

A COMPARATIVE ECONOMIC ANALYSIS OF CONTRACTED AND NON CONTRACTED  
SUGARCANE FARMING - THE CASE OF THE SOUTH NYANZA SUGAR PROJECT,  
KENYA.

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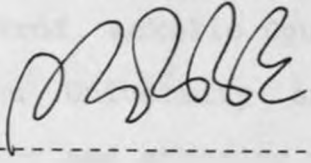
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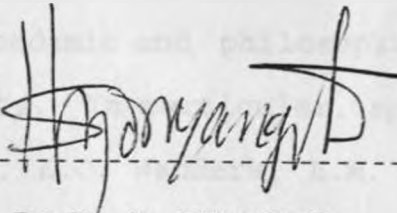
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ABSTRACT

This study is an economic analysis of the contracted and non - contracted systems of sugarcane farming. In the analysis, the South Nyanza Sugar Company (SONY SUGAR) in South Nyanza District was used as a case study. The broad objective of this study was to undertake a critical review and assessment of the Kenyan sugar industry in general, and in particular analyze the contracted and non contracted organizational structure of the sugarcane enterprise at SONY SUGAR. This would assist to identify and examine the bottlenecks inherent in the two systems of sugarcane farming. The sources of information used were primary and secondary data. The former were generated via a questionnaire administered to a sample of 50 farmers from each of the two systems of cane production. The secondary data were, however, obtained from relevant published documents. The analytical tools applied included descriptive statistics and gross margin analyses. The results reveal that it costs twice as much to establish and market one hectare of contracted sugarcane (Kshs 22,890) compared to that in non - contract sugarcane (Kshs 11,222). The study also reveals that sugarcane farming is relatively more remunerative to the non - contracted farmers than the contracted ones. Further, the Contract Agreement impacts negatively on sugarcane production, giving rise to numerous cases of independent non - contract cane farming in the project area. The study recommends that the Contract Agreement should be revised and re-written with incentives to attract farmers to the

outgrowers'scheme. The study recommends that the Contract Agreement should be revised and re-written with incentives to attract farmers to the outgrowers'scheme. The revised scheme should encourage farmers to perform as many operations of production as possible on their own to reduce the costs of cane farming and thus raise their net cash incomes. The large number of transactions that take place between the sugar company and the individual farmers together with the subjective nature of judgements about produce quality by the former has often lead to conflicts. As a result, accusations between the two parties over the performance and execution of the contract arise frequently. A third party most probably the Government should therefore provide a mechanism to solve such conflicts by requiring or providing a neutral arbitrator to whom the cane farmers or the sugar company can refer to in cases of disputes. The study also recommends that more cane production along the lines of non - contracted structure be encouraged as it is a more viable form of rewarding the producers for their investment in the industry. Finally, the study recommends that a farmers' producer organization such as the existing South Nyanza Sugarcane Outgrowers' Company (SOC) should be strengthened to increase the farmers' bargaining power and coordination between them and the Sugar company. In the long run, the organization should be encouraged to take over the services now rendered by the sugar company including the ownership of the sugar company by floating shares. SOC should be set up as a limited liability company by Government guarantee.

This guarantee is deemed useful in attracting commercial banks' financing instead of depending on the sugar company as a financier. SOC should also be involved in the establishment, maintenance and transport aspects of cane and also provide machinery for farm level operations including harvested cane transportation. It should also provide advisory cane extension services to the cane farmers. It has already established a savings and credit unit to enable farmers to finance their agricultural practices as well as spread their earnings from cane to cover their consumption requirements in the long spells of two years between two cane harvests.

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## CHAPTER ONE

### 1.0 Introduction

Sugar is one of the commodities produced domestically by the Kenyan agricultural sector exclusively from sugarcane and traded internationally. Although Kenya is considered a marginal producer of sugar by international standards, her participation in the global sugar market has a significant bearing on her sugar domestic policies with respect to production, processing, consumption, pricing, imports and exports. For instance, the world sugar market has been one of the most erratic and distorted one on the international scene. There has been hardly any time when global sugar production has been synchronized with consumption nor any other when prices have been stable despite the existence of the International Sugar Agreement (ISA). The ISA was formed in 1977 to regulate the global sugar industry by way of price stabilization but has never been functionally effective due to the boycott of both the USA and EEC, the major consumer and producer blocks respectively. It is in line with the above scenario that Kenya has tried to formulate her domestic sugar policies and objectives .

The domestic sugar policy objectives have been encouraged in Kenya's Development plans and each can be justified and defended on important grounds. First, in most years, Kenya is not self-sufficient in sugar production. It is important that the Kenyan sugar projects contribute to the economy as much as their potential allows but they are not doing so. Generally, domestic production of sugar has been declining while consumption has been exhibiting a positive growth trend. The declining trend in production is a loss

both to the farmer and the nation with severe economic implications. The failure to attain brood domestic self sufficiency would therefore put Kenya in a vulnerable position when foreign suppliers' ability or willingness is hindered by factors beyond the control of Kenya's economy.

Second, increased production of sugar beyond the domestic requirements may improve the country's balance of payments by generating foreign exchange through exports. Any reduction in production would therefore have detrimental effects on policy objectives of increased agricultural growth, improved incomes and foreign exchange earnings. For instance, after the attainment of self-sufficiency in sugar in 1979, Kenya reduced her imports to negligible amounts, representing a foreign exchange savings of approximately 69 million dollars (KShs. 1,400 million) per year (IBRD, 1986). Thus, the production of sugar capable of offsetting imports will constitute a saving of foreign exchange, which savings could be ploughed into other areas of the economy.

Third, the domestic production of sugar has stimulated the setting up of agro-industries in the rural areas. Employment opportunities have been generated as a way of attaining the policy objective of regional equity.

Finally, sugarcane is one of Kenya's major crops whose successful programmes of expansion in the last few years after independence was made possible by the participation of small holders in the country. This enabled the country to attain a short lived self-sufficiency in production for the first time in 1979.

### 1.1 Importance of Kenyan Sugar Industry to the Economy

The sugar industry is important to Kenya's economy both regionally and nationally. The importance can be gleaned from looking at the sugar production and consumption levels in Kenya from independence in 1963 to 1987 as shown in Table 1.1.

Table 1.1 reveals that the domestic annual sugar output in 1963 was only 38,000 tonnes with the rest needed to bridge the then domestic production gap of 65,000 tonnes being imported. Seemingly alarmed at the wide divergence between the production and consumption levels and realizing the importance of the Kenyan sugar industry, the Government intervened soon after political independence in 1963 by setting up five new factories. This enabled production of sugar to increase almost ten - fold during the period 1963 - 1987 to over 383,000 tonnes per year. This dramatic rise represented over 1000 percentage points increase and an annual growth rate in production of 13.8 percent. This positive trend in domestic production within two decades is attributed to the establishment of five new sugar factories.

Further importance of the sugar industry arises from the fact that in the fiscal policy, sugar production is attractive to the Kenyan Treasury as a source of Government revenue in the form of excise duty, dividends and taxes.

In 1987 alone, Treasury receipts from sugar amounted to over Kshs 37.1 million (GOK,1988). By then, the Government was charging an excise duty levy of Kshs 1000 per tonne of manufactured white sugar and the annual output was 37,400 tonnes.

Table 1.1 Sugar Production and Consumption in Kenya (1963-1987)

( '000 tonnes )

Year	<u>Production</u>	<u>Consumption.</u>
1963*	38.0	103.0
1964*	35.0	105.0
1965*	29.0	112.0
1966*	36.0	131.0
1967*	60.0	131.0
1968*	81.0	132.0
1969*	115.0	142.0
1970*	125.0	160.0
1971*	124.0	193.0
1972*	92.0	195.0
1973*	138.0	217.0
1974*	163.0	224.0
1975*	183.0	283.0
1976**	170.0	195.0
1977**	185.0	200.0
1978**	238.0	260.0
1979**	296.0	253.0
1980**	383.0	296.0
1981**	368.0	367.0
1982**	353.0	349.0
1983**	325.0	333.0
1984**	375.0	360.0
1985**	346.0	363.8
1986**	121.0	372.0
1987***	374.0	381.0

Source: \* Odhiambo, 1978 pp. 5

\*\* 1976 - 1986 Data: Sugar Statistical Series, 1986

\*\*\* Estimate



In the same year, rural producers were paid a gross revenue of over Kshs 127 million from about 37,100 tonnes of sugarcane supplied to the sugar companies at the then prevailing producer price of Kshs 341 per tonne. The amount paid to the farmers was substantial in that year given that these earnings accrued directly to the participating small scale rural households.

In terms of employment creation opportunities, sugar economies with an annual domestic output of 500,000 tonnes of sugar are capable of generating 100,000 jobs (Thomas, 1979). Kenya's combined installed capacity from the seven sugar projects currently stand at over 516,000 tonnes of sugar annually. However, this capacity has rarely been achieved and subsequently only about one half of the employment potential has been achieved. Thus the number of people employed in the sugar industry was only 41,000 by 1983 (Odada et al., 1986). Out of this, 16,000 people were employed at the factory level on a permanent basis while 15,000 were on casual basis. Another 10,000 were employed at the nucleus estates and large scale farms. If the jobs in the marketing activities like transportation are included, it can be justified to conclude that the Kenyan sugar industry offers substantial employment opportunities to rural households.

A number of urban-based industries utilize sugar as one of the ingredients of their various products. Industries that manufacture soft drinks, beer, confectioneries and bread are examples that use sugar in significant quantities. Industrialization therefore has a direct link with the development of the sugar industry, since the

which were diverted to other sectors of the economy.

Despite the above positive contributions to the economy, a review of the Kenyan sugar industry indicates that it has encountered serious bottlenecks in its determined efforts to make the country self-reliant in the production of sugar. Apart from the temporary self-sufficiency achieved between 1979 and 1983, Kenya continues to import sugar. The same review indicates that sugarcane is not a recently introduced crop in the country as it has been grown for jaggery and chewing from time immemorial.

However, commercial production and processing of sugar in the country only started in 1924 at Miwani, Kisumu District of Nyanza Province. A second sugar factory was established by Associated Sugar Company at Ramisi in Kwale District of Coast Province in 1927. The country had to contend with the then status quo until the attainment of political independence in 1963.

