19	17.3
Total	110	100

Source: Survey results, 1997

According to survey results, majority of farmers are poor and medium income earners with 41.8% and 40.9% respectively. A few farmers (17.3%) indicated that they belong to the group of relatively rich farmers. Farmers in the district own more than one plot of land. On average farmers own 3 separate plots, the range was as wide as from 1 to 5 plots. Basically a household has a plot at homestead and a few more away from home. The average distance from homestead for sample farmers was 2.5 km.

Table 4.6 Distribution of farmers by average number of farm plots and distance from homestead in Iramba district for 1995/96

parameter	Iramba district (n = 110)
Number of plots	3.0
Average distance (km)	2.5

Source: Computed from survey data, 1997

4.2.6 Land acquisition

From table 4.7, various methods of land acquisition exists in the study area. About 31.8% of farmers obtained land through inheritance, 26.4% bought, whereas 25.5% hired or rented land. Only 16.4% of respondents acquired land through offering. Offering means that a farmer borrow the plot for one or several seasons after which the farmer is obliged to return it to the owner or given free of charge for good.

Table 4.7 Distribution of respondents by land acquisition in Iramba district for 1995/96 season

Land acquisition	No. of farmers	Percent
Inheritance	35	31.8
Bought	29	26.4
Hired	28	25.5
Offered	18	16.4
Total	110	100

Source: Survey results, 1997

4.2.7 Household off-farm activities

Sampled farmers were requested to provide information on off-farm activities that contributed to their income or labour utilization. From table 4.8 one can observe that there were few off-farm activities in the study area which were carried or operated by household. A few farmers reported that they were also involved in business and/or trading (20.9%). Only 9.09% and 5.45% reported that they were involved in formal employment and village leadership respectively. Majority of farmers reported that they had no off-farm activities (64.56%). This implies that most farmers do not have enough off-farm activities, once the seasonal farm activities end they remain relatively idle until next season.

Table 4.8 Distribution of respondents by off-farm activities in Iramba district. 1995/96

Off-farm activities	No of respondents	Percent
None	71	64.56
Business/trading	23	20.90
Village leadership	10	9.09
Paid employment	6	5.45
Total	110	100

Source: Survey results, 1997

The results from table 4.8 on village leadership as one of off-farm activities may be misleading. This could be probably because of bias sampling that might have been done by field extension officers favoring the village leaders. However, the results represent the fact that the study area had a few alternatives in terms of off-farm activities.

4.3 Farming practices

4.3.1 Structure of farming

Small holder farmer has multiple objectives that contribute to maximizing family satisfaction. Any enterprise or productive process that allows the family food security and satisfaction might take precedence over those that are more profitable. Iramba district farmers who grow drought resistant cereals like sorghum at small-scale level so as to feed their families do fall in the second category of smallholder farmers. As such these farmers are not motivated by profit making but by several objectives, like food security.

In the study area, both rotation of fields and crops are evident. Most crops are grown as pure stand, a few are intercropped, and it has also been shown that sunflower was mostly grown as a sole crop as reported by (73%) of the respondents. About 20.9% of farmers intercropped, and a few farmers (5.45%) reported that they grew both in pure stand and intercropped patterns (table 4.9).

Table 4.9 Cropping system for sunflower in Iramba district. 1995/96 season

Cropping system	No of respondents	Percent
Sole crop (pure stand)	81	72.72
Intercropped	23	20.90
Both pure stand and intercropping	6	5.45
Total	110	100

Source: Survey results, 1997

Sunflower can be intercropped into other crops mainly beans and groundnut. In most farms where there were intercropping, there were not in the form of row or mixed style but rather smaller pure stands planted in one bigger plot. It was also observed that many farmers used sunflower as a boundary crop, planted on the borders of either maize or sorghum plots. All these were considered as intercropping. However, most farmers were conscious of the competitiveness of sunflower and its ability to suppress other plants grown with.

4.3.3 Livestock keeping

The district's recommended land carrying capacity was one livestock unit for 4.05 ha (URT, 1988), but the estimated hectares per livestock unit was 0.59 (DALDO, 1996). The above statistic shows that there was serious overstocking in the area. As shown in table 4.11, ox-ploughing plays an important role in the area. The ox-ploughing operation is a necessity given the short rain season, labour availability and total amount of land that must be ploughed.

It is true that with ox-plough more land can be ploughed as compared to hand hoe. Ox-plough is also cheaper compared to tractor and so the reference to oxen as an important tool for production in Iramba district warrants some attention.

Over stocking on the other hand, means that cattle do loose condition and weight during dry season due to shortage of adequate feed - which is both poor in quality and quantity. Since oxen are needed to work throughout the dry season in pulling ox-carts and ox-ploughs during farming season, it is a clear indication that the farming system in the area owes much from the livestock sector and therefore, proper policies on livestock are necessary to keep Iramba district farmers use draught power effectively.

4.3.4 Labour Availability

Availability of family labour on a small holder farmer assumes a great significance in the

context of Tanzanian agriculture. Reliance on family labour for farm work predominates in the district. production operations including land preparation. planting, weeding and harvesting mostly make use of family labour. However, labour hiring in and out of the family was found to exist especially in peak labour demand operations - weeding and harvesting. A few farmers employed hired labour in order to boost production while majority of farmers do not use hired labour. This could mainly be a result of lack of cash to hire labour as manifested in the levels of other inputs used in their production. Division of labour within a household to a large extent was traditionally in operation for the district, notably weeding, carrying crops and harvesting were predominantly done by women. Adult males on the other hand have a great role in land clearing.

Farmers in the area mainly utilized labour from four main sources. These are family labour, hired labour, a combination of the two sources above, and the so called 'Chama'. 'Chama' literally means working groups, whereby the 'chama' organizer prepares food or beer and asks neighours to assist in the farm work. Essentially this is a social organization of farm labour which helps to bridge the gap of labour deficits which could have been experienced if each household had done all of its farm operations. It helps also to solve the problem of unavailability of hired labour in the survey area. 'Chama' is practiced by various farmer groups and tends to reduce the need for hired labour. From the sampled sunflower farmers 28.2% of total respondents used family labour. About 10.9% of respondents used

hired labour alone, those were employed workers and traders. Farmers who used both family and hired labour in their farming operations were 27.27%. About 33.64% of respondents reported to have used family and hired labour, in addition, they used 'Chama'.

Table 4.10 Distribution of respondents by type of labour used in Iramba district, 1997

Type of labour	no. of respondents	percent
Family labour	31	28.20
Hired labour	12	10.99
Family and Hired	30	27.27
Family, hired and 'Chama'	37	33.64
Total	110	100

Source: Survey results, 1997.

Hired labour payment was in cash or a certain amount of food, normally maize or beans. Valuation of these foods was in terms of cash a farmer would get by disposing it for sell.

4.3.5 Farming schedule for selected main crops in Iramba district

Farming schedule for major crops grown in the study area was a bit dynamic due to fluctuations of weather. Crops growing season follows the pattern of rainfall. Land preparation is done early in October and early November to coincide with the growing season. Farmers in the surveyed area planted from January to as late as February for sunflower although recommended planting dates for sunflower in the area was in mid - December.

Sunflower was planted after maize, beans, sorghum, and cotton if any, therefore when rains are late the planting period of the crop is more affected. Sunflower weeding is usually spread between January to march and sometimes February to April for late planted sunflower. Weeding is done one or two times depending on the method of land preparation. However, majority of sample farmers reported that because they plough the sunflower field twice before planting and usually plant late after other crops especially food crops, weeds do not grow big enough to compete with the crop and thus weeding is done only once in February. Harvesting was done between May and June depending on the varieties grown.

Maize was planted in late November, December or early January depending on the onset of the rains. Weeding for maize was between December to March. Maize was harvested between late April to July. Cotton was planted immediately after maize, weeding was done

twice or thrice and was between January and March. Harvesting for cotton was done between May and July. Beans were planted the same time as maize and intercropped with maize, there were a few cases where beans were planted as a sole crop. Beans were harvested earlier than maize between February and April. The cropping schedule for sorghum was the same as for maize.

4.4 Farm input usages - technology

4.4.1 Farm implements

As shown in table 4.11, ox-plough plays an important role in the area. The table depicts the proportions of respondents who use various farm implements in land preparation. Ox-plough was the major implement used in land preparation (80.9%).

Table 4.11 Distribution of respondents by use of farm implements for land preparation for 1995/96 season.

Farm implements	No.	percent
Hand hoe	6	5.5
ox – plough	89	80.9
Tractor	15	13.6
Total	110	100

Source: Survey results, 1997

Survey results on ownership of farm implements in Iramba district (table 4.12) revealed that only 62.5% of farmers owned ox-plough whereas 37.5% of farmers hired ox-plough for land preparation. About 96.8% of farmers who used tractors for land preparation indicated to have hired from other farmers. Only 3.2% of farmers owned tractors for land preparation. From these survey results, it seems that there is a need to improve the farm implements in Iramba district.

Table 4.12 Respondents' ownerships by farm implements in Iramba district for 1995/96 season

Farm implements	Type of ownership		
	owned (%)	hired (%)	total (%)
Hand hoe	98.0	2.0	100.0
ox-plough	62.5	37.5	100.0
Tractor	3.2	96.8	100.0

Source: Survey results, 1997

4.4.2 Fertilizer application

Fertilizer is one of the most important factors for increased yields. In fact, FAO (1981)

concluded that the contribution of fertilizer to increasing yield is perhaps the greatest among the purchased inputs in most areas of Tanzania. This clearly shows the importance of fertilizer to crops production. Fertilizer can improve yield to certain extent only on combination of improved seed, proper use of fertilizer and cultural practices that are necessary to achieve higher crop yields in a good season. The most commonly used fertilizer was the manure (kraal manure).

Forty six percent of farmers reported that they did not use any type of fertilizer in their farms. About 21% of farmers indicated that they used only inorganic fertilizer especially manure in the reference year. Only 11% of farmers reported that they applied chemical fertilizer and no organic fertilizers in their farms. The quantity of chemical fertilizer applied was nevertheless, very small. About 23.6% of farmers reported that they applied both chemical and organic fertilizers (table 4.13). It can be seen from these results that farmers in Iramba district were not using fertilizers.