After Independence, the Government embarked on an ambitious expansion programme of the sugar industry by establishing new factories. Thus Muhoroni and Chemelil Sugar projects were established in 1966 and 1967, respectively, in Kisumu District. These were closely followed by establishment of two more sugar projects in Western Province at Mumias, Kakamega District in 1973 and Nzoia, Bungoma District in 1978. The latest sugar project is the South Nyanza Project, established in 1979. Table 1.2. below shows the position of ownership and management of the seven sugar projects in Kenya by 1987.

Table 1.2:Ownership and Management Sugar Factories in Kenya

Sugar Company	Year of Establishment	Ownership	Management	Rated Capacity Tonnes/year
Miwani	1921	Hindocha	Family (K)	60,000
Ramisi	1927	Madhavani Group (India)	Madhavani Group (India)	30,000
Muhoroni	1966	GOK	B.A.I	60,000
Chemelil	1966	GOK	GOK	66,000
Mumias	1973	GOK	B.A.I	180,000
Nzoia	1978	GOK	GOK	60,000
SONY SUGAR	1979	GOK	B.A.I	60,000

Source: (Odada et.al.1986 PP 9)

Notes : B.A.I: Bookers Agricultural International.

GOK : Government of Kenya

Table 1.2 indicates that the Kenyan Government owns five sugar of the seven sugar projects in the country while the rest are in private hands. The five were all established after independence. The ownership and guidance of the Sugar projects by the Government resulted in the direct participation of smallholders who have now emerged as the dominant suppliers of sugarcane to the factories. While ownership of the sugar projects is the Government of Kenya, management is however, provided by hired multinational consulting firms on three year renewable contracts. These contracts provide for fixed management fees besides the proportionate shares in the gross earnings of the projects.

involves the establishment of an outgrowers' scheme. This consists of either a group of individual farmers, farming company or Cooperative Society supplying sugarcane to the factory on contract. They are therefore designated as contract farmers. Any cane producer and supplier to the factory outside this outgrowers' scheme is referred to as a non - contract farmer.

This study focusses and examines the economics of contracted and non contracted systems sugarcane farming in the South Nyanza Sugar Project. The project is one of the seven companies in the Kenyan sugar industry .

#### 1.2 The South Nyanza Sugar Project.

The South Nyanza Sugar Project, abbreviated "SONY SUGAR" is located in the south Nyanza District of Nyanza Province. The project which had an initial total investment cost of Kshs 800 million (1979 prices) consists of a factory complex, an outgrowers' section covering land of about 9,000 hectares for farmers on contract, a non-contracted farmers' section of unknown hectarage, and a nucleus estate of about 2,400 hectares (SONY SUGAR: Records, 1987).

The factory has a rated capacity of 60,000 tonnes per year and is owned by the Government of Kenya whose share holding is 93.8 percent. The other share holders include: the Industrial and Commercial Development Corporation (ICDC) which holds 3.6 percent, Industrial Development Bank (IDB) - 1.6 per cent and the Metha Group International of India - 1.0 percent. The project is managed by a multi-national firm; Bookers Agriculture International

(B.A.I). However, when the company started operating in 1979, the management was under the Mehta Group International. It changed hands at the request of the Government of Kenya in January, 1987 to B.A.I. on a three year renewable management contract.

Since 1979, when the project became operational, it has managed to construct 900 apartments, a primary school, a shopping centre complex and developed a total of 750 km of access roads serving the sugarcane growing areas. During the first six months of operations from January to June 1980, the project produced 15,170 tonnes of sugar (SONY SUGAR Reports, various issues).

From 1980, the project has had nearly 10,000 families participating in the outgrowers' scheme on contract and numerous non - contracted cane growers from 1981. The latter, in 1981 alone contributed 10.0 percent of the total cane supplied then. Since 1981, sugarcane producers in the project are paid an average of Kshs 5 million monthly (Daily Nation March 24, 1987, pp 10). With the injection of Kshs 5 million monthly into the rural areas around the townships of Awendo, Kokuro, Uriri and Ranen since 1981 by SONY SUGAR, a strong case can be advanced that the project has substantially contributed to the regional development of the area.

Although the present study is not an economic appraisal of the project, nevertheless tangible benefits brought by the project, to the region can be cited. Nearly 10,000 outgrowers' families have been introduced into the money economy enabling them to improve their standard of living. Similarly, their level of agricultural practices has improved. The project has also generated substantial

rural employment opportunities. There are over 1,500 people employed in the production, harvesting and transportation sectors of the project alone. Nearly other 40,000 individuals benefit directly from this rural agro-based enterprise.

Perhaps the only noticeable negative affect associated with the project is the fate of over 800 families who were hastily evicted to create room for the nucleus estate and the factory. It is widely believed that they have become rural squatters and landless around the project's township of Awendo. Even more surprising is the revelation that no single member of the evicted families had ever got company employment at SONY SUGAR by 1983. (Odada,et al, 1986).

### 1.3 Contracted and Non-Contracted Sugarcane Farming

In general the "contract" in contract farming, (Appendix 1), is an agreement between a farmer and a factory or a processing firm. The agreement takes the place of exchange on the open market. The contract contains provisions which involve either the input supplier or the processor in decisions governing the selection of land and its preparation, planting, crop husbandry and marketing of the commodity under contract. Thus, contract farming is a type of farm development scheme where land is offered to some agro-based firms by the land owner to grow a particular crop. The firm provides all the inputs to the land owner, in most cases to facilitate the production of a specific crop to its satisfaction. The major condition in such a contract is that all the farmer's produce from the contracted land must go to the firm for final use,

sale or processing. The firm then can recover the money advanced as credit before the farmer is paid any income from the commodity. Contract farming is a safer method of reducing variability in producer prices. It is a risk aversion strategy benefiting both the producer and the processing firm. The latter finds violent swings of over and under production costly, thus through contracts, the firm is assured reasonable expectations in advance of the quantity and quality of a commodity expected at a particular time for processing. For the producer, the price of the commodity is set in advance, thus removing the price uncertainties at the time of harvest. Indeed, under contract farming, production and marketing decisions are vertically integrated such that they are coordinated by the processing firm. The processors persuade producers that they will benefit from a more coordinated method of planned production in which prices and quantities of the commodity are agreed upon before even planting. Basically then, the producer shifts the risks inherent in agricultural production and open markets to the buyer. The contract however, assumes a different outlook in situations where a third party, for instance the Government, may intervene and fix the producer price of the commodity independently of the processor and the farmer.

In the contract farming of sugarcane, a sugar company leases a farmer's plot under contract for a period long enough for three crop harvests to be completed. It then develops that plot, that is; surveys, clears the bush, ploughs and harrows the plot until the appropriate soil tilth for seedcane is achieved. The company

then furrows it and provides the farmer with seedcane material. The farmer plants the crop under the sugar company's supervision. The crop is thereafter continuously monitored by the sugar company throughout the growing period until it is harvested and sold to the company for processing. The company ensures that all the recommended cultural practices are strictly adhered to during this monitoring phase. All these operations on cane production are executed on the farmer's plot with his/her minimum participation provided the land has been contracted by the two parties involved. The farmer's only contribution in contract sugarcane farming is providing labour for planting, weeding and fertilizing the crop. Alternatively, the farmer may not contribute any labour for the crop at all as there is a provision in the contract that the company may hire casual labourers to undertake these three operations. During the marketing of the crop, which involves cane transportation, the company may use its labour force or hire contractors to undertake the task. All these production and marketing operations are provided to the contracted farmer on credit.

Under the current contractual arrangements, the farmer is paid net earnings within a month of delivery of the crop at the factory. Loan recovery including interest on principal term loan is effected before the farmers receive their proceeds from the crop. In almost all cases, the whole loan is recovered from the gross proceeds of plant cane as stipulated in the contract. If, however, the proceeds are lower than the total value of credit and the cost of servicing



it plus interest, the farmer may end up with a negative income from plant cane. In such a case the credit balance will be deducted fully with interest from the proceeds of the next ratoons until all is recovered.

A sugar company procures sugarcane for processing from either its nucleus estate or from contracted outgrowers. It may also obtain sugarcane from non-contracted farmers. Most Kenyan sugar companies cannot service their contracted farmers sufficiently to produce enough sugarcane, a situation which results in the problem of excess capacity in the factories. Such companies therefore resort to the option of procuring sugarcane from non-contracted farmers. This is the situation which has encouraged the springing up of non-contracted sugarcane producers around many sugar factories.

The "non-contracted farmers" are those who opt not to have any formal contractual arrangements with the sugar companies. They produce the crop independently for sale to either the jaggeries or the white sugar factories. They are therefore more commercialized farmers who have on the one hand, more options than small farmers (more access to credit, inputs, markets, more capacity to absorb risk) and on the other hand more cash expenses, since less of the managerial or production labour is performed by unpaid family help. They also prefer competing in non - contract markets and provide their own financing and inputs, take more risks, which alternative also provides more potential for profit.

Non - contract farmers have also more power or influence, and more ability to involve troublesome company officials, agencies and

lawyers in the event of a contractual dispute. In some areas, jaggeries have been banned officially in order to protect the white sugar factories from the problem of cane supply shortages. Most non-contracted farmers are more often those who are endowed with reasonable resources for cane production or those formerly under contract who were disillusioned with poor returns from the contractual arrangements and opted to go it alone.

Contract farming has been used by Kenyan farmers for several commodities. A few examples of such contract agreements include; the production of barley with the Kenya Breweries Limited, oil seed crops by the East African Industries and Oil Crops Development Corporation, Macadamia with Kenya Nut Company, Horticultural produce with several horticultural produce exporters and tobacco growing with the British American Tobacco Limited (BAT).

#### 1.4 A Statement of the Problem of the Study

Contract cane farming in SONY SUGAR seems to have been very popular at the start of the project. At that time, there were spirited campaigns by SONY SUGAR and Government officials aimed at attracting farmers to grow sugarcane for the new up - coming factory. As a marketing strategy, the farmers were then promised packages and incentives that made them have high financial expectations from their participation in contract sugarcane farming. In other words, to secure sufficient and new sources of raw materials the company initially pursued promotional policies like high producer prices, low quality standards, more generous

credit terms and other attractions that were used to allure outgrowers to abandon their previous enterprises. In this start-up phase, the company's aim was to establish the new sources of cane supply than to maximize short term profits. Hence many of these farmers abandoned their traditional and lesser paying cash and subsistence crops in favour of contracted cane production.

Once the new source of supply was assured and the factory started operating at planned capacity levels, the company strategies started shifting as the farmer and company each sought to maximize its own benefits, even risking severing the contractual relationship. The sugar company's profit maximization objective then shifted to obtaining desired cane quality and quantity at the lowest cost. This was meant to drive marginal producers out of cane farming. At the same time, the number of contracted farmers began to grow and the company found itself without adequate managerial capacity to give the multitude of small outgrowers individual attention. It therefore started prescribing detailed but standardized procedures of cane production without regard to the small farmer's initiative and intimate knowledge of the plot's soil, topography and social characteristics. After plant cane was harvested, the farmers discovered that contracted sugarcane production did not offer them as high returns as they were made to believe before entering the contract. Some of them, after experiencing low, including negative, returns from plant cane neglected their ratoon cane plots before the contract period expired resulting in even lower yields and incomes from the crops,

insufficient cane and declining output. The resultant economic hardships made many contract farmers to blame the company and also saw the emergence of independent (non - contract) farmers replacing many contract ones. The problems of contracted farmers with the sugar company increased over time and most contracted farmers threatened to abandon cane production altogether with fewer renewal of cane contracts being experienced than before. The Contracted farmer's other problem with contract farming was that of loss of independence and decision making at the farm level. The contract reduced the farmer from being an independent entrepreneur to being, at best, a farm manager with limited delegated powers. Indeed under the contract terms, the production and marketing operations are executed on the farmers plot with his or her minimum participation provided the land has been contracted by the Sugar Company. The farmers's only contribution in contracted cane farming is the provision of labour for planting, weeding and fertilizing the crop. The farmer may as well decide against this as there is a provision that the company may hire casual labourers to undertake these three farm level operations.

Contracted farmers have also institutional problem of feeling that they are cheated as they believe they are weak in bargaining and negotiating for the contract on equal terms with the sugar company. They therefore have difficulties in accepting that the contract is fair and the income obtained is true representation of what they could get under market forces.

Many farmers dispute several deductions made from their gross

they are cheated as they believe they are weak in bargaining and negotiating for the contract on equal terms with the sugar company. They therefore have difficulties in accepting that the contract is fair and the income obtained is true representation of what they could get under market forces.

Many farmers dispute several deductions made from their gross income and many of them fail to repay cane related expenses as well as meet their financial obligations. Rationally as expected from their distrusting of the company, they keep their own records of accounts and transactions and explores other lower cost alternatives of inputs needed to produce cane other than company supplies. Hence the problems with contract cane farming then that need to be considered revolve around the questions that contract farmers ask, namely:

- i) How cane producer prices and input costs are determined by the company ?
- ii) How the credit terms such as interest rates and repayment plans for production credit issued are determined ?
- iii) What provisions are there for renewal, exit / termination of the contract and provisions for arbitration ?
- iv) What adjustments must be made for a premium price for quality differentials, and
- v) How the risks and insurance against the crop losses (arson) for should be apportioned?

The final problem of contract farming is in policing farmers as the contract involves too many variables to monitor effectively. Many

Furthermore, although the current contractual arrangements stipulates that the farmer is paid net earnings within a month of delivery of the crop at the factory, delays in payments for upto nine months are common. If the company really wants to sabotage and manipulate the contract, there are a many ways to do it which renders the producer helpless.

Thus, an examination of most sugar projects in the country reveals that small scale producers are the predominant suppliers of sugarcane to the factories either as contracted or non - contracted cane farmers. Their continued participation in the sugar industry however is threatened by being not rewarded sufficiently for their efforts under the two production systems, a major focus in this study.

### 1.5 Objectives and Hypotheses of the Study

The broad objective of this study was to undertake a review and assessment of the Kenyan sugar industry in general and in particular analyze the organizational structure of the contracted and non-contracted systems of sugarcane farming at SONY SUGAR. This would assist to identify and examine the bottlenecks inherent in the two systems of cane production. The specific objectives of this study were :

1. To review and analyze the Kenya Sugar Industry in general and SONY SUGAR project in particular.
2. To analyze the economic logic of contracted and non-contracted cane farming, its social impact on the rural community and the ways in which farmers have responded.
3. To determine the costs of producing and marketing sugarcane in the two systems;
4. To compare the income generating capacity of contracted farms with that of the non - contract ones

Using the above objectives, hypotheses were formulated as follows:-

- 1). The first hypothesis is that "there is no significant difference in cane yields between the contracted and non-contracted farms against an alternative hypothesis that there is a significant difference in cane yields between the two systems of cane production at SONY SUGAR.

The mean yields achieved in contracted  $x_1$  and non contracted  $x_2$  systems of sugarcane production respectively

contracted and non-contracted farms and used to test the second hypothesis.

- 3) The third hypothesis is that "There are no significant differences between gross margins per hectare achieved by the contracted farms and those of the non-contracted ones at the SONY SUGAR Project".

Except for labour, the contractual terms between the two parties bind the sugar company to provide all inputs as a package for sugarcane production. Indeed, contracted farmers have virtually everything done for them at full cost and are expected to perform better in terms of yields than those not under the contract. In this study, the gross margin per hectare from plant cane and the first ratoon crop will be obtained from the two groups of producers at the scheme and used to test the third hypothesis.

#### 1.6 Justification of the Study

The justification of this study arises from the fact that the sugar industry is a vital sector in the Kenyan economy and that sugar is an important item in the budget and diet of an average Kenyan household. At the same time, the Kenyan economy depends on domestic sugar production as an import substitution policy to save foreign exchange.

The Kenyan sugar industry has never at any one time been static. Thus expected to emerge constantly are new priorities and policies. Therefore, constant but mostly periodical information gathering and analyses are required by industry stakeholders and policy makers to








appraise and re-evaluate the status quo of the industry at any time. Planning tools must therefore be developed and sharpened to accommodate the attendant position of the industry. This study is therefore indispensable for formulation of the appropriate policies for the farm level operations of the sugar industry. Furthermore, the formulation of sectoral policies must be based on both long term domestic as well as international production .

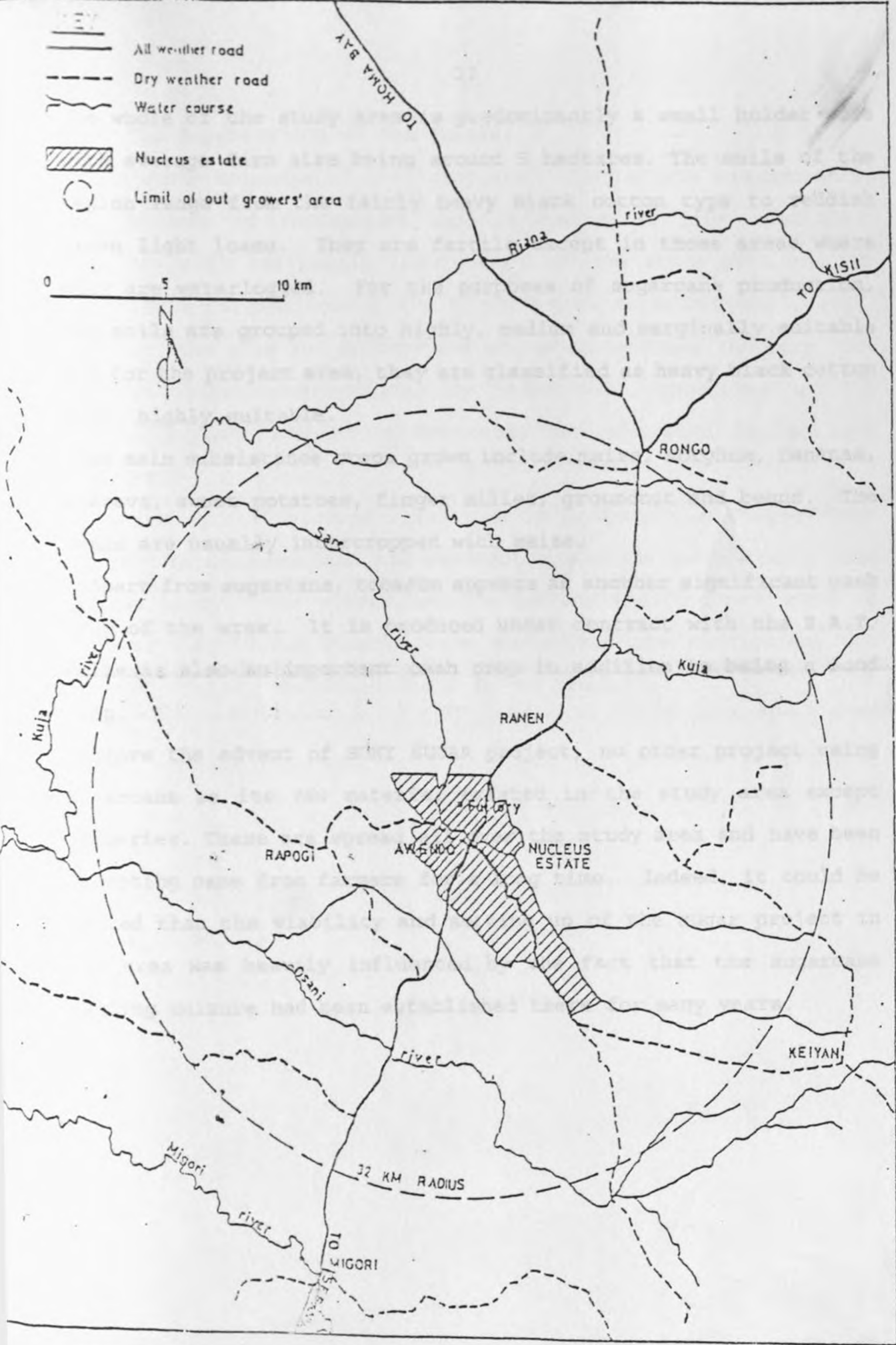
At the same time, a review of the post - independence Kenyan sugar industry provides very interesting cases of success and failure. For example, domestic production grew very rapidly during this period making Kenya self sufficiency in sugar for the first time in 1979. However, this was short lived and temporary as the country slid back to importation from 1983. This disturbing scenario serves as a pointer to the many factors that may be responsible and hindering the country from sustaining the domestic self sufficiency level. Alternatively, the question of whether Kenya has adequate comparative advantage to justify the pursuit of the self sufficiency policy arises and begs for a critical examination. This study will provide a basis for assessing policies related to the sugar industry in such aspects like production and relative attractiveness of the enterprises to the stakeholder at the farm level. Besides, it may go a long way in assisting the policy makers and stakeholders in the sugar industry to formulate appropriate incentives and other policy issues to boost domestic production of sugar.