Table 4.13 Distribution of farmers by use of fertilizers for sunflower in Iramba district for 1995/96 season

Type of fertilizer use	No. of respondent (N = 110)	percent
None	59	53.6
Organic	23	20.9
Chemical	12	10.9
Both	26	23.6

Source: Computed from survey data, 1997

Several reasons were given as to why most of them did not use fertilizers. Some reported that they appreciate that the area is fertile enough and were not able to justify the additional cost of fertilizers. Others reported that fertilizers were not available and when appeared at the local markets they were very expensive and a few reported that once chemical fertilizer use has started can not be stopped lest the production becomes ruined.

Table: 4.14 Distribution of respondents who used fertilizers by type of seed planted for 1995/96 season in Iramba district.

Type of seeds	percent use of fertilizers	
	yes	no
Improved	75.0	12.0
Local	25.0	88.0
Total	100.0	100.0

Source: Computed from survey data, 1997

he survey results indicate (table 4.14) that farmers who used improved seeds were the ones also using fertilizers. Seventy five percent of respondents who used improved seeds, also used fertilizers, only 12% of farmers who used improved seeds did not use fertilizers. Twenty five percent of farmers who did not use improved seeds, reported to have used fertilizers (table 4.14). The term fertilizer here include both organic and chemical (inorganic) fertilizers.

4.4.3 Improved seeds usages

In the surveyed area, all farmers indicated that little improved seed were delivered to the local depots. Non-availability of improved seed in the area was cited as the main cause for

farmers planting local seed. The other limitation cited was the cost of purchasing improved seeds.

Most farmers interviewed showed readiness to use improved seeds but they reported that it was difficult to get and were expensive. Table 4.15 indicates that majority of farmers used their own seeds, i.e. they set aside some
amount of harvested seeds and used for the next season.

Table 4.15 Proportion of respondents by type of seed varieties for 1995/96 season in Iramba district.

Crops	percentage of respondents		
	local	Improved	total
S/flower	68.2	31.8	100
maize	44.5	55.5	100
Beans	68.3	31.7	100
sorghum	88.9	11.1	100
cotton	38.1	61.9	100

Source: Computed from Survey data, 1997.

A bigger proportion of farmers do buy improved seed from agricultural officers or extension services personnel. A good number also obtain seeds from friends and neighbours. It was only from the agricultural officers where farmers got good improved seeds. chances are that the quality of seeds obtained from neighbours and friends resemble the own seeds. Data from district agricultural and livestock office indicate that the estimated demand for improved seeds was higher but the amount used was lower (table 4.16).

Table 4.16 Type of improved seeds by amounts used and estimated demand as per 1995/96 season in Iramba district.

Improved seeds		Amount used	estimated demand	% deficit
Maize: U.C.A		-	5 000	100.00
CG4141/4142	Kilima	7 000	10 000	30.00
Katumani		7 000 -	12 000	42.00
			2 000	100 .00
Sunf.: Record		500	15 000	96.60
Others				
		1 000	5 000	80.00
Beans: Canadian		500	1 500	66.60
Lyamungu		-	1 000	100.00
Cotton: UK 74		2 000	15 000	86.60
Sorghum		5 200	7 000	25.60
Total		23 200	73 500	68.40

Source: DALDO, 1997

Table 4.16 indicates that the amount of improved seeds were lower than their demands. in total there was a deficit of 68.4%. Majority of farmers reported that the improved seeds were not available in their area and also the prices were too high.

4.4.4 Insecticide/pesticide Application.

Pesticide were used by a very few respondents. The situation was a bit worse with insecticides because out of 110 farmers interviewed only 18.2% of farmers used insecticides - the type of which they could not specify, and those were the ones growing cotton in Ndago and Kinampanda divisions. About 81.8% of respondents did not use any pesticides (table 4.17).

Table 4.17 Sample households response by whether they used insecticides /pesticides in Iramba district, 1995/96

Response	No of respondents	percent
Yes	20	18.2
No	90	81.8
Total	110	100

Source: Survey results, 1997

Some farmers reported that there were less diseases and pests in the district. Others pointed out that it was difficult to find the insecticides and when found proved to be very expensive. Pesticides were used mainly for controlling storage pests and not in the fields.

4.4.5 Education and extension services

This is a type of education services undertaken by extension agents. The study found out that extension services were poorly rendered, although majority of farmers reported to have extension contacts (74.5%), but the services were not effective. A few farmers (25.5%) reported to have no any extension contacts (table 4.18).

Table 4.18 Distribution of farmers by response whether they have extension contacts in Iramba district for 1995/96

Response	no of respondents	percent
Yes	82	74.5
No	28	25.5
Total	110	100

Source: Survey results, 1997

Attempts to look into how close and how much contact with agricultural extension workers have led to asking how frequently did they receive advice. The majority of the sample farmers who received advice indicated that they received agricultural advice few times in a year (60%). About 28.2% received very frequently and the rest of the sampled farmers received agricultural advice very few times in a year (11.8%) (table 4.19).

Table 4.19 Distribution of respondents by frequency of advice for 1995/96 season in Iramba district

Frequency of advice	No. of farmers	%
Very frequently	31	28.2
Few times in a year	66	60.0
Very few times in a year	13	11.8
Total	110	100.0

Source: Survey results, 1997.

The survey revealed also that extension workers were very few especially after the retrenchment exercise undertaken by the government. Those present at work were ill-equipped and thus remarkable contribution to farm outputs was not unexpected.

The study area is an area which agricultural extension workers could be very influential in passing through innovations and guidelines to the farmers. This is not only for the sunflower crop but to the general agricultural activities. This fact was more or less the same for all the divisions surveyed in the district. The nature of advice given was good crop husbandry practices such as proper planting, spacing of different crops, and fertilizer application. Farmers were eager to receive advice and the researcher found out that it is one area where more effort should be put.

4.5 Agricultural productivity

4.5.1 Cropping intensity

There were about 20 different crops grown in the study area. These were sunflower. sorghum, bananas, bulrush millet, finger millet, maize, beans, onion, cotton, potatoes. sugar cane, peas, groundnut, tomatoes, paddy, green grain, guava, cassava, cow peas and castor oil. Table 4.20 presents the major crops of the study area. This is by virtue of the number of growers met and relative importance accorded to the respondents.

According to the area grown to each crop (table 4.20) maize, sunflower, cotton and sorghum are shown as the main crops grown by the respondents with maize having the highest mean area. Sunflower is also shown to be an important crop to these farmers as reflected by the mean area of 3.03 ha. The mean area can thus reflect the proportion of sunflower in the cropping system.. According to reports by DADO - Iramba district, agricultural productivity in the area has been fluctuating year after year and well below national averages as table 1.3 shows. These yield levels do differ slightly among different parts of the district.

Respondents were asked to provide yield levels of major crops for the year 1995/96. The status of agricultural productivity in any area can be judged from the yield levels of

important crops as compared to the recommended yield levels. The survey results revealed also that all crops had lower yield (table 4.20), this situation was found to be attributed by a number of constraints like lack of access to improved seed, fertilizers, insecticides, bad weather and improper seedbed preparations as shown in the prevous sections.

Table 4.20 Respondents' mean area, yield estimate per hectare and recommended yield per hectare as per 1995/96 in Iramba district.

Crops	Mean area(ha)	Yields Kg /ha	Recomm. yield level kg/ha*
Sunflower	3.03	838.03	1213.1
Maize	3.72	1007.4	1102.2
Beans	0.95	519.4	606.2
Sorghum	1.718	549.2	937.0
Cotton	3.2	784.8	1098.0
Bulrush millet	1.2	508.5	937.0
Finger millet	1.6	607.0	937.0

* Refers to the district's recommended yield level in kg/ha (DALDO, 1996)

Source: Diagnostic survey, 1997.

I was found that farm household cultivated an average of 3.03, 3.72. 0.95. 1.718. 3.2. 1.2 and 1.6 ha for sunflower. maize, beans. sorghum. cotton, bulrush and finger millet respectiveiy as per 1995/96 season.

Table 4.20 indicates that sunflower had been ranking higher in terms of yield and also had relatively high value as depicted by the gross margin (table 4.37). These show relative importance attached to this crop. It is evident that farmers' estimates of production per hectare were lower than districts' recommended yields. It should be noted that survey results on estimated yield per hectare of sampled farmers differed slightly from ones provided by RALDO office, 1997 (Table 1.3).

4.5.2 Sunflower production characteristics

4.5.2.1 Land ownership for sunflower field

Survey results on areas under sunflower shows that only (40%) of the cultivated area were owned by the household. About (40.9%) hired (rented), 11.8% offered on contract basis and 7.3% leased in free of charge (table 4.21).

Table 4.21 Distribution of respondents by land ownership under sunflower in Iramba district for 1995/96

Land ownership	No of respondents	Percent
Owned	44	40.0
Hired (rented)	45	40.9
Offered	13	11.8
Leased free	8	7.3
Total	110	100

Source: Computed from survey data, 1997

It can be seen from (table 4.21) that sunflower in the study area had high value that land can be hired. This implies that arable land in Iramba district is one of the constraints for sunflower growing.

4.5.2.2 Reasons for growing sunflower

It was thought important to look into reasons for growing sunflower, table 4.22 presents a summary of responses. Fifty one percent of respondents who grow sunflower, indicated that they grew sunflower for the purpose of generating cash income through sales of seeds.

Followed by those who both sold seeds and process oil (39.1%). Few farmers grew sunflower for the purpose of extracting oil (10.0%) (table 4.22).

Table 4.22 Distribution of farmers by major reasons for growing sunflower in Iramba district for 1995/96

Item	No. of farmers	percent
Selling	56	50.9
Oil processing	11	10.0
selling and oil processing	43	39.1
Others	0	0.0
Total	110	100.0

Source: Survey results, 1997.

It is indicative that higher percentage of farmers in the area preferred sunflower due to its adaptability and less demanding agronomic and field practices. Many farmers explained that sunflower requires only a single weeding after which the canopy cover suppressed weeds. There were also explanations that processing and storage is relatively easier than many crops. Less pests and diseases also surfaced as a reason under other's option.