### 1.7 The Study Area

The area to be studied is shown in Figure 1. The SONY SUGAR project occupies parts of Rongo and Migori Divisions of South Nyanza District, in the Nyanza Province of Kenya. The area is predominantly inhabited by the Luo ethnic group with small scattered pockets of Luhya immigrants, Abagusii, Kuria and Abasuba. Most of the inhabitants have been assimilated into the Luo culture as the Luo language appears to be the major language of the study area. According to the 1979 census, the population density was 149 people per square kilometre although the 1984-88 South Nyanza District Development Plan (pp.5) had projected that by 1988 the population would have reached 217 persons per square kilometre. Most of the land tenure is on freehold; that is the land has been surveyed, adjudicated and registered in the name of the household head. Married sons in a household normally get plots allocated to them. However, such plots are not registered in their names yet. SONY SUGAR does not enter into contract with any farmer without a title deed.

-  All weather road
-  Dry weather road
-  Water course
-  Nucleus estate
-  Limit of out growers' area

0 5 10 km



The whole of the study area is predominantly a small holder zone with average farm size being around 5 hectares. The soils of the region range from the fairly heavy black cotton type to reddish brown light loams. They are fertile except in those areas where they are waterlogged. For the purposes of sugarcane production, the soils are grouped into highly, medium and marginally suitable and for the project area, they are classified as heavy black cotton soil, highly suitable.

The main subsistence crops grown include maize, sorghum, bananas, cassava, sweet potatoes, finger millet, groundnut and beans. The beans are usually intercropped with maize.

Apart from sugarcane, tobacco appears as another significant cash crop of the area. It is produced under contract with the B.A.T. Maize is also an important cash crop in addition to being a food crop.

Before the advent of SONY SUGAR project, no other project using sugarcane as its raw material existed in the study area except jaggeries. These are spread all over the study area and have been accepting cane from farmers for a long time. Indeed, it could be argued that the viability and setting up of the sugar project in the area was heavily influenced by the fact that the sugarcane farming culture had been established there for many years.

### 1.8 The Organization of the Thesis.

This study consists of five chapters. Chapter one has presented the process of contracted and non-contracted cane production together with the people and location of the study area and the background information of the South Nyanza Sugar Project itself. Further, the role and an overview of the Kenya Sugar Industry, the problem under investigation, the objectives, hypotheses and the relevance/justification of the study are addressed in the same chapter.

A review of the relevant literature is presented in Chapter Two. Chapter Three introduces the methodology and analytical tools used in the study. The survey results are analyzed and presented in Chapter Four while Chapter Five summarizes the conclusions and suggests policy recommendations of the study.

CHAPTER TWO

## 2.0 LITERATURE REVIEW

A number of studies<sup>1</sup> on feasibility, expansion and rehabilitation of sugar projects have been carried out for the Government of Kenya by a number of consultants over the last two decades. Indeed, the acceptance of their findings and recommendations have formed the basis of the existing government sponsored sugar projects in the country. The terms of reference for the studies have ranged from among others; supply and production; profitability of sugarcane farming, structure, conduct and performance of the Kenyan sugar industry, institutional and legal issues in sugarcane farming. As in almost all cases, Kenya Government consultative studies are not made public and have limited circulation. They continue to be confidential. Although the studies could have been exhaustive, they do not seem to have analyzed the role that contracting of cane suppliers play in the supply situation obtaining in a sugar Project. Similarly, few studies have analyzed the welfare of farmers under the contract, and whether or not sugarcane can be produced in situations not under contract. The present study compares the economics of sugarcane farming under two production systems; namely, contract and non-contract under the mentioned sub sections.

.....  
<sup>1</sup>. Examples include:

- (1) Tale and Lyle : Technical Services Ltd. and Government of Kenya:  
Kenya Sugar Industry Expansion Study: Vol. I - IV - Kent England, 1974
- (2) The Mehta Group: South Nyanza Sugar Project Final Feasibility Report: Phase II - Investigations Vol. 1 -V. Nairobi 1975.
- (3) Agro - Investment Industrial Consultants and Management Agents:  
Small Scale Sugar Production in Kenya: Vol. I - V, Nairobi, 1976.
- (4) Bookers Agricultural Holdings: Mumias Sugar Scheme Final Feasibility Report Vol. I - III, Nairobi, 1976

## 2.1 Production and Supply of Sugarcane

Frank (1965), investigated the sugar industry in East Africa using an econometric analysis of time series data generated between 1954 - 1963. His study had the objective of formulating a common policy for the sugar industry in the then member states of the East African Community. The study provides a very useful guide for predictive and projection purposes on the demand and supply situations in the sugar industry. Investigating transportation costs, location, distribution and the future of the industry, the study recommended a vigorous expansion of the sugar industry in Kenya. The supply and production policy issues which were raised by the Frank study are still relevant to the Kenyan sugar industry as they are considered when setting up the annual producer and consumer prices.. The present study looks at the measures and production policies taken at the farm level to improve the welfare and rewards of those participating as producers.

Odhiambo (1978) investigated the structure, conduct and performance of three sugar schemes in the Nyanza sugar belt: namely, Miwani, Muhoroni and Chemilil. The study established that there are several problems in the sugar industry. Some of them include the alleged unrealistic pricing policy, underutilization of factory capacity and excessive sugarcane processing and distribution costs. The study advocated strongly for a comprehensive legal framework in contract farming in order to share equally between the company and producers the risks and benefits inherent in contracted sugarcane farming.

Mbogoh (1980), used dynamic models to analyse the structure of demand and supply situation obtaining in the Kenya sugar industry with special emphasis on the attainment of the Government stated self-sufficiency goal. Using parametric simulation at different growth rates, the study projected future trends in consumption, demand and production. At moderate growth rates in consumption and production, the study predicted that the country could have achieved self-sufficiency by the year 1987. This, however, was not to be the case, as in the same year, Kenya imported 26,000 tonnes of sugar to meet domestic consumption demand.

Wambia (1981) conducted an economic appraisal of the Mumias Sugar Project in Western Kenya. Using an econometric approach to analyse the cost structures and production functions of the Mumias outgrowers, it was established that the outgrowers experience an acute degree of decreasing returns to scale. Wambia's findings support another study by Odada (1982) on the suitability of machinery for the Kenyan Sugar industry in which he found that the returns to scale are not significantly different from unity. The wider implication here is that no cost advantage can be derived from large scale operational units in cane production.

According to Odada et al (1986), the cost of establishing and maintaining one hectare of plant cane in the contracted SONY SUGAR Project farms by 1986 was over Kshs 16,000. By local standards, this amount is prohibitive for rural folks with negligible opportunities to save. Assistance would be necessary for them to emerge from subsistence into the money economy and the easiest



source is the Sugar company. The present study will investigate the sources and credit and their potential impact on sugarcane farming at the SONY SUGAR Project.

The sessional Paper No.1 of 1986 (op. cit.) argues that the cost of cane production in Kenya is above the world average in general and that it should be drastically reduced if farmers are to stay in cane production.

## 2.2 Profitability of the Sugarcane Enterprise

Ochieng (1981) investigated the relative profitability of crop enterprises in the region using Mumias sugar project as a case study. The study found out that Mumias outgrowers were on average getting over Kshs. 17,000 per year from contracted cane production.

However, the sessional Paper No.1 of 1986 on Economic Management for Renewed Growth admits that the gross margins per hectare of sugarcane is on average a negative figure estimated at Kf 132.

The difference in returns per hectare from Ochieng's study and that of Sessional Paper No 1 of 1986 is quite significant. The present study will address the factors that have been responsible for the depression of the gross margins that farmers expected from sugarcane. As Odada et. al. (1986) point out in a later study, there is no economic justification for the operation of large scale nucleus estates, a common feature in all the sugar projects in Kenya's sugar industry.

Farmers on contract with other companies such as B.A.T. for tobacco production have comparatively good incomes. For instance, a contracted tobacco farmer growing 0.5 hectares of the crop gets

an average net income of KShs. 10,000 per season (South Nyanza Development Plan 1984-88). Besides, tobacco can be produced twice a year, unlike cane.

The Mhogoh study (1980) established that amongst the farm enterprise relationships in the Nyanza sugar belt, sugarcane has the highest gross margins per hectare. However, incomes from sugarcane are lumpy and are earned after two years of gestation when producers do without any income at all from the crop. Thus sugarcane gross margins should be discounted to reflect the real income situation which is not the case for the Mhogoh study.

The illusion of sugarcane's high profitability is supported by sessional Paper No.1 of 1986 on Economic Management for Renewed Growth. This paper estimates that the gross margins of sugarcane enterprises are on average negative and that this is a severe barrier to farm level cane production and expansion in the country. What is strange is that even when farmers seem to experience very low returns, including negative ones, from their participation in the enterprise, they have not quit cane production. The implication is that they could be in the cane business for other non-business motives such as the prestige associated with being a cane farmer or absence of other competitive cash crops in the sugarcane growing areas. It could also be that the contract locks them in the vicious cycle of debt repayments otherwise they could lose the land pledged as a collateral. The present study will undertake gross margin analysis of contracted and non-contracted farming in order to compare the income generating potential of the two groups of

producers.

It is only perhaps in contracted sugarcane production where the returns are generally poor due to the structure of sugar projects providing allegedly expensive credit in kind. It could seem that credit has not facilitated increased farm productivity as would otherwise be expected ( Mellor, 1986). It has on the contrary turned into an instrument of oppression in the SONY SUGAR project. It is not surprising then that some contracted farmers are making spirited attempts to become non-contracted farmers while the rest are withdrawing into subsistence farming with which they are familiar. Such a response may be viewed as a rational behaviour in the part of producers as their continued participation depends to a good degree on the profitability of sugarcane production relative to the other enterprises in the area.