4.5.2.3 Sunflower seed variety grown and the criterion used for selection.

Most farmers did not use improved seed varieties in sunflower production as depicted in table 4.14. The type of local variety pointed out was mixed. Few farmers who responded that they used improved seed, they mentioned the types as Jupiter, Black and/or recode. Farmers were asked on the characteristics considered when choosing a variety of sunflower they preferred. About 34.5% of farmers reported that high yielding as a criterion was used for selection, followed by those reported early maturity (37.3%). Twenty percent of farmers reported that bigger heads as their criterion for selection. Few farmers (8.2%) indicated that higher seed weight as their criterion (table 4.23).

Table 4.23 Characteristics desired when choosing a sunflower variety in Iramba district, 1997

Characteristics	Frequency	Percent
Higher yielding	38	34.5
Early maturity	9	8.2
Higher seed weight	22	20.0
Bigger heads	41	47.3
Total	110	100

Source: Survey results, 1997

4.5.2.4 Sunflower quality

Many factors are important in determining sunflower seed quality. These include climatic factors, soils, husbandry practices and marketing conditions for example handling and grading. Survey results revealed that farmers were not following sunflower crop husbandry practices as recommended.

It was clearly seen that there would be a substantial amount of poor grades from Iramba district. Poor grades could be contributed by free market. The private traders have to compete with each other for produce. In doing so, restriction on proper inspection of general condition of sunflower seed is neglected. This implies that private traders are not taking quality as their main area of emphasis in sunflower buying. Market prices at each point of sale in the marketing chain have to reflect quality. This could give an incentive for quality improvements.

4.5.2.5 Farmers' future plans on sunflower production

Farmers growing sunflower were asked about their future plans in sunflower production. Very conscious about sunflower being a cash crop which they depend on for cash income, table 4.24 presents a summary of different views about future plans.

Table 4.24 Household future plans on sunflower growing as per 1995/96 in Iramba district.

Farmers' future plan on sunflower growing	No. of farmers	percent
Expand production	57	51.8
Reduce production	24	21.8
Produce at the same level	29	26.4
Total	110	100

Source: survey results 1997.

Expanding or increasing sunflower production seems to be the ambition of many farmers, table 4.24 indicates that farmers who responded to expand production were 51.8%, It is appropriate to mention here that this attitude or willingness was expressed subject to their appreciation of several things, including an assurance of smooth marketing, good prices and availability of inputs. It can be observed that farmers won't be ready to expand their farms, buy new land, use fertilizer and adopt new varieties all which are costly without being sure of returns.

4.5 Probit analysis results

Table 4.25 indicates the summary statistics for the probit model analysis. The overall significance of the model was tested using the likelihood ratio test and the result showed that the model to be significant at 10% level of confidence. The Chi-Squared statistics was computed to test the joint effects of the dependent variables. The chi-Squared value was found to be highly significant at 1% level of confidence.

The overall fit of the equation was examined using McFadden's R2. The McFadden's R2 equals 0.3528, this value is reasonable considering the data used in the analysis (That is, cross-sectional survey of farmers). Because empirical evidence suggests McFadden's R2 usually lies between 0.2 and 0.4 (Mbatia, 1984). A maximum of seven iterations were required for convergence of the model. Use of maximum likelihood approach yielded parameter estimates that are asymptotically efficient and consistent. Parameter estimates were evaluated at the 0.01, 0.05 and 0.10 significance levels.

The coefficients of most of variables included in the probit model had the right a priori sign (Farmer's age, total farm size, extension service, credit availability, improved seed use, fertilizer use, poor market arrangements, low price of sunflower and bad weather except for area devoted to sunflower, land problem and pests and diseases) (table 4.25)

Factors such as land problem, pests and diseases, improved seed use, fertilizer use and credit availability were not statistically significant at either the 5%, 1% or 10% level of confidence.

Table 4.25 Probit model for factors affecting yield performance of sunflower in the study area

Variable	Estimated coefficient	Standard error	T- value
Intercept	-2.559		
Farmer's age (FARAGE)	-0.113	0.071	-1.591*
Area under s/f (SFAREA)	-1.244	0.495	-2.561**
Total farm size (TFARMSZHA)	0.697	0.433	1.621*
Extension service (EXTENS)	0.271	0.130	2.106**
Credit availability (CREDAVL)	0.632	0.682	0.923
Improved seed use (IMPRSUS)	0.419	0.601	0.702
Fertilizer use (FERTSE)	0.369	0.530	0.692
Poor market arrangements (MARKAR)	-1.966	0.481	-4.121***
price of sunflower (PRICESF)	-0.279	0.112	-2.591**
Land problem (LANDPR)	0.422	0.621	0.681
Pests and diseases (PDISES)	0.167	0.180	0.912
Bad weather (WEATHER)	-0.373	0.211	-1.771*

Goodness-of-fit 266.3060 Chi-Squared value 79.8800***
Log of likelihood function 312.3130*
Likelihood ratio test value 264.2400*
pseudo R^2 0.3528
Total number of observation 110.0000
Farmers classified as good performers 15%
No. of iterations 7.0000
*** Significant at 0.01 level of confidence
** Significant at 0.05 level of confidence
* Significant at 0.1 level of confidence

Source: Survey data, 1997.

The priori sign of the coefficient of area devoted to sunflower was initially predetermined. But in this study a negative sign was obtained. this implies that as area under sunflower increases the yield tend to decrease. This result is contrary to Hossain's argument that farm size of any crop is surrogate for a large number of factors that have important bearing on the adoption decision (Hossain. 1988). However. the variable area devoted to sunflower was significantly different from zero at 5% level of confidence.

With respect to farmer's age. many researchers including Mbata. (1997) found it difficult to classify this variable as to whether it influence adoption. crop production or yield performance negatively or positively. However. this study assumed the variable to have a negative influence to sunflower yield. The variable was found statistically significant at 10% level of confidence and bore a priori sign. This result implies that older farmers were more risk averse than younger farmers and therefore preferred to invest more on food crops and less in sunflower and thus low yield perfomance.

The coefficient of total farm size as a variable had expected a priori sign and was found to be significant at 10% level of confidence with a positive relationship. This finding is in line with other findings by Akinola, (1987), and Hossain (1988) that farm size is an indication of level of economic resources available to farmers and the probability that a farmer would get better yield increases as farm size increases.

Extension service was found statistically significant at 5% level of confidence and had the expected priori sign. This implies that extension service in the study area was not perceived by farmers as a limiting factor to sunflower yield. The direction of effect to dependent variable was found as expected. This finding is in line with the one shown in table 4.19 that a few farmers in the study area were found not to have access to extension services.

According to the probit analysis results, the variables not statistically significant at either the 5%, 1% or 10% level of confidence is an indication that farmers perceived these factors as not significant constraints to sunflower production in the study area.

The coefficients of price of sunflower, poor market arrangements and bad weather in the model were statistically significant at 5%, 1% and 10% level of confidence respectively. An inverse relationship was obtained as expected. From these results one can say that the most significant constraints which affect yield performance and thus production were poor market arrangements, low price of sunflower and bad weather in Iramba district.

Correct classification of farmers as good or bad yield performers was done. The estimated model correctly classified only 15.% of total number of farmers as good performers. One can therefore say that most of farmers in the study area performed badly in terms of sunflower yield.

4.6. Institutional factors

4.6.1 Agricultural Credit

Credit is among the important sources of capital which is however not yet available to the majority of the small holder farmers. The credit system in Tanzania is not favorable to small holder farmers. Lack of credit has been one of impediments to introduction of new technology. Cash constraints which prevent the adoption of new agricultural technology have been the rationale for large credit programs directed at small scale farmers. Credit is an important pre-requisite for rural poor farmers to be able to purchase expensive inputs such as fertilizers and improved seeds.

Credit provision by the government and other Non-Governmental Organizations has been instrumental in boosting agricultural production of small holder farmers who have limited income to purchase inputs. Credit plays an important role in agriculture. it is essential to influence the innovation and technology for improving agriculture productivity in the rural areas. Many farmers do not have access to credit facilities. Survey results indicate that 93.6% of farmers had no access to formal credit where as only 6.4% had access to such facilities (table 4.26).

Table 4.26 Distribution of respondents by accessibility to credit facility in Iramba district, 1997.

Credit accessibility	Frequency	Percent
Accessed to credit facility	7	6.4
Not accessed	10.3	93.6
Total	110	100.00

Source: Survey results, 1997.

The major reasons given by farmers for not accessing/using credit facilities are shown in table 4.27. Twenty eight percent of farmers did not know how to get credit although they appeared to have an interest in getting credit. About 21% of respondents reported that credit were not available in their area and they would like to have credit facilities. Some (18.2%) of sampled farmers indicated that interest rates were too high and would not be able to justify the additional cost and 9.1% of the sampled farmers reported that they did not want to go into debts because they were afraid of failing to pay back the loans. Other reasons although not significant included that farmers were not aware of credits and some reported that they applied but got none.

Table 4.27 Distribution of respondents by major reasons for not accessing credit in Iramba district for 1995/96 season

Reasons		No. of farmers	percent
Did not know to get credit	Not available	31	28.2
Interest/cost too high		23	20.9
Did not want to go into debts		20	18.2
Others		10	9.1
		16	14.7
Total		110	100.0

Source: Survey results 1997

Following the introduction and implementation of the market economy in Tanzania, credit accessibility and availability to small holder farmers has deteriorated considerably. Credit institutions in the country have formulated new policies and business strategies which are geared less to agriculture and even lesser to small holder farmers. The policies include the removal of credit subsidies and increased interest rates. Together with the high collateral requirements like land title makes it very difficult for the small holder farmers to obtain credit.

Some Non Government Organizations (NGOs) are currently very active in financially supporting to small holder farmers in some areas of the country. However, these are still few and most of them do not seem to have evolved adequate strategies for the sustainability of their operation.

4.6.2 Sunflower marketing

4.6.2.1 Market organization and trade practice

It is assumed that the better informed producers and traders, the better free markets are. The hypothesis here is that the smallholder farmers in the study area have weak bargaining power partly due to a lack of information. In Tanzania, collection of market data is mainly done by the MDB. Availability of such information is, however, limited at village level especially in remote areas like Iramba district.

In practice, information flows were inadequate. Traders were asked on the source of price information. Overwhelmingly, about 80% of traders reported that they obtained market information from other middlemen (traders)(table 4.28). Sixty five percent of respondents reported that they obtained price/market information mainly from farmers. Forty five percent of farmers reported to have price information by themselves visiting the markets. It is not surprisingly, therefore, that only approximately 10% of traders reported to have received price/market information from the mass media.