### **2.3 Institutional and Legal Issues in Sugarcane production**

Owinyi (1977) examined the effects of compulsory eviction of families to create land for the Mumias nucleus estate. The study which dealt with the legal aspects in the eviction, cites numerous cases of what happened to the displaced peasants and their futile efforts to resist eviction. The same process occurred at SONY SUGAR where over 1,000 households were evicted. They were paid compensation but were not assisted to find alternative settlement elsewhere such that many of them ended up being completely landless and are now living as rural squatters in small market centres in Nyanza.

Odada et. al. (1986), examined the institutional, incentives and rewards structure in the Kenyan Sugar Industry. Their study indicated that the Kenya sugar industry has not lived up to the expectations which the country had when it invested massive amounts of public funds in the sugar projects. The study also addresses itself to the wisdom of further Government investment in the industry and notes that although the industry has failed to attain its self-sufficiency goal, it is nevertheless defended as a major source of gainful employment in the rural areas. Further more it can be defended on the fact that it also reduces the risk of overdependence upon outside sources which may be unreliable at times.

Of particular relevance is that their study recommends the rewording of the contract terms such that the risks are borne by all the parties concerned in the sugar industry. For instance, the study found that an outgrower effectively loses control over what can be done on his land once the contract is signed. Making the farmer a marginal observer if not satisfied with his cultural practices, the sugar company intervenes on his plot and takes over cane production from him. During the intervention, the company is empowered to deduct its costs from the gross value of the crop. Odada et. al. further alleges that the loser at the end of the day is the farmer as the company inflates the value of its services rendered during the intervention. During the time of this study, an outgrower sued a sugar company for damages, and the court of law so upheld, alleging that the company interfered with his farm and

paid him nothing for the cane harvested from his plot ( Daily Nation, 16th October, 1986). The present study touches upon some of the issues as Odada et. al. (1986) but confines itself to contrasting the contractual and non contractual cane production arrangements at the farm level in the SONY SUGAR project.

#### 2.4 Advantages and Disadvantages of Contract Farming of Sugarcane

A number of studies have analysed the advantages and disadvantages of contract farming. Wilson (1987), argues that contract farming is found in situations where: processors are few in relation to producers; there is heavy dependence on mechanized farming and credit is tight; farmers are poorly organized; government support services are relatively weak; and where the farmer has little capital but a surplus of family labour exists and the household income is dependent on the sale of a single crop. He concludes that contract farming is conditioned by class relations between the foreign capitalist class and the individual peasant farmer. The present study will investigate the production structure and ownership in the sugar industry to see whether or not contract farming at the SONY SUGAR Project is beneficial to the farmer.

Kuester and Glover (1990) review the theory and practice of contract farming and argue that contract farming lies on the premise that a central processing or exporting unit to purchase the harvests of independent farmers exists as a supplement or substitute for company production. The terms of the purchase are arranged in advance through contracts which are generally entered

at planting time and specify how much produce the company will buy and what price it will pay for it. Often the firm provides credit, inputs, rental farm machinery and technical advice and it always retains the right to reject sub-standard produce.

They further argue that contracting is most commonly practiced by food processing firms which have high fixed costs and have therefore an interest in keeping raw material inflows at a steady level close to plant capacity. They add that relying on open market purchases is unlikely to achieve the planned capacity. Contracts, on the other hand, specify planting dates and thus, indirectly the delivery dates as well as total quantities to be delivered. The contract reduces much of the uncertainty that would exist if the company procured raw materials in the open market and gives it some control over the production process.

Kuester and Glover continue to argue that contracting is fundamentally a way of sharing / allocating the distribution of risks between the firm and its growers. The latter assume most of the risks associated with production while the former assume the risks of marketing the final product. In practical terms, however, considerable interdependence exists between the two parties. A supply shortfall will affect the company's final product sales just as a downturn in sales will result in a decline in the firm's demand for raw materials. The mechanism of sharing or bearing risks are allocated is specified in the contract although there is a great deal of variation between contracts. In some, the grower and firm agree to trade a certain volume of production; in such cases,

the grower bears the risk of variations in yield. In others, the firm bears this risk by accepting all production from a specified acreage, the price is usually set in advance, but in some cases the firm pays the market price at the time of delivery.

Modern agri - business involves a coalition of partners each with different motives and interests. The firm and its contract growers are always key actors but government and foreign aid agencies frequently play important roles as well. The possible motives of each actor for participating in contract farming schemes are described below.

For firms, contracts allow them a degree of control over the production process that is often comparable to that obtained on company plantations. On the other hand, the company does not have to invest in land, hire labour or manage large scale farming operations which may tax the managerial capacity and technical expertise of a primarily industrial firm. Of the broader motives for contracting, avoiding conflicts over land ownership and labour issues is probably more significant. Cost advantages may also be possible. For crops requiring much labour and careful attention, smallholder production may be more efficient than plantations; in cases where it is not (e.g. bananas), local plantation owners may be able to achieve lower costs than firms by paying lower wages. Local firms are less conspicuous than foreign ones and can often pay workers less and deal more harshly with unions.

Another possible advantage of contract farming is that local growers may find it easier than multinationals to get the local

government (or indirectly, international aid agencies) to provide credit for operating capital or for the rehabilitation of plantations. If these sources provide loans at sufficiently low interest rates, the cost of operating or restoring the farms can be kept down, allowing the firm to avoid financial risks. Local purchasing also lessens the risk of expropriation by locating fewer assets within the host country. Contract farming may promote good public relations and present a progressive corporate image by involving local producers. It can also make the companies' wages and social benefits look good in comparison with those paid by local growers. Finally, contract farming may contribute to the formation of alliances with local businessmen who may defend multinational interests on certain issues.

Small scale farmers may see contract farming as a way to overcome some of their numerous traditional farming problems. First, they face competition from producers who have adopted new technologies but they are often reluctant to adopt these technologies themselves because of the risks and costs involved. For example, new crop varieties often result in higher yields / income variances and are more input -intensive than the traditional ones.

Second, input supply systems are often weak. Whether in response to lack of initiative from the private sector or as matter of preference, governments have often taken over the supply of fertilizer and other inputs. Frequently, however, they are unable to supply them in sufficient quantities or in a timely fashion.

Third, agricultural extension is frequently weak, since neither the



private nor the public sector is well positioned to provide it. Fourth, access to credit is difficult. Institutional credit is generally subsidized and must therefore be rationed. Informal credit appears to be more effective in reaching smallholders but only partially so.

Fifth, local markets for high value perishable goods tend to be very thin and thus highly volatile. While products like fruit and vegetables may be suitable for smallholder production, prices are unpredictable and can drop suddenly and drastically if a few farmers market a day's harvest simultaneously.

Sixth, international markets, which are larger than local ones, are inaccessible to peasant farmers unless specific channels have been established.

Contract farming has the potential to overcome these problems. The risk reducing aspect of the contract may facilitate technology adoption. Input supply and extension may be superior to government support services not necessarily because of private sector expertise, but because the firm has a direct interest in seeing that these are carried out efficiently. The results will be directly reflected in growers' yields and quality and thus in the firm's profits. Credit provision is facilitated because the firm can deduct loan repayment from crop payments and can use the crop as a collateral. The existence of collateral in the form of a crop contract can also make it easier for a grower to get loans from a private or public bank. Since most agri-business firms process perishable goods or export them to large markets abroad, they do

not face thin markets. They can therefore offer growers fixed - priced contracts. Finally, contracting with transnational agri - business based in developed countries can often provide access to lucrative markets, through their expertise, brand names or oligopolistic marketing channels.

CHAPTER THREE

## 3.0 METHODOLOGY

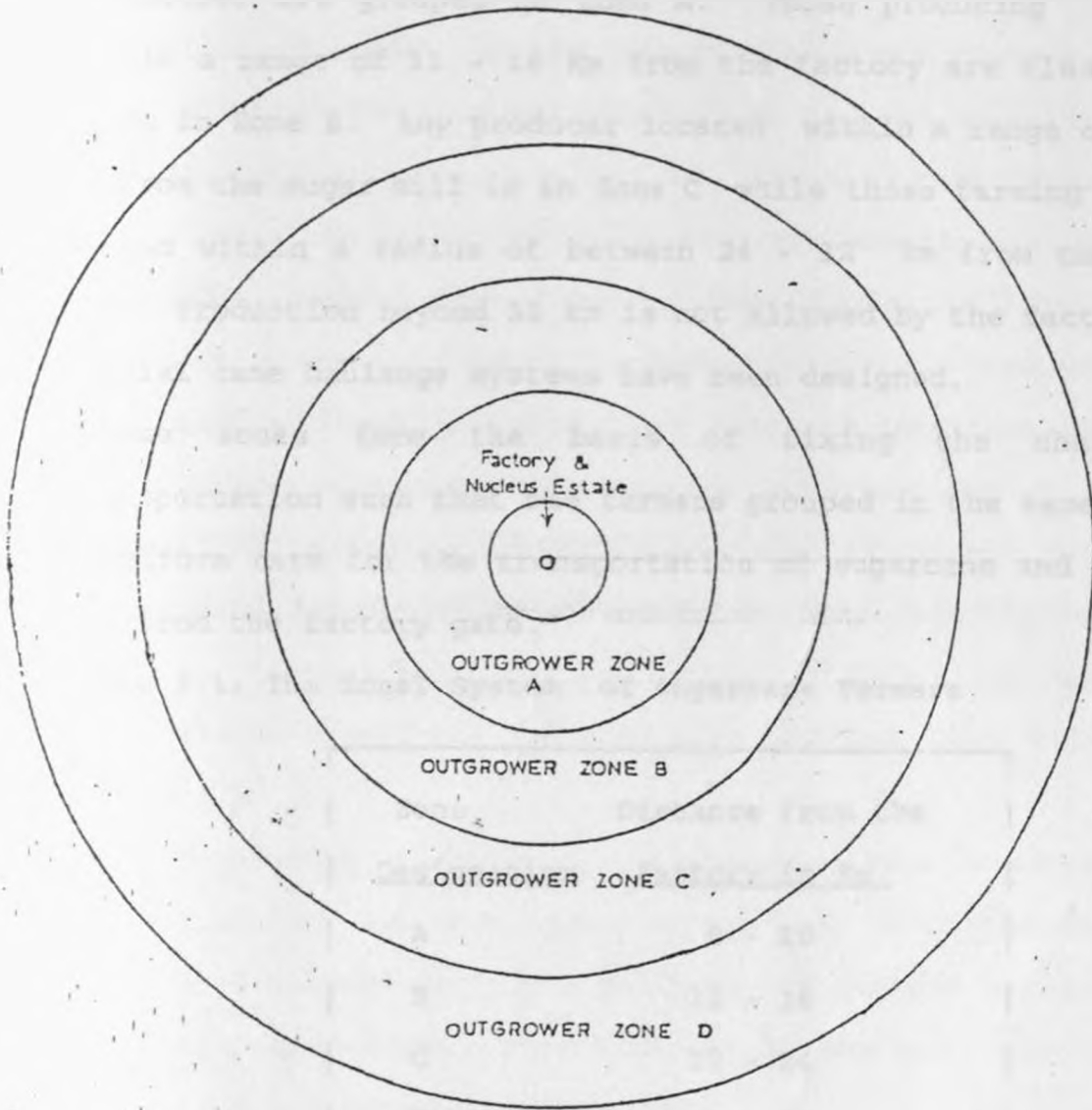
This chapter is divided into two sections. The first one describes how data for the study was generated. The second part describes the analytical tools employed in comparing contracted and non - contracted systems of cane production found in the SONY SUGAR project:

## 3.1 The Sampling Procedure

The SONY SUGAR project farmers are spatially distributed all over the sugarcane growing area. The area is divided into four producing regions called zones. Figure 2 is a presentation of the organizational structure of sugarcane production at SONY SUGAR.

As figure 2 shows, the scheme zonal structure consists of a sugar mill at the centre, surrounded by its supporting nucleus estate. This estate consists of land under sugarcane owned by the Sugar company itself. Outside the nucleus estate are found contracted and non- contracted farmers in what is known as the South Nyanza Sugarcane Outgrower's scheme.

Fig. 2: The Social Organizational Structure of Sugarcane Production at the South Nyanza Sugar Project



Specifically, the zoning system indicates the position of a cane producer from the sugar factory gate. The position is based on the actual distance from the factory gate to the farmer's plot. Thus farmers falling between a sugar mill and a distance of 10 kilometres are grouped in Zone A. Those producing sugarcane within a range of 11 - 16 km from the factory are classified as being in Zone B. Any producer located within a range of 17 - 24 km from the sugar mill is in Zone C while those farming in Zone D spread within a radius of between 24 - 32 km from the factory gate. Production beyond 32 km is not allowed by the factory until special cane haulage systems have been designed.

These zones form the basis of fixing the charges for transportation such that the farmers grouped in the same zone pay a uniform rate for the transportation of sugarcane and inputs to and from the factory gate.

Table 3.1: The Zonal System of Sugarcane Farmers

Zone <u>Designation</u>	Distance from the <u>Factory in Km</u>
A	0 - 10
B	11 - 16
C	17 - 24
D	25 - 32

Source: SONY SUGAR Company Records - 1987

Initially, the field survey was intended to cover a cross section of farmers who had delivered plant cane, the first and second ratoon crops from all the zones. These farmers should have at the same time supplied the factory with cane from three consecutive harvests from the same plot and paid for their deliveries. However, at the time of the survey, payments had only been effected for cane delivered up to the end of July, 1986 and most non-contracted farmers had not harvested their second ratoon crop. Hence the cases of non-contracted farmers were too few for the second ratoon crop. Due to this limitation, the study was forced to cover only those farmers from the two systems of cane production who had delivered plant cane and the first ratoon crop and had been paid for the deliveries as at the end of July, 1986 from all the zones .

In that period, 1008 contracted and 310 non-contracted sugarcane farmers had supplied the factory with plant cane and the first ratoon crop from the same plot and had been paid for the deliveries.

For the purpose of sampling, the sampling frame was taken as all the farmers in the above two categories. Their identities were compiled from the factory's delivery and payment registers. For sampling purposes then, this list of farmers was stratified into contracted and non-contracted groups.

From the non-contracted stratum, 50 farmers were randomly selected and located in their plots to form an interviewee sample. However, due to large cases of contracted farmers, systematic

random sampling technique was used in which every twentieth producer in that stratum was drawn from a list of 1,008 farmers. The procedure adopted involved choosing farmers at regular intervals from the whole population list. To select a sample of 50 farmers we had to obtain the size of the interval by dividing 1,008 by 50 which gave 20.16 as the interval size. For a start, the first farmer was randomly selected. This turned out to be producer number 11 in the list of 20 contract farmers. Thereafter, to determine the next interviewee to be included, every twentieth farmer was chosen, thus the contracted producers numbered 11, 31, 51, 71, ---, 991 from the sampling frame were included in the interviewee sample. Table 3.2 shows the spatial and sample distribution of the respondents interviewed.

Table 3.2: Sample Distribution of Respondents Interviewed

Sub-Location	Non-contracted	Contracted
Alego	3	8
Kanyimach	13	4
Kanyajuok	8	8
Kanyagwanga	5	6
Kanyalwanga	7	5
Kadelalwala	3	5
Kanyagwalla	5	9
Kogelo	4	4
Waware	2	2
Total	50	50

Source: Survey Data -1987

Dorling (1978) argues that a sample size should be based on the precision of the data required. As a rule of thumb in statistics,

anything above 30 is the minimum sample size for the law of large numbers to apply (Dorling, 1978). Indeed Westfall and Boyd (1972) show that for any sample size above that number, inferences can be made about the whole population characteristics .

### 3.2 Data Collection

#### 3.2.1 Primary Data

A structured questionnaire was used to collect primary data. It was administered with the help of two field assistants in the study area for a period of seven weeks during February and March, 1987.

The main quantitative data that the questionnaire set out to capture as far as the sugarcane farms aspects were concerned included respondents' farm size and proportion allocated to sugarcane, the cane yield levels realized from the plant, the first and the second ratoon crops, cane hectarages harvested, gross revenues realized; the materials and inputs used, the costs of obtaining the other services rendered and the rates at which the services were recovered. The same treatment was meted to other crops and livestock within the farm besides the personal particulars of the respondent.

Data of qualitative nature were also generated. Non - structured questions were discussed with the relevant members of the management of the South Nyanza Sugar Company who favourably responded to the interviews and discussions. The Mangement staff of South Nyanza outgrowers' company were also interviewed and in a similar manner, they were found to be warm and willing to shed light on several important aspects and operations of company.



### 3.2.2 Secondary Data

Non - survey data were also used in the present study. It was generated from various sources such as public and confidential reports as indicated below:

1. The feasibility studies on rehabilitation, expansion and establishment of sugar schemes in Kenya by a number of various multinational consultancy firms
2. The Central Bureau of Statistics, Ministry of Planning and Economic Development, Government of Kenya, Institute of Development Studies, University of Nairobi.;
3. Ministry of Agriculture's Annual and other confidential reports, Government of Kenya;
4. The Kenya Sugar Authority's Annual reports;
5. The South Nyanza Sugar Company's annual reports; and
6. The South Nyanza Sugarcane Outgrowers' Company reports.

### 3.3 Methods of Data Analysis

The following methods were applied in the analyses of data generated from the field survey of the SONY SUGAR Project.

#### 3.3.1 Cross Tabulation Analysis Method

Simple descriptive statistics and frequency tables presenting the results of the field survey constitute part of the method of analysis. A cross - tabulation enables the inter - relationship between a respondent's score or response on one variable and the other to be compared. During the survey, variables of both

qualitative and quantitative nature were captured from each respondent. Twenty - four of the variables per respondent were of qualitative nature and the cross - tabulation method was employed to count frequencies of those with similar responses to a given set of variables.

### 3.3.2 The Gross Margin Method of Analysis

Basically, when assessing the income generating capacity of an enterprise in farm planning, gross margin analysis is one of the methods used. Gross margin is defined as the value of the gross output less the variable costs of production and marketing. Gross margins indicate which farm plan is likely to be more attractive in terms of net monetary gain. Thus gross margins represent the contribution of an enterprise towards paying off the fixed costs of the farm. Symbolically, the gross margin analysis model can be expressed as shown in Equation 3.0 below:

$$GM/ha = Q_y p_y - \sum_{i=1}^n p_i X_{yi} \quad (3.0)$$

Where GM/ha = the gross margin in shillings per hectare

$Q_y$  = the level of output, in units per hectare

$P_y$  = the producer price of output, in Kshs/unit

$P_i$  = the  $i$ th input price

$X_i$  = quantity of the  $i$ th input  $i = 1, \dots, n$

$\Sigma$  = a summation notation

Thus in a typical smallholder farm which normally consists of more

than one enterprise, gross margin serves as an indicator of overall profitability when all the other enterprises are taken together. The gross margin analysis method has its advantages when used in farm planning. These include being easily understood; lending itself to a logical process in farm planning and the easy assessment of the economic potential or contribution of each enterprise to the well-being of the whole farm (Upton, 1979).

The difference between the total gross margin and the fixed or common costs of all farm enterprises constitutes the net farm income.

The above gross marginal analysis method is more applicable to annual crops but cannot be applied to sugarcane. This is because sugarcane is a perennial crop and returns from the investment come over some period of time.

Sugarcane takes a minimum gestation period of 24 months and a crop cycle of 5 years. Hence, the time when costs and benefits occur determine how valuable the resources used are and benefits obtained. A period of time therefore elapses from the point investment decisions are made and when the benefits accrue. For sugarcane, the bulk of investment costs are incurred upto planting time while the first stream of income occurs 24 months later. The returns to cane are therefore accrued in lumpsum and far ahead in the future after 24, 42 and 60 months respectively for plant cane, the first ratoon and second ratoon crops. As such the kind of gross marginal analysis applicable to annual crops cannot be applied to sugarcane. Because of the time value of money, the value of streams

of costs and benefits must be standardized using a common denominator to adequately evaluate the worth of the investment. A discounting principle is normally employed for perennial crops. The discounting principle provides a means for reflecting the time value of money. The common saying that a shilling today is worth more than a shilling tomorrow, since in the period, there is some inflationary increases in prices and interest might be earned on the money. This can be done by reducing the streams of costs and benefits to their present worth or value. This process of calculating the present value of a sum of money due some time in the future is called discounting i.e it calculates the present value of future cash flows at various discounting factors. The difference in the value of the same sum of money in two different periods is determined by the discount factor. The discount rate is also the cost of capital and is the preferred rate of returns on investments. As such it is the farmer's opportunity cost.