Table 4.28 Distribution of traders by major sources of price information for 1995/96 season in Iramba district

Source	No. of respondents (N = 20)	percent
Other traders (middlemen)	16	80
Farmers	13	65
At the markets	11	55
Mass media	2	1

Source: Survey results, 1997

4.6.2.2 Sunflower marketing and transactions

Like any other agricultural produce, sunflower marketing has not been controlled by government, following the trade liberalization and has been carried out by semi-autonomous parastatal agencies and private traders. The changes in agricultural produce market arrangements disrupt the whole marketing channel and this has caused large quantities of produce remain uncollected from rural depots and farmers.

From the liberalization policies farmers everywhere in Tanzania are free to sell their produce to any village based middlemen, directly to traders in town or to any cooperative union if any. At present, Iramba district trade is dominated by the private sector and private traders have been the major outlet where to dispose off the marketable surplus produce, although the cooperative unions have been of assistance. In this regard, it can be argued that traders serve farmers relatively better.

4.6.2.3 Sunflower pricing

Pricing of sunflower if fully liberalized buyers may vary the price. Any buyer is free to set its price at its own. But one could suspect a possibility of collusion on the part of sunflower buyers in regard to price setting. The problem with this price setting process is that farmers make their production decision completely unaware of the probable price at which they are likely going to sell their crop.

Sunflower traders are alleged to have hesitated to announce price at which each was going to buy seed in a fear that other traders would take it as the basis for setting sunflower price which could be higher and thus outcompete them. To some extent this increased competition in the sunflower marketing operations.

4.6.2.4 Transportation of sunflower seed

Sunflower buyers are responsible for sunflower transportation from farmers to the port of

exporting or to the oil seed milling institutions /companies. Private traders considered owning vehicles as expensive because the crop it deals in is seasonal. This would increase overhead costs. It was evident that sunflower traders preferred hiring vehicles. However, cost of transportation was higher due to poor road infrastructure and fuel expenses. This increased the marketing margin of traders as shown in (table 4.34).

4.6.2.5 Marketing channels for sunflower and other oil seeds

It is argued (Raju and von Oppen, 1980) that if market channels are efficient, they will induce farmers to become more commercialized. This is because access to efficient markets serves as an incentive for farmers to specialize in the production of certain crops which are comparatively most advantageous for the district. It follows therefore, that policies to enhance market channel efficiency are crucial in agricultural marketing. This in turn needs knowledge of operation and contribution to development of market channels.

To understand how sunflower moves through various channels, it is necessary to identify the roles of various market places and marketing agents involved. In this study marketing participants were assessed. Marketing participants refer to all individuals or firms that are involved in the marketing process. These include smallholder farmers, private traders (i.e wholesalers and/or retailers), cooperative unions and oil seed processors. The way marketing participants transfer the produce from production to where it can be used as a final product is referred as a marketing channel.

The purpose of the schematic model of fig.4.1 is to illustrate how various market participants were linked to the complex network of marketing channels for sunflower seed in the study area. Basically, there were mainly six marketing channels in the Iramba district, these are as follows:

(i) Farmers - Oil millers. Oil millers purchase sunflower seed directly from the farmers. Farmers transport their sunflower seed to oil millers for sale.

(ii) Farmers - wholesalers - wholesalers - oil millers or exporting agent. Farmers sell their sunflower directly to wholesalers from urban places like Arusha and Singida towns. And these resell to other bigger wholesalers who in turn sell to either larger oil millers or to exporting agents in Dar es Salaam.

(iii) Farmers - retailers (village and inter- village collectors) - wholesalers - wholesalers - oil millers or exporting agent. Farmers sell their sunflower seed to either village collectors or inter-village collectors and these would sell it to the wholesalers. These wholesalers resell to other wholesalers and then to either exporting agent or to the bigger oil millers.

(iv) Farmers - cooperative societies - oil millers or exporting agent. Farmers sell their sunflower directly to cooperative societies which are agents of Singida Farmers Cooperative union (SIFACU). SIFACU would sell it either to exporting agents or to oil millers.

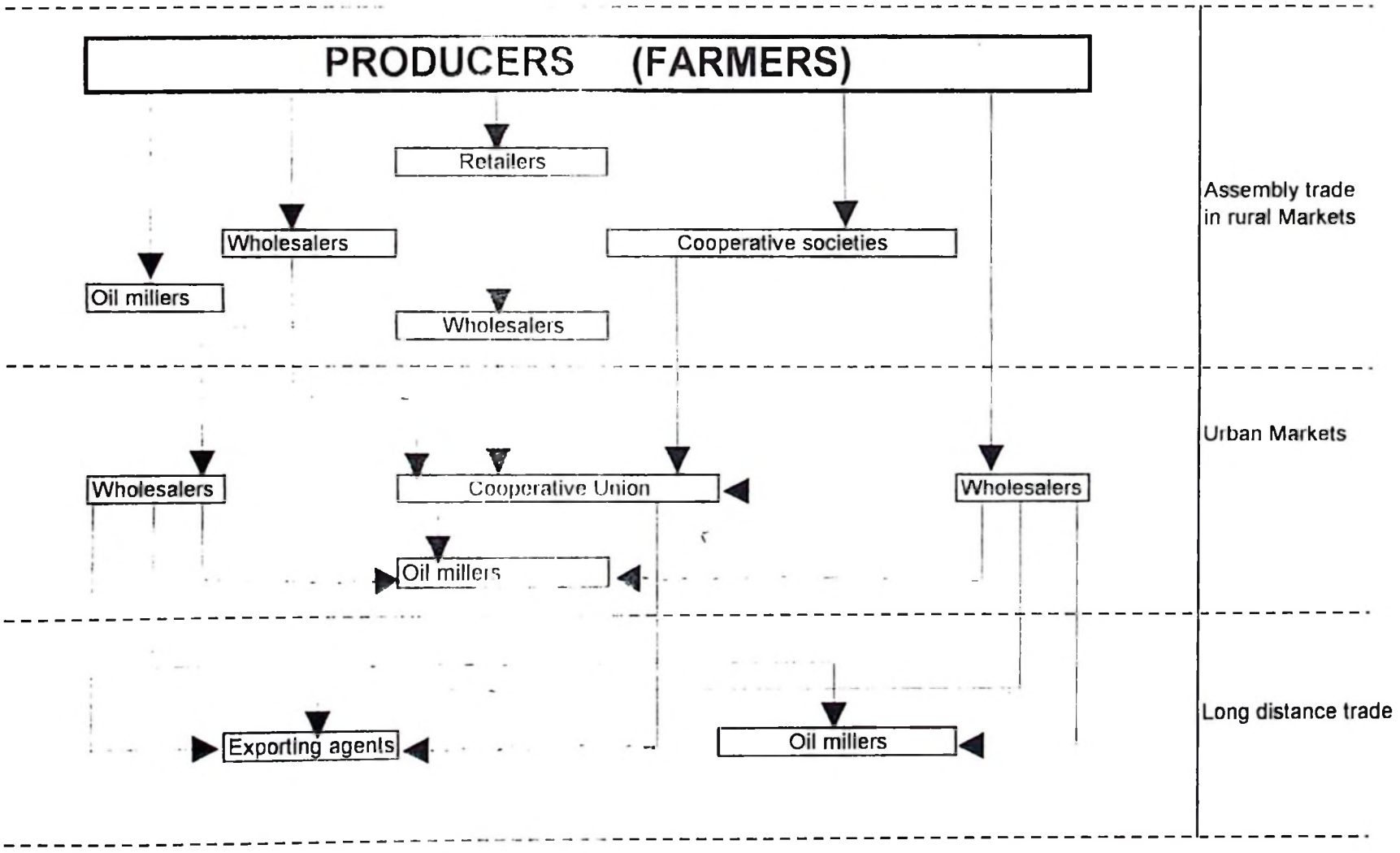

Fig. 4.1: Marketing channels of sunflower trade in the study area
Source: Own Survey, 1997

Table 4.29 Distribution of farmers by marketing outlets for sunflower sale in Iramba district, 1995/96

market outlet	No. of respondents (N = 110)	percent
Village collector	79	71.8
Inter-village collector	54	49.1
Wholesaler	35	31.8
oil millers	21	19.0

Source: Survey results

Some of these village collectors and inter-village collectors acting as agents of town wholesalers buy sunflower, bulk it and wait up to when it can be collected by the wholesalers. Since village collectors are mostly farmers who engage in sunflower trading in addition to their agricultural undertakings they collect sunflower from neighboring farmers. Due to their lack of mobility, village collectors can only confine themselves to the village environs for sunflower purchases.

Data from this survey tend to imply that sunflower traders depend largely on these market participants (table 4.30) for their income which, as a result, is influenced by the nature of functioning of the marketing channels. Although they have an alternative to sell sunflower to any outlet of their choice, but table 4.30 indicates that they sell most of their sunflower seed to individual private traders

Table 4.30 Distribution of traders by buying organizations in Iramba district for 1995/96

Buyer	No. of respondents	percent
Other private traders	13	65
Private companies	9	45
Cooperatives	1	5
oil millers	12	60

Source: Survey results, 1997

About 60% of traders sold their sunflower to oil millers.

Occasionally private companies and other wholesalers from Singida town and other urban areas bought sunflower from different traders. As shown by response of sampled traders (table 4.30), it appears that few traders reported to have sold to cooperative unions (5%). None of the respondents reported to have made any transaction with government agencies as regards to sunflower trading.

(a) Sunflower producers

Farmers were required to take their crop up to the buying centers. Although it was directed that every sunflower buyer was to buy from farmers on cash at the time and place of delivery, but this order was not followed. The sunflower price was set independently for cooperative unions and among private buyers, no minimum price was set for all villages. Somehow, the availability of various marketing outlets improved farmers option on disposing off their produce as well as offering them more bargaining power. All the sampled farmers reported that the condition of sale for all buyers was on cash basis.

Regional Cooperative Union - Singida Farmers Cooperative Union (SIFACU) bought the crop from farmers through primary societies and their own depots in the area. Cooperative Union would have been the most convenient buyer of the crop from farmers.

This is because of the proximity of its depots and that of its affiliates (primary societies) to farmers rather than private traders, this has not been effective in the study area.

Farmers' main cause of dissatisfaction over marketing arrangement in the survey area were low produce price offered by the Cooperative Unions as well as private traders. Survey results (table 4.31) indicate that there were mainly four constraints faced by farmers. These were as follows: Prices offered by traders to farmers were too low (34.0%), marketing inefficient (18.0%), farmers could not find a buyer on time (17.0%), delays in payment (10.0%) and unavailability of transport (9.0%). Other constraints reported by farmers but found not significant include storage facility, poor crop quality etc.

Table 4.31 Proportion of farmers by major constraints to sunflower marketing as per 1995/96 in Iramba district.

Constraints	No.	percent
Price too low	37	33.6
Marketing inefficient	20	18.2
Could not find a buyer on time	19	17.3
Delays in payment	11	10.0
Transport	10	9.1
Others	13	8.2
Total	110	100.0

Source: Survey results 1997.

It is a researcher's observation that only after ensuring a smooth marketing system and prompt payments to the farmers that other measures to promote sunflower in the area will be of use and benefit.

(b) Sunflower traders and oil seed millers

Many small holder farmers sold primarily to those who resell the produce. In such a case producers can be considered as being engaged in wholesaling business. Producer prices were absolutely based on the market forces, it has been observed that the transactions of the traders were not affected by any direct control in their day to day activities. Private traders usually operate alone or two and each handle at least two farm crops on average. Trading in other products was a sideline of the sunflower trading business.

Some traders move from house to house collecting sunflower in small lots from the farmers. Collection of sunflower was done by the trader himself. In rare circumstances agents were used to assemble the product usually under the supervision of the trader. Normally collection was done from house to house because there were no established market places. However, it was observed that sometimes farmers take their produce to the trader at a specified point. This reduced traders collection costs. Once traders attain a satisfactory amount they transport to consignment places for selling. Majority of traders bought sunflower produce from farmers. Most sunflower traders reported that they also trade crops other than sunflower such as maize and beans.

Traders were asked about their main occupation. About 80% of the traders responded farming as their main occupation. About 15% of traders responded that trading was their main occupation. A few traders (5%) reported that formal employment was their main occupation. This observation concur with another finding that 85% of traders obtained their initial capital to enter into trading from farming (table 4.32). About 15% of traders raised their capital through either an informal source of credit by borrowing money from relatives and friends or grants from parents. This implies that most traders were also farmers.

Table 4.32 Distribution of traders by main occupation in for 1995/96 season in Iramba district

Main occupation	No. of respondents	percent
Farming	16	80
Trading	3	15
Formal employment	1	5
Total	20	100

Source: Survey results, 1997

In the process of assessing the marketing channel of sunflower in the study area, the researcher also looked into oil milling aspect. The survey results found out that most oil millers obtained their initial capital for milling business from farming. Some obtained capital from relatives /friends and a few obtained from bank /other millers or traders (table 4.33). It is indicative that most oil millers were also farmers. Due to increasing number of oil milling machines, farmers morale for sunflower production was increasing as compared to the previous years.

Table 4.33 Source of capital for traders and oil millers for 1995/96 season in Iramba district

Source of capital	Type of enterprises			
	Traders		oil millers	
	No.	%	No.	%
Farming	17	85.0	16	80.0
Relatives/friends	1	5.0	2	10.0
Grants from parents	1	5.0	1	5.0
Bank/other traders	1	5.0	1	5.0
Total	20	100.0	20	100.0

Source: Survey results, 1997

It was observed that traders do not run bank accounts neither do they keep cash. The only way of keeping the principle cash during off season was to invest it in farming activities and the output acts as a principle for the following trading season. Traders acknowledged lack of credit as a serious setback in their business. Most traders have no access to credit services because they have no collateral. With no credit services most traders fail to increase their annual turnover.

(c) Sunflower trade marketing margin

The break down of the costs involved per kg as per 1995/96, gross and marketing margins of sunflower trade are shown in table (table 4.34). The survey results indicated that only 13.34 Tshs (16.8% of total costs) was realized as gross margin per kg of sunflower produce traded. The value of marketing margin was relatively significant (33.70 Tshs per kg), but the return was lower as reflected by the gross margin. This finding shows that sunflower marketing in the surveyed area was inefficient and the main reason was high transport cost due to lack of good infrastructure and transport facilities.

Table 4.34 Gross and marketing margins per kg of sunflower trade as per 1995/96 in Iramba district.

Activities	Costs in Tshs
a) Amount (3.03ha/hh x 838.03kg/ha)	2765.49
b) Selling price	92.30
c) Buying price	58.80
d) Transport	10.23
e) Loading and unloading	3.41
f) Market fees	3.08
g) Storage	2.56
h) Security	1.07
i) Total costs	78.95
j) Gross margin	13.34
k) Marketing margin	33.70

Source: Computed from Survey data, 1997

4.6.2.5 Marketing constraints for traders and oil seed millers

Survey results indicate that there were a number of constraints facing the sunflower traders as well as oil millers in marketing of sunflower seeds and oils respectively. Most of sampled traders were complaining about selling price (90%), they reported that prices were too low to cover the marketing costs and leave behind a normal profit. Some 70% of traders reported that there were inefficient marketing institutions in their area. This hindered them to market their sunflower produce at a right time they preferred and at a reasonable price. Others (60%) reported that production was also a serious constraint in their area. Fifty percent of traders reported that they could not find a buyer on time. A few traders indicated that transport (35%) and inefficient milling machines (5%) were among the constraints (table 4.35).

The survey results on the constraints that were facing oil millers in the study area revealed that they faced almost the same problems as sunflower traders with minor exceptions. Majority of oil millers (90%) indicated that production insufficient was the major constraints for their business operations. They reported that sunflower seeds and other oil seeds were not adequate to meet their demand of their milling machines. Some traders transported their oil seeds to distant places like Arusha town for high prices offered in these markets.

Seventy percent of oil millers indicated that unavailability of buyers of oil as soon as they preferred was a serious constraint in the study area. This caused low rate of return in their business. About 80% of oil millers who were interviewed reported that they were forced to sell processed oil at lower prices that could not cover the running costs of their milling machines due to supply and demand factors. Other oil millers (50%) indicated that there were no efficient marketing institutions that could facilitate the marketing operations. If these could be available, they believed that their business would have been very profitable.

Some oil millers (60%) reported that their milling machines used were very inefficient and there were problems of spare parts in the area (table 4.35). The problem of transport for oil millers were not significant as reflected by their response (10%).

Table 4.35 Constraints facing sunflower traders and oil millers as per 1995/96 seasons in Iramba district

Constraints	Type of enterprises			
	Traders		oil millers	
	No.	%	No.	%
Selling price were too low	18	90.00	16	80.00
Ineff. marketing institutions	14	70.00	10	50.00
Production insufficient	12	60.00	18	90.00
Could not find a buyer on time	10	50.00	14	70.00
Transport problems	7	35.00	2	10.00
ineffic. of milling machines	1	5.00	12	60.00

Source: Survey results, 1997

Generally, the marketing channel of sunflower was diversified. Traders were divided into private individuals (wholesalers and retailers), Cooperative Unions and oil seed processors.

Most of farmers sold their oil seeds to traders i. e. wholesalers and/or retailers. a few sold to Cooperative Union (SIFACU) and some farmers could deliver to the seed crushers directly.

However, only farmers near the seed crushers could deliver to the seed crushers. The SIFACU bought the crop from farmers through primary societies and their depots in the area. The cooperative union would have been the most convenient buyer of the crop from farmers. This is because of the proximity of its depots and that of its affiliates (primary societies) to farmers. However, this was not the case, because, it was taking long to pay farmers. The price was also low, late payment to farmers tied farmers' money and disrupted farmers' budget. It also eroded farmers' purchasing power because of consistent upward price changes in Tanzania. Late payment to farmers did not only demotivate but was very costly to farmers who used borrowed inputs. In sum, a general observation was that farmers preferred to sale their produce to private traders who paid promptly although the price was also low.

4.7 Gross margin analysis results

4.7.1 Labour Input

In calculating labour inputs for different age groups, three major groups have been categorized. Category one includes people between the ages 18-55 years whose man-equivalent value is taken to be one unit where as category two is the people between 10 and 17 and category three are the people over 55 years. In category two and three the man-equivalent ratios were taken to be half a unit. For children with ages ten years and below. the contribution was taken as negligible. Mlambiti and Mlay used similar groupings for Ulanga resource utilization (Mlambiti and Mlay, 1989). Such labour categorization by man equivalent values for the respective groups was arrived at by taking into consideration effective participation in farm activitie. However, the grouping is apparent in the sense that the effectiveness of an individual at a given farm activity depends very much on the nature of farm operation. For instance tasks involving physical strength like land clearing, men may perform faster than women, but for bird scaring, whether by men, women or children there is no difference. Where no market differences exists between adults and youth output. measurement is uniform.

In the traditional farming, labour is often the limiting resource in the farming system particularly during peak periods. The availability of labour governs not only the size of

farms for a particular area but also the scope of the improvements which can be introduced and successfully implemented (Mlambiti and Mlay, 1989). Labour requirement for different operations for major crops is shown in table 4.36. The table shows that the crop which is most labour demanding in the district is cotton (131 M.d.), followed by maize (95 M.d.), sorghum (72 M.d.) and beans (62 M.d). The least labour demanding is sunflower (40 M.d.).

Table 4.36 Labour requirement for major crops by different operations for 1995/96 season.

Operation	S/F M.d./ha	Maize M.d./ha	Beans M.d./ha	Sorghum M.d./ha	Cotton M.d/ha
Land preparation	9.8	15.4	17.9	16.5	20.2
Planting	8.5	19.1	19.1	18.5	21.2
Weeding*	12.5	31.7	9.5	23.6	43.3
Fertiliz.**	-	7.2	-	-	-
Spraying***	-	1.8	4.8	-	8.7
Harvesting	9.2	19.0	10.7	13.4	37.6
Total	40.0	95.0	62.0	72.0	131.0

Source: Computed from Survey data, 1997

* Weeding for maize and sorghum is done twice per season, thrice for cotton and once for sunflower and beans.