The formula used to discounted future streams of benefits and costs to their present value is mathematically given as:

$$V = \frac{R_1}{1+r} + \frac{R_2}{(1+r)^2} + \dots + \frac{R_n}{(1+r)^n} + \frac{S_n}{(1+r)^n} \quad 3.1$$

where V = present value of the investment

R<sub>i</sub> = net cash flow after discounting in year i

n = life of the Asset

s = salvage value of the asset in the terminal year, n

r = after tax rate of return of capital

The discounted cash flow of sugarcane at different rates in contracted and non - contracted farms will be worked out and used to test the formulated hypotheses.

In the study area, a typical farm has three main crop enterprises; tobacco, a pure maize stand or maize intercropped with beans, and sugarcane which may be on contract or non-contract. Tobacco is grown on contract basis with British American Tobacco Company Limited while maize and non-contracted cane are produced mostly using the farmer's own resources. Thus tobacco, maize and non-contract cane compete with contract cane for the limited farm resources. The gross margins for these alternative crops were obtained and compared with those of contracted cane. While data for the gross margin analyses of contracted and non-contracted cane were generated from the field survey, those for tobacco and maize were obtained from secondary sources.

### 3.3.3. The Comparison of Two Sample Means

Two populations means (of contracted and non contracted farms in this case) are compared by forming their difference. A reasonable point estimate of this is the difference in sample means. The theory behind the distribution of the difference of two population means,  $\mu_1 - \mu_2$ , is based on the fact that if the two population means are normal and independently distributed, then their sample distribution,  $X_1 - X_2$  is also normal with sample and population means being equal i.e.:

(3.2)

$$\bar{X}_1 - \bar{X}_2 = \mu_1 - \mu_2$$

The estimated standard error of the difference between two sample means whose variances are unequal and unknown is given as follows:

$$S_{\bar{X}_1 - \bar{X}_2} = \sqrt{\left(\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}\right)} \quad (3.3)$$

The confidence interval is then given by

$$\mu_1 - \mu_2 = (\bar{X}_1 - \bar{X}_2) \pm t (\sigma_{\bar{X}_1 - \bar{X}_2}) \quad (3.4)$$

If  $\bar{x}_1 - \bar{x}_2$  differs significantly from 0, the hypothesized value for  $\mu_1 - \mu_2$ , the null hypothesis is rejected and the alternative hypothesis accepted.

A statistical test using the student t - statistic will be employed to evaluate the differences between the means of the two data sets. The t - statistic is derived as follows:

$$t = \frac{\bar{X}_c - \bar{X}_{nc}}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \quad (3.5)$$

Where: t = t - statistic

$\bar{X}_c - \bar{X}_{nc}$  = differences in mean costs per hectare for the two sample groups of non-contracted and contracted farms respectively

S1 = Standard error of contracted farms mean costs per hectare

S2 = standard error of non-contract farms' mean costs per

hectare

$n_1$  = sample size of contract farms

$n_2$  = sample size of non-contract farms

In order to carry out the test of this hypothesis, the mean costs of contracted plant cane and the first ratoon crop production and marketing per hectare will be calculated for each zone .

A null hypothesis formulated is that there is no differences between the means of contracted and non-contracted farms, that is,

$$H_0: \bar{X}_n = \bar{X}_{nc} \quad \Rightarrow \quad \bar{X}_n - \bar{X}_{nc} = 0 \quad (3.6)$$

against the alternative hypothesis that the pair of means under comparison were not equal.

$$H_A: \bar{X}_n \neq \bar{X}_{nc} \quad \Rightarrow \quad \bar{X}_n - \bar{X}_{nc} \neq 0 \quad (3.7)$$

To evaluate whether the differences in the two means are significant at 0.05 level of significance, the costs data will be worked out and plugged into the t - statistic formula to obtain the results.

## CHAPTER FOUR

### 4.0 RESULTS OF THE STUDY

In this chapter, the results from the analysis of survey data on contracted and non - contracted cane production and marketing systems are presented and discussed. The chapter describes and traces the various activities and inputs used in the process of cane production and marketing operations from the farm level to the sugar factory gate in the two systems of sugarcane production. The chapter ends up with the testing of the stated hypotheses.

#### 4.1 The Average Costs of Sugarcane Farming

##### 4.1.1 The Process of Sugarcane Production

To grasp the costs associated with sugarcane production and marketing, it is necessary to trace the processes and activities involved. The process involves a number of mechanized operations right from the beginning until the crop is established, monitored continuously upto maturity and harvested. The operations are analysed below:

##### 4.1.2 The Process and Costs of Land Preparation

The first operation is the mechanical preparation of a good seedbed which is necessary for cane production. Where virgin land is involved, costly capital investment in the form of  $D_5$ ,  $D_6$  and  $D_7$  crawler tractors are used for bush clearing, destumping, land levelling and grading. Depending on the sizes of the trees and bushes as well as landscape, the use of heavy earth - moving machinery is normally unavoidable. However, where the tasks are



lighter, lower - cost machinery or even hand operations are used. The soil is opened up by one round of deep ploughing and two rounds of light ploughing followed by harrowing to produce a suitable soil tilth. After this, the field is furrowed to make appropriate beds for seedcane.

Land preparation is achieved in contracted farms through the use of heavy machinery such as the D<sub>5</sub>, D<sub>6</sub> and D<sub>7</sub> crawler tractors with cultivators and subsoilers. Also used are the conventional wheel tractors with light ploughs and harrows. Among the interviewed contracted farmers, all had used company machinery for this operation. However, the main problem among the contracted farms is the competition for company-owned machinery at land preparation period such that growers must often wait until the Sugar Company has completed its own land preparation before accessing the equipment.

The non-contract farmers on the other hand employed a variety of means to execute this farm operation. They used tractors and ox-ploughs which were either hired or owned. The proportions which used the various methods among the surveyed farmers are presented in Table 4.1 :

Table 4.1: Sources of Machinery/Implements Used for Land Preparation at SONY in Contracted and Non- Contracted Farms (%)

Source of Machinery	Farm Category	
	Contracted	Non-Contracted
Own machinery	0	10
Sugar Company machinery	100	2
Hired Machinery	0	12
Own oxen	0	5
Hired oxen	0	20

Source: Author's Field Survey - 1987

Table 4.1 shows that 24 percent of the non-contracted farmers had used machinery while the remaining 76 percent had employed ox-ploughs for the farm level operation. The company machinery seems to be inaccessible to the non-contracted farmers and the proportion which had used it also happened to be employees in management ranks of SONY SUGAR Project.

Land preparation charges are based on per hectare basis and during the survey it was estimated at an average of Kshs. 8,609.70 per hectare in contract farms. On average the non - contracted farms registered a mean land preparation cost of Kshs. 1,400.00 per hectare which is almost one sixth of the contracted group (Table 4.2). This arises from the fact that the non - contract farmers can make their own decisions on land preparation and can

go for cheaper alternatives. Contracted farmers on the other hand cannot make decisions on when and how to plough and harrow. They cannot even decide what implement or machinery to use in the activity because the sugar company executes the operation for them according to the contractual terms.

Bush clearing is another operation undertaken during land preparation. As provided in the contract, this activity is executed by the sugar company on all contracted farms using their machinery. Presently the operation is charged on a per hour basis and stands at Kshs 869.00 per tractor hour which on average amounts of Kshs.3,476.00 per hectare excluding interest.

Non- contracted farmers on the other hand use a combination of the conventional wheeled tractors with lighter ploughs and harrows as well use jembes, pangas and axes for the same operation. They therefore register a lower land preparation and bush clearing cost per hectare as compared to the contracted group. Table 4.2 shows the average cost of land preparation and bush clearing per hectare among the contracted and non contracted farms. As Table 4.2 indicates, the average cost of preparing non - contracted land per hectare is almost one sixth of what the contracted plots incur.

Table 4.2: Average Land Preparation and Bush Clearing Costs per Hectare Among Contracted and Non - Contracted Farms atSONY ( Kshs.)

Farm Category	Activity		
	Land Preparation	Bush Clearing	Total Cost
Contracted	8,609.70	3,476.00	12,085.70
Non-Contracted	1,400.00	305.00	1,705.00

Source: Author's Field Survey, 1987.

The differences between the costs incurred on the contracted and non contracted farms is attributed to the source, type of machinery and implements used for these two operations. On contracted farms, the machinery used include the huge and expensive D<sub>5</sub>, D<sub>6</sub> and D<sub>7</sub> crawler tractors with heavy cultivators and subsoilers from the sugar Company's fleet. Evidence gathered during this study indicates that even in some cases where contract farms have their own tractors, the Company does not allow them to be used for land preparation. No technical rationale could be obtained for this ban on using one's own machinery on contracted farms. Again as shown in Table 4.2, none of these farmers used other sources of machinery for this operation apart from the company's while the non-contracted farms had mainly used oxen. Interviewed contracted farmers were of the opinion that should they be allowed a free hand in land preparation, (commonly referred to by the interviewees as "self development"), they would opt for either privately hired machinery or oxen as practiced by the non - contracted farmers. They therefore are of the view that

contracted machinery charges are excessively higher. Further, they were of the view that if farmers were allowed or encouraged to perform as many cane operations as possible on their own without the sugar company's intervention, the cost of land preparation could be much lower.