** Fertilization is done mainly for maize.

*** Spraying for cotton is done thrice, where as for maize and beans spraying is just once.

4.7.2 Gross margin per hectare

Gross margins were calculated for the five major crops i.e maize, sunflower, beans. sorghum and cotton. Table 4.37 shows the calculation of gross margins for the above mentioned crops. Output values of respective crops were calculated as a product of farm gate prices and amount of output per ha. The farm gate prices as per 1995/96 prices were Tshs. 58.6, 46.4, 180, 57.2 and 160.5 per kg for sunflower, maize, beans, sorghum and cotton respectively. Gross margin per hectare for respective crop was derived by subtracting important variable input costs per hectare from output values.

The following are important variable input costs per hectare incurred by each enterprise:

(a) With regard to seed, farmers were not able to estimate the amount of seed used per ha, however they managed to estimate their values. Maize costed about Tshs. 2 491.3 per ha. Sunflower, beans, sorghum and cotton costed about Tshs. 1 553.8, 6 294.8, 801.4 and 3 598.4 per ha respectively. These seed prices estimates per ha were based on the local market price at which farmers sold to each other in the area.

(b) Farmers applied insecticide /pesticides which costed about Tshs. 21 845.3, 1 621, and 7 350 for cotton, maize and beans respectively, other crops were not treated with any pesticides/insecticides.

(c) With respect to fertilizer use, farmers applied only for maize and it costed about

Tshs. 5 254.9 per ha. The type of fertilizer include organic manure and insignificant amount of chemical fertilizers.

(d) Weeding operation was done twice per season for maize and sorghum, thrice for cotton and once for sunflower. The cost estimates as per sampled farmers were as shown in the table 4.37: Tshs 4 663.6, 7 432.7, 6 125, 6 230 and 12 376 for sunflower, maize, beans, sorghum and cotton respectively.

(e) Costs incurred for ploughing and planting were Tshs. 6 594.4 and 700.5 for sunflower, 6 600.2 and 7 707 for maize, 6 450.2 and 770.7 for beans, 6 198.5 and 770.7 for sorghum, and 6 447.8 and 1 940.5 for cotton respectively.

(f) With regard to harvesting, costs were Tshs. 3 379.04, 3 178.8, 2 984.5, 4 003.4 and 10 087 for sunflower, maize, beans, sorghum and cotton respectively.

(g) Packing material requirements were 11, 10, 3, 5 empty bags and 11 mini bales for sunflower, maize, beans, sorghum and cotton respectively. Their costs were as shown in Table 4.37.

(h) Lastly, local transport charges to deliver crops produce from farmers' fields to homestead was per bag and sampled farmers' estimates were Tshs. 2 285, 1 900, 1 100, 1 744.6 and 4 005.8 per ha for sunflower, maize, beans, sorghum and cotton respectively.

Table 4.37 Gross margins calculations for sunflower, maize, beans, sorghum and cotton per ha for 1995/96 season in Iramba district.

Item	Unit	Crops				
		SF	MZ	Beans	Sorghum	Cotton
Cropped farm size	Ha	3.03	3.72	0.95	1.72	3.2
Total output/ha	Kg	838.03	1007.4	519.0	607.0	784.8
Price/kg	Tsh	58.6	46.4	180	57.2	160.5
Total revenue/ha	Tsh	43563.2	46743.4	93420	34720.4	125568
Variable Costs:	Tsh					
Fertilizer/ha	Tsh	-	5254.9	-	-	-
Land prep/ha	Tsh	2083.06	2028.04	2333.4	1839.7	3570
Ploughing/ha	Tsh	6594.4	6600.2	6450.22	6198.5	6447.8
Planting	Tsh	700.5	770.7	770.7	770.7	1940.5
Weeding	Tsh	4663.6	7432.7	6125.0	6230	12376
Pesticide/insecticide	Tsh	-	1621	7356	-	21845.3
Harvesting	Tsh	3379.04	3178.8	2984.5	4003.4	10087
Packing material	Tsh	2500.0	2000	900	1500	4400
Transport	Tsh	2285.4	1900	1100	1744.6	4005.8
Total costs	Tsh	23759.7	332776	34308.6	23088.3	68270.4
Gross margin	Tshs/ha	19803.5	13466.4	51111.4	11632.1	57297.6
Labour input	Mandays	40	95	62	72	131
Return/man-day	Tsh	495.08	141.75	953.41	161.5	437.38
Return/shilling	Tsh	0.83	0.405	1.72	0.504	0.83

Source: Computed from Survey data, 1997

Beans gave the highest gross margin per ha (Tshs. 59 111.4) followed by cotton (Tshs 57 297.6), sunflower (Tshs. 19 803.5), maize (Tshs. 13 466.4) and lastly sorghum (Tshs. 11 632.1). Sunflower gross margin was more than maize and sorghum and less than that of cotton and beans at local market price.

4.7.3 Return per man-day per hectare and returns per shilling invested

Man-days were calculated by dividing total man-equivalent by 8 hrs. The man-days were divided by area under each crop to obtain labour input per hectare. Then gross margin per hectare was divided by labour input per ha to get return per man-day per ha for each crop. The return per man-day was Tshs. 495.08 for sunflower which was higher than cotton (437.38), maize (141.75) and sorghum (161.5) and was less than that of beans (953.41).

Return per shilling invested was calculated by dividing gross margin per hectare by total cost per hectare. It indicates that the amount of money a farmer gains from each shilling spent on the production process. Return per shilling invested is lowest for maize and highest for beans production where a farmer receive Tshs. 0.405 and Tshs. 1.72 respectively for each shilling spent on the farm. Return per shilling in cotton and sunflower was the same Tshs 0.83. Return per shilling in sorghum was Tshs 0.504.

Return per shilling for sunflower (0.83) was less than for beans. Although return per shilling for beans is highest but sampled farmers reported that its production is very risky due to frequent pest attack and farmers preferred to invest very less in beans production.

CHAPTER V

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The general objective of this study was to investigate the constraints facing the oil seed crops production and marketing with special emphasis on sunflower and identify strategies for improving the oil seed industry. The specific objectives include: to investigate factors limiting sunflower production and marketing, to describe the marketing channel and the roles of institutions involved in marketing of sunflower and finally to assess the relative net returns of crops enterprises competing with sunflower for resource use in the district.

The study has confirmed that there were a number of constraints limiting production and marketing of oil seed in Tanzania and sunflower in particular. These results were however, expected because domestic output has been increasing at a lower rate than domestic consumption. This caused imports bill to increase substantially. It was therefore important to find out the constraints that have contributed to that situation. The survey provided a good impression of the fact that sunflower is a potential edible oil seed crop in Tanzania. It is generally contended that there is a wide scope for its development.

5.1.1 Objective I: To investigate factors limiting sunflower production and marketing

Findings: The survey results observed that there were no specific institutions that ensured farmers on supply and use of improved sunflower varieties that have higher yield potential than local varieties. Most farmers interviewed showed readiness to use improved seeds of sunflower but reported that it was difficult to get and when available, there were expensive. Majority of farmers (68.2% of farmers) used their own local seeds.

As concluded by FAO (1981), that the contribution of fertilizer to increasing yield is perhaps the greatest among the purchased inputs in most areas of Tanzania. As shown by the survey result only 41 farmers out of 110 used fertilizers, most of them applied organic fertilisers. The quantity of chemical fertilizer applied was nevertheless very small. Many farmers reported to have interest on fertiliser use, the problem is inability to purchase due to high price of fertilisers. Although probit model analysis indicates that the factor was not statistically significant at either 5% or 1% level of confidence to sunflower yield or production. However, the study found out that fertiliser use could substantially increase yield and thus, production of sunflower in the study area. This finding is in line with another finding by Feder (1985).

With regards to farm implements for land preparations, survey results indicated that 81% of farmers used ox-plough, but among these farmers, some own ox-ploughs (62.5%) and the rest (37.5%) used through hiring on payment basis. A few farmers used hand hoe and

tractor for land preparation. The study found out that farm implements was a significant factor in causing a lower rate of sunflower production in the study area.

Pesticides were used by a very few farmers. The situation was worse with insecticides because only 18.2% farmers out of 110 used insecticides. The major reason advanced by farmers was that it was difficult to find pesticides /insecticides and when found proved to be very expensive. However, majority of farmers showed an indication that there were less diseases and pests in the district and therefore, this constraint was not shown as a significant factor limiting sunflower production. This finding is in line with the one shown by probit model analysis.

As credit is an important pre-requisite for rural poor farmers to be able to purchase expensive inputs such as fertilizer and improved seeds. Survey results revealed that many farmers (93.6%) were not having access to credit facilities. Due to this constraint, it is impossible for them to use best available tools and best method of production, since market economies is absent in their farming. The survey results found out that, lack of credit was one of the major factors limiting production and marketing of sunflower. Despite the fact that probit analysis has shown the factor to be statistically insignificant at both the 5% and 1% confidence level.

Farmers need to be assured of market for their produce. Efficient markets that reduce marketing costs to farmers are essential, this lacks in the study area. Descriptive analysis has shown that farmers' main cause of dissatisfaction was poor marketing arrangements and low produce price of sunflower. This finding is also revealed by the probit model analysis where by poor market arrangement and low price of sunflower was reported to be the most significant constraint to sunflower yiel. Survey results indicate that most farmers received extension advice few times in a year. Probit analysis indicated that the extension service was statistically significant at 5% and 1% level of confidence to sunflower yield. This revealed that although the service was provided infrequently, but the study found it not to be one of the main constraints to sunflower production. However, some improvements should be made on the service.

5.1.2 Objective II: To describe the marketing channel and the roles of institutions Involved in marketing of sunflower in the district.

Findings: In the process of assessing marketing channels of sunflower, the survey results revealed that there were four marketing participants, these include smallholder farmers, private traders (i.e. whole salers and retailers), cooperatives and oil seed processors. There were mainly six marketing channels in the study area. These are as follows: Firstly, from farmers to oilmillers; From farmers to wholesalers, wholesalers, and finally to oil millers or exporting agents; From farmers to retailers, wholesalers, and finally to oil millers or exporting agents; From farmers to cooperative societies, and finally to oil millers or

exporting agents; From farmers to wholesalers, cooperative societies, and finally to the oil millers or exporting agents; Lastly from farmers to retailers, cooperative societies, and to the oil millers or exporting agents.

According to the survey results, most of farmers in the district sold sunflower produce to individual private traders. The main outlets for sunflower were individual private trading and oil processing sectors. Majority of farmers pointed out the critical obstacle was unsatisfactory market arrangement.

5.1.3. Objective III: To assess the relative net returns of crops enterprises currently competing with sunflower for resource use in the district

Findings: The gross margin analysis was used to assess the contribution of various crops grown in the study area in order to establish the relative economic profitability of these crops. The idea was that more returns warrant future production of the crop due to the fact that transferable resources are switched from the low paying enterprise to more paying one. Sunflower gross margin was more than maize and sorghum and less than that of cotton and beans at local market price. With exceptional of cotton which was grown only in Ndago division, sunflower had high gross margin than other crops except bean. This finding reject the hypothesis that gross margins of competing crops is a factor that was limiting sunflower production and marketing in Iramba district.

The return per man-day for sunflower was higher than that of maize, sorghum and cotton and was less than that of beans. This indicates that sunflower used less labour than most of competing crops in the district. Return per shilling invested was higher than maize and sorghum and lower than beans.

Survey results showed that most of crops enterprises did not outweigh sunflower in terms of relative returns. The crop enterprises that compete with sunflower for resource use were those of food security purposes. The researcher concluded that the issue of competing crop enterprises with sunflower for resource use as one of the factors limiting sunflower production and marketing was insignificant.

5.2 Recommendations

The survey provides the fact that sunflower is a potential edible oil seed crop in Tanzania. It is generally contended that there is a wide scope for its development. Getting inputs prices right is a necessary but not a sufficient condition for increasing sunflower production.. Other measures include among others prompt inputs delivery and the adoption of a multi- channel system. The government should play an important role on improved inputs as there were no specific institutions that ensured farmers on supply and use of improved sunflower varieties that have higher yield potential than local varieties.

There is a need to look into ways of improving farming tools and equipment used by the farmers. It is anticipated that in the presence of credit availability and other back-up

services. adequate inputs supplies at the right time and at reasonable prices to farmers will definitely encourage farmers to increase sunflower production to a greater extent.

The study has shown that sunflower is an important crop both for consumption and household income generation. This thus calls for improvement in the marketing system in term of prices and participants in sunflower marketing. There is a need to maintain farmers' enthusiasm and interest in growing the crop. In order to give farmers the much needed confidence and minimize risks connected to pricing and marketing policies. Much be established on long term basis.

The government also has a responsibility of improving and maintaining infrastructure. A massive investment in rural infrastructure (e.g. roads leading to rural areas, storage and processing facilities etc) is needed in order to improve not only the produce marketing but inputs marketing as well as general mobility and transmission of information to end users and producers.

It should be noted that, sound pricing policies are pre-requisite to raising production. The level of prices offered to farmers should reflect the opportunity cost of using resources. Only in this way will production incentives be maintained and costly misallocation of resources be prevented. Although deconfinement should continue but the government should provide an indicative price which will actually be a 'floor price' such a price should be set in such a way that it will reflect seasonal price changes and spatial variations.

The issue of credit is also important for farmers with small farm sizes if they are to gain from the new improved seed and other inputs. It has been found that farmers lack improved inputs for sunflower growing and other crops. Since most farmers were not aware of the credit facilities, farmers should be assisted in obtaining credit. Proper means should be encouraged to educate farmers about it. extension staff should be used for the purpose. Policies to induce the establishment of an economically viable credit system for agricultural inputs need to be designed and where necessary farmers should be given credit in terms of physical inputs such as seeds, herbicides, machinery, fertilizers etc. The way of scrutinising and approving credit applications should be fairly simple, less bureaucratic and very efficient so that farmers receive the required inputs in time.

The government extension system should be improved to carry special messages about sunflower growing and other crops. The extension system can also be a good channel for improved seed distribution and other inputs because they are always in touch with the farmers. Non-Government Organizations and the private traders can as well provide credit facilities for sunflower and ensure market for the farmers. This is advantageous because most of the NGOs work with the smallholder farmers.

Farmers should also be assisted have their own oil processing plants and these should be owned privately by villagers and in a way some assistance in marketing of oil should be offered.

Farmers should also be assisted have their own oil processing plants and these should be owned privately by villagers and in a way some assistance in marketing of oil should be offered.

5.3 Limitations of the study and suggestions for further studies

A permanent source of labour comes from family labour which includes relatives. During peak labour demands such as weeding, most farmers do seek help from relatives or neighbors who work communally with local brew, lunch or dinner as payment. This poses a problem when it comes to valuing this labour as a cost of production. It was difficult for farmers to recall with certainty what cost was incurred in the form of local brew, lunch or dinner. These factors need consideration in further studies.

The study included only main crop enterprises, in this case, there is a need to integrate livestock and crops. During survey work, limited data were available to the extent of necessitating the use of supplementary data from DALDO and RALDO which in some cases do not reflect the true situation of Iramba farmers. The study looked at constraints of production and marketing of oil seed crops without a study on the economics of commercial production as a whole. However, the data is believed to have produced viable source of information on constraints affecting production and marketing of sunflower and other oil seeds, thus recommendations of this study can be used by planners and other policy makers in making proper decisions.

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APPENDICES

APPENDIX 1

QUESTIONNAIRE FOR SUNFLOWER PRODUCERS

1.0 **HOUSEHOLD IDENTIFICATION**

1.1 Name of respondent .....

1.2 Region .....

1.3 District .....

1.4 Ward .....

1.5 Village .....

1.6 Date of interview .....

2.0 **HOUSEHOLD CHARACTERISTICS**

2.1 Age (years) .....

2.2 Sex .....

2.3 Education .....

2.4 Main occupation .....

2.5 Other occupation .....

2.6 Marital status .....

2.7 Work on holding .....

2.8 Number of family members .....

2.9 Members participating farming .....

CODES

Sex: 1 = male, 2 = female; Education: 1 = no formal, 2 = primary education, 3 = secondary education, 4 = post secondary education, 5 = other.occupation: 1 = family holding , 2 = education, 3 = household, 4 = sick, old , disabled; 5 = self employed, 6 = employed, 7 = Agric. farming; Marital status: 1 = Married, 2 = widow, 3 = separated, 4 = divorced, 5 = yet married; Work on holding: 1 = full time, 2 = part time, 3 = infrequent, 4 = none.

3.1 Main source of the family income .....

1 = Agriculture, 2 = Off-farm employ. 3 = Non-farm employ. 4 = others.

3.2 Main first source of cash for family income ..... 1 = Sales of food crops, 2 = sales of cash crops, 3 = sales of livestock/products, 4 = self employ. activities, 5 = Formal employ. 6 = others.

3.3 Main second source of cash for family income ..... the same as 3.2.

3.4 What type of off-farm activities are you doing .....

3.5 Main source of labour for farming .....

1 = family labour, 2 = family and hired labour, 3 = family and hired labour and also aids labour.

4.0 Is the land for agriculture a problem ..... 1 = yes, 2 = no.

5.0 If you have more than one plot, give the following information for 1995/96 season .

	Plot 1	Plot 2	Plot 3	Plot 4	Plot5
Area (acres)					
Acquiring mode					
land ownership					
Crop grown					
Time to plots					
seed type					
Fertiliser type					
Timely planting.					
spacing					
land prep.					
Weeding					
plant protectant.					

CODES

fertiliser type : 1 = SA, 2 = UREA, 3 = TSP, 4 = CAN, 5 = MANURE, 6 = other. Land prep.: 1 = hand hoe, 2 = tractor 3 = ox-plough 4 = other. Seed type: 1 = Own, 2 = improved, 3 = other. plot/land ownership: 1 = own, 2 = leased free of charge, 3 = rented/hired, 4 = other. Weeding: 1 = once, 2 = twice, 3 = thrice. Spacing: 1 = recommended ext. spacing, 2 = Own spacing. Plant protect. use: 1 = yes, 2 = no.

Timely planting: 1 = yes, 2 = no.

6.0 Give the total output, output sold and consumed and the prices of each of the crop grown for 1995/96 season.

	s/flower	maize	beans	sorghum	cotton
T/output					
Amt/consum.					
Amt/sold					
prices/kg					
other uses					

7.0 Changes in output of sunflower for the past three years ..... 1 = increased, 2 = decreased, 3 = same.

8.1 Major reason for the increased output of sunflower ..... 1 = more marketable, 2 = increase in area cultivated, 3 = increase in farm gate price, 4 = inputs are highly available, 5 = prompt payment to farmers, 6 = highly profitable.

8.2 What types of cropping systems for sunflower growing .....

8.3 Major reason for the decreased output of sunflower ..... 1 = not marketable, 2 = reduced area cultivated, 3 = low farm gate price, 4 =inputs are not available, 5 = payments are not paid promptly, 6 = not profitable, 7 = bad weather.

8.4 Major reason for growing sunflower ..... 1 = Selling and generating income, 2 = oil processing, 3 = selling and oil processing 4 = other.

9.0 Major quality of sunflower preferred .....

1 = high yielding variety, 2 = higher seed weight, 3 = bigger heads, 4 = early maturing, 5 = other.

10.0 Plans for sunflower production .....

1 = expand production, 2 = reduce production, 3 = continue producing the same, 4 = other.

11.1 Information about the tools and equipment the household uses in agriculture, and estimated prices per unit by respondent.

Type of tools	no. of tools	estimated price per unit
Hand hoe		
ox-ploughs		
pangas		
axes		
tractors		

11.2 Type of ownership of tools and equipment used in your farming

Type of tools	owned	Hired
Hand hoe		
Ox-plough		
Tractor		

12.0 Area rainfall reliability .....

1 = yes, 2 = no.

13.0 Area rainfall pattern .....

1 = yes, 2 = no.

14.0 What were the requirement of labour per hectare in each crop on the following activities and charge paid per hectare for 1995/96 season

ACTIV.	S/F MD	CHG	MZM D	CHG	BN MD	CHG	SOR. MD	CHG	COTMD	CH
land prep.										
Ploug.										
Plant.										
Fert. appl.										
Weed.										
Harv.										

15.1 Amount of fertiliser inputs in kg for 1995/96 .....

15.2 Average prices of fertiliser inputs per kg for 1995/96 .....

16.1 Amount of agrochemicals in kg for 1995/96 .....

16.2 Average prices of agrochemicals per kg for 1995/96 .....

17.1 Any improvements of availability of farm inputs ..... 1 = yes, 2 = no.

17.2 Major reason for improvements of farm inputs ..... 1 = many shops, 2 = low price of inputs.

18.1 What is the major agricultural practice that have led or could lead to a deterioration in soil fertility or increase soil erosion ..... 1 = overgrazing,

2 = deforestation, 3 = ploughing up and down, 4 = burning, 5 = reduction of fallow, 6 =

over use of fertilisers, 7 = over cultivation, 8 = other.

19.0 Major measure undertaken to increase soil fertility ..... 1 = contour ploughing, planting of trees, 3 = Grow marejea, 4 = fallow period, 5 = other.

20.0 Do you have extension services ..... 1 = yes, 2 = no.

21.0 How frequently do you receive extension advice .....

22.0 Major kind of extension service you have received ..... 1 = growing of crops, 2 = using, 3 = control of pests, 4 = crop husbandry, 5 = can not remember, 6 = none, 7 = other.

23.0 Major constraint in increasing sunflower production ..... 1 = not enough labour, 2 = not enough land, 3 = lack of finance, 4 = inadeq. fertilisers, 5 = higher prices of fertilisers, 6 = inadeq. of other inputs supply, 7 = no access to market, 8 = transport problem, 9 = bad weather, 10 = pests and diseases, 11 = poor soils, 12 = other.

24.1 Household acquired credit.....

1 = yes, 2 = no.

24.2 If household acquired credit, purposes ..... 1 = purchase seasonal inputs, 2 = purchase tools/equip. 3 = to pay for labour, 4 = buy livestock, 5 = other.

24.3 If not acquired credit, reasons .....

1 = not needed, 2 = not available, 3 = did not want to go into debts, 4 = interest high, 5 = did not know how to get credit, 6 = not aware of credit, 7 = applied but got none, 8 = other.

24.4 Source of credit acquired ..... 1 = member of family friend, 2 = CRDB, 3 = NBC, 4 = cooperative society, 5 = saving society, 6 = trader/trade store, 7 = private individual, 8 = mission/ NGOs etc. 9 = other.

25.1 To whom do you sell your sunflower produce ..... 1 = Government agencies, 2 = cooperatives, 3 = private companies, 4 = individual private traders, 5 = other.

25.2 What is the major condition of sell ..... 1 = Cash, 2 = credit, 3 = both cash and credit, 4 = other.

26.1 What is the price trend of sunflower produce for the last three years .....

1 = increasing, 2 = decreasing, 3 = more or less the same.

26.2 From 27.1 above, if it is increasing, why ..... 1 = many customers, 2 = low supply, 3 = highly demanded.

26.3 From 27.1 above, if it is decreasing, why few customers in the market .....

1 = highly production, 2 = low demand.

27.1 Do you find it difficult to sell sunflower ..... 1 = yes, 2 = no.

27.2 If 28.1 above is yes, why .....

1 = it is far from the market, 2 = few customers, 3 = low farm gate price, 4 = lack of

transport facilities, 5 = low demand.

28.0 Major problems of marketing sunflower produce ..... 1 = production insuff., 2 = price too low, 3 = transport problems, 4 = delays in payments, 5 = Could not find a buy on time, 6 = insuff. marketing institution, 7 = crop quality not good enough, 8 = other.

APPENDIX 2

TRADER'S QUESTIONNAIRE

1.0 TRADER'S IDENTIFICATION

1.1 Name of respondent.....

1.2 District .....

1.3 Ward .....

1.4 Village .....

2.0 TRADER'S CHARACTERISTICS

2.1 Age of trader .....(years)

2.2 Gender of trader ..... 1 = male, 2 = female.

2.3 Trader's education ..... 1 = no formal, 2 = std 1-4, 3 = std 5-8, 4 = secondary educ., 6 = post sec., 7 = other.

2.4 Main occupation ..... 1 = self employed, 2 = unemployed, 3 = farming, 4 = employed, 5 = other.

2.5 Marital status ..... 1 = married, 2 = widow, 3 = separated, 4 = divorced, 5 = yet married.

2.6 Work on holding ..... 1 = full time, 2 = part time, 3 = infrequent, 4 = other.

2.7 What crops other than sunflower trading .....

1 = maize, 2 = beans, 3 = maize and beans 4 = sorghum, 5 = maize and sorghum, 6 = beans and sorghum.

2.8 Type of trader ..... 1 = wholesale, 2 = retailer, 3 = village collector, 4 = inter village collector, 5 = other.

2.9 Who buys sunflower for you ..... 1 = self, 2 = family, 3 = an agent.

3.1 Where bought most sunflower..... 1 = farmer, 2 = whole sale, 3 = village collector, 4 = other.

3.2 Where sold most sunflower produce ..... 1 = Farmer, 2 = Regular, 3 = other traders,

4 = institutions, 5 = processors/millers.

4.0 In the following table give a break down of the costs involved per bag in sunflower marketing as from 1994/95 to 1995/96.

COST ITEM	1994/95	1995/96
Buying		
Transport		
Loading		
Empty bag		
Market fees		
Storage		
Other		

5.0 How did you get the initial capital to enter into trading ..... 1 = money from other business, 2 = borrowed money from friend, 3 = bank/other traders, 4 = money from farming

6.1 Household acquired credit ..... 1 = yes, 2 = no.

6.2 If acquired credit, purposes ..... 1 = to pay for transport, 2 = buy the produce, 3 = buy the empty bags.

6.3 If not acquired credit, reason ..... 1 = not needed, 2 = not available, 3 = did not want to go into debts, 4 = interest/ cost too high, 5 = did not know how to get credit, 6 = not aware of credit, 7 = applied but got none, 8 = other.

6.4 Source of credit acquired .....

1 = member of family, relative or friend, 2 = CRDB, 3 = NBC, 4 = Cooperative, 5 = credit society, 6 = trader/ trade store, 7 = private individual, 8 = Mission, NGO's etc. 9 = other.

7.0 How do you get the price information .....

1 = from other traders, 2 = from farmers, 3 = from mass media, 4 = visit at the market.

8.0 What was the major barrier to entry in the market ..... 1 = Low prices, 2 = Lack of capital, 3 = unstable prices, 4 = Lack of transport, 5 = Lack of markets, 6 = unreliable sunflower supply, 7 = No barrier.

9.0 Major pressing problem facing the trader in sunflower marketing ..... 1 = Production ineff. 2 = transport problem, 3 = delays in payment, 4 = could not find a buyer on time, 5 = insuff. marketing institutions, 6 = selling price low, 7 = crop quality not good enough, 8 = other.

APPENDIX 3

OIL MILLER QUESTIONNAIRE

1.0 OIL MILLER'S IDENTIFICATION

1.1 Name of respondent .....

1.2 District .....

1.3 Division .....

1.4 Ward .....

1.5 Village .....

2.0 OIL MILLER'S CHARACTERISTICS

2.1 Age of Miller .....(years)

2.2 Miller's gender .....

2.3 Miller's education level .....

1 = no formal, 2 = std 1-4, 3 =std 5-8, 4 = form 1-4, 5 = form 5-6, 6 = post sec.,7 = other.

2.4 Main occupation ..... 1 = self employed, 2 = unemployed, 3 = farming, 4 = employed, 5 = other.

2.5 Marital status ..... 1 = married, 2 = widow, 3 = separated, 4 = divorced, 5 = yet married.

2.6 Work on holding ..... 1 = full time, 2 = part time, 3 = infrequent, 4 = other.

3.0 Other oil seed used for milling .....1 = g/nut, 2 = palm, 3 = soya bean, 4 = cotton, 5 = sesame, 6 = none.

4.0 Number of years in oil processing ..... 1 = 1-2, 2 = 2-5, 3 = 5-10, 4 = 10-15, 5 = above 15.

5.0 What type of mill do you have ..... 1 = Bielenberg ram press, 2 = German built expeller, 3 = small hand operated oil press (IPI product), 4 = Distillation technique (boiling).

6.0 Did you engage yourself in sunflower trading ..... 1 = yes 2 = no.

7.0 If also engaged in sunflower trading, reasons .....

1 = Fewer produce, 2 = maximise, 3 = less expensive.

8.0 If not engaged in sunflower trading, reasons ..... 1 = many producers, 2 = cheap produce, 3 = limited, 4 = limited time to do trading.

9.0 Where sold most refined oil ..... 1 = Farmers, 2 = regular traders,

3 = institutions, 4 = other traders.

10.0 How did you get the initial capital to enter into oil processing business.....

1 = Money from other business, 2 = Borrowed money from a friend, 3 = Bank/other institutions or other traders 4 = Money from farming

12.0 What was the major barrier to entry in the market ..... 1 = Low prices, 2 = Lack of capital, 3 = Unstable prices, 4 = Lack of transport,

5 = Lack of market, 6 = Unreliable sunflower supply, 7 = No barrier.

13.1 Do you have access to credit facility ..... 1 = yes, 2 = no.

13.2 If applied amount of credit obtained .....

13.3 If applied amount of interest to credit .....

13.4 If obtained credit repayment procedure for the credit .....

15.0 What was the most pressing problem facing the miller in sunflower oil processing and marketing .....

1 = production insuff., 2 = transport problem, 3 = Delays in payment, 4 = could not find a buyer on time, 5 = insuff. marketing institutions, 6 = selling price too low, crop quality not enough, 7 = other.

APPENDIX IV

Regional hectrage under oil seed production estimates (Ha.) for 1993/94 season

Region	Cotton	Sunflower	simsim	G/nuts	soyabeans	castor oil
Mwanza	186 850	-	NA	-	-	-
Shinyanga	271 386	10 000	NA	148 220	-	-
Singida	5 590	14 441	NA	4 999	-	5
Mtwara	NA	NA	10 390	10 320	4 400	-
Lindi	NA	NA	9 469	2 111	112	-
Morogoro	8 092	3 920	481	411	120	74
Ruvuma	NA	3 560	5 960	9 436	200	-
Mbeya	6 091	13 984	550	13 502	-	-

Source: Ministry of Agriculture - MDB.