#### 4.1.3 The Process and Costs of Seedcane Procurement

There are three sources of seed cane for farmers at the sugar scheme. The first two are the specially managed nucleus and contracted seed cane nursery farms. All contracted farmers must only use seed cane from these two sources as stipulated in the contract agreement. The SONY SUGAR Project records show that the dominant cane seed variety supplied to farmers is the C0421 which is said to be resistant to the diseases that affect the other varieties like C0467 and C0775. The third source which is only for the non-contracted farms is either the farmer's own plot or neighbour's plots. Seedcane sufficient to plant one hectare is obtained at an average cost of KShs. 205.00. While the "setts" are obtained by cutting a full length sugarcane plant in contracted farming, some non-contracted farmers use even the tops of harvested cane as seed which often results in poor yields.

Apart from the cost incurred when seed cane is obtained from neighbours' plots, non - contracted farmers rarely incur any transportation cost for seed cane. For the contracted group however, seed cane is first transported to the factory's weigh bridge from the nucleus estate or contracted seed cane nursery

for weighing. It is then transported to the farmer's plot. The cost incurred in this transfer of seed cane from nurseries to the factory and then to the farms is passed on to the farmer as an additional cost.

During the survey, cases of delayed planting were observed in contracted farms with heaps of seed cane dumped at the farmer's plot with no planting activity taking place. The result of such delays is poor germination which can result in the need for gapping, a process which requires more seed cane material and labour. Thus, higher costs are unnecessarily incurred by some contracted farmers. Table 4.3 shows by zone the average cost farmers incur per hectare in obtaining seedcane material.

Table 4.3 Average Seed Cane Cost per Hectare for Contracted Farms and Non - Contracted Farms (Kshs).

1. <u>Contracted Farms</u>	Zone A	Zone B	Zone C	Zone D
a) Seed cane material cost	4,350.30	4,350.30	4,350.30	4,350.30
(b) Transportation cost of seed cane	94.05	106.50	118.50	129.00
(c) Interest at 15 %	666.65	668.50	670.30	671.90
d) Total cost of contracted seed cane	5,111.00	5,125.30	5,139.10	5,151.20
2. <u>Non-Contracted Farms</u>				
(a) Seedcane material cost	205.20	225.40	222.60	215.80
(b) Transportation cost	0.00	0.00	0.00	0.00
(c) Total cost of Non-contracted seed cane	205.20	225.40	222.60	215.80

Source: Author's Field Survey - 1987

As shown in Table 4.3, contracted farmers were supplied with seedcane from SONY SUGAR. The rate the company billed the farmers for supplying them with 8 tonnes per hectare was over Kshs 5,111.00 in all the zones. Thus seed cane alone costs approximately over Kshs. 638.80 per tonne in all the zones. Indeed this is over 87 percent higher than the price paid for mature millable cane which is presently fixed at Kshs 341 per tonne. The rationale for this phenomena is that seed cane from the company nurseries undergoes elaborate treatments before being released to the farmers. It is maintained and nursed for 14 months at the nucleus estate and on some special contracted seed cane nurseries. Before being released to the farmers, it is heat-treated and dipped into disinfectants for protection against pests and diseases. All these added costs are passed on to the farmers. This perhaps explains why it costs the contracted farmer twenty times more to obtain seed cane material than the non-contracted one. The non-contracted farmers on average spend only Kshs. 205.60 on seed cane per Hectare.

#### 4.1.4 The Processes and Costs of Planting and Weeding

Planting and weeding are normally done by hired labour on contract farms. The casual labourers are paid by the company once a job completion certificate is presented to the company. However, if local labour is not available for hire, the sugar company labour force is requested. In both cases, the costs of planting and weeding are footed by the company but billed to the respective

farmer to be deducted from his or her harvest proceeds. During the survey, the average cost of planting seed cane on contracted farms was Kshs 482.00 per hectare. The sugar company recommends that plant cane must be weeded at least six times before harvest. Weeding, on the other hand, is recommended only four times for the first ratoon crop. Thus the average cost of weeding billed to the farmer for plant cane is Kshs 2,332.20 per hectare while the figure decreases to Kshs 1,732.20 for the first ratoon crop. These costs exclude the interest charged at 15 percent for credit offered.

On non-contracted farms, family labour is used to a large extent. Extra labour is also hired on a measured piece meal work basis and the payment rate for the job depends on the number of rows/lines of sugarcane planted or weeded. Oxen or manual labour is the major type of hired labour in these farms. This labour is given a task to accomplish and payments are prompt daily. Non-contracted farmers interviewed asserted that the prompt payment has acted as an added incentive to the workers. In contracted farms, hired casual labourers wait for a period to have their payments processed by the company. As the measured piece work is easier to understand to the workers, many of them tend to prefer to work on non-contracted farms. During the survey, the payment rates in non-contracted farms were kshs 5.00 per 100 metre -line (row) of cane weeded or planted. On average the costs of planting and weeding one hectare of cane on non-contract farms was Kshs 327.10 and Kshs 1,043.60 respectively for plant cane. On



average non - contracted plant and the first ratoon crops were weeded four times each.

#### 4.1.5 The Process and Costs of Fertilizer Application

Sugarcane requires potassic, nitrogenous and phosphatic fertilizers but field trials conducted by SONY SUGAR's agronomy section indicate no significant response to potash fertilizer applications (Agronomy Reports, SONY SUGAR:1987). Hence, nitrogenous fertilizers in the form of urea and diammonium phosphate (DAP) remain the most widely used fertilizers in the Project area. The recommended rates of application are 150 kg of DAP at planting time and 150 kg of urea for top dressing per hectare three to five months later. Contracted farmers do not make decisions on when to apply the fertilizers. They have to wait for the company's advice and delivery of the input at their farms. Moreover, all of them obtained this farm input from the sugar company on credit.

The non-contracted farmers obtained the input from two sources. These were the local fertilizer dealers at a nearby market centre of Migori and the contracted farmers through parallel fertilizer marketing system. A majority of the non-contracted farmers (54 percent) used this system to obtain the input.

On average the non-contracted farmers used 0.9 bags or 45 kg of DAP on plant cane alone at a cost of Kshs 388.00 per hectare. In the contracted group, the level of fertilizer use in plant cane was five bags or 450 kg at an average cost of Kshs 1,966.00. The latter cost, however, includes interest charges levied on

fertilizer supplied on credit to the contract farmers.

In the first ratoon crop, non-contracted farmers slightly improved on the level of fertilizer use and applied 1.2 bags or 60 kg at an average cost of Kshs 465.00 per hectare. The contracted group used an average of 4 bags (200 kg) at a cost of Kshs 1,124.00 per hectare in the first ratoon crop. The slight improvement in the use of fertilizers on non-contracted farms in the first ratoon crop may be attributed to perhaps good incomes realized from the sale of plant cane .

#### 4.1.6 The Processes and Costs of Harvesting and Transportation

Mature millable cane is only determined at the scheme by age and not the sucrose content. The company keeps records of contracted plots but none on the non-contracted ones. Hence the latter experiences difficulties in convincing the company that their cane crops have matured. Scientific and modern means of identifying maturity have not been devised by the company. Non contract cane also present a variety of problems for the sugar company. Many of these arise from the difficulty of coordinating the production and deliveries of many farmers so as to ensure an optimal flow of cane. Besides, there is a lengthy procedure of accepting cane from non - contracted farms. This is the opportunity cost of not contracting and results in over-mature cane and the crop cycle is unnecessarily extended on non-contract farms.

Harvesting of cane is done manually with pangas/matchetes and the operation is labour intensive. The rates of cutting cane are

set by the Kenya Sugar Authority. Presently the rate stands at Kshs 25.95 per tonne. Poor yields below standards set by the sugar company are however, penalized by harvesting at double the normal rates. The company argues that poor yields or stunted cane needs a lot of effort and time to harvest. As casual labourers are paid on a per tonne basis, they tend to refuse to harvest such stunted cane until the farmer accepts to pay a higher rate. The earnings accrued to farmers get depressed heavily under such circumstances.

Although burning of cane to be harvested is an established normal procedure at the company's nucleus estate, accidental burning is penalized on outgrowers' farms by farmers being paid at a half the producer price. This is because it interferes with the company's harvesting programme in that burnt cane must be crushed before the expiry of 48 hours in order to get quality sugar.

All the contracted farms cane is harvested by company labour or company appointed contractors. One peculiar aspect of the harvesting labour is that the contracted farmer is left with the responsibility of housing and feeding them on his homestead until they have completed harvesting his/ her plot. In the non-contracted farms, harvesting is done by either using family or company labour. In most cases, this group of farmers use local organized labour such as church groups. Alternatively, these farmers organize themselves into groups to harvest their own plots in rotation in order to reduce the cost of harvesting from their

respective bills. Payments are immediate, unlike company labour where casual labourers are paid by the company after some delay. In the non - contracted group, 48 percent of the farmers had harvested the crop on their own.

No standard mode of cane transportation exists in the scheme. It can be done using lorries or tractors owned by the farmers, the company or private transporters licensed by Sugar Company. Most transport is in the form of tractor drawn trailers. However, the majority of transport is owned by the company. Most farmers indicated a wish to invest their cane earnings in the purchase of transport facilities. It appears that ownership of transportation facilities could be a well paying business at SONY SUGAR. Presently, 26 people are registered with the Sugar Company as harvesting and transportation contractors. The rates of cane transportation are fixed by the Government and reviewed from time to time. At the time of this study, the transportation rates stood as shown in Table 4.4:

Table 4.4 Sugarcane Transportation Rates per Zone  
(Kshs /Tonne)

Zone Designation	Distance from the Factory In KM	Transportation Charge
A	0 - 10	63.00
B	11 - 16	71.00
C	17 - 24	79.00
D	25 - 32	87.00

Source: South Nyanza Sugar Company Records - 1987

The rates differ from zone to zone and are reviewed from time to time. All contracted farmers had cane transported from their farms by the sugar company or its licensed contractors. The non - contracted ones either made their own transport arrangements or used company transportation .

#### 4.2 The Fixed Costs of Sugarcane Farming

A longstanding and still unresolved problem of farm business management is how to determine fixed costs of production for individual commodities on a multi enterprise farm. This is because most farm units are not large enough to be compartmentalized into specialized production units, each with its own complement of labour, machinery and other capital inputs. Among the fixed costs of sugarcane production and marketing include those of rent and wages for permanent labour, interest on loans, depreciation of machinery, equipment and buildings, maintenance and repairs of the same, insurance and taxes. Each of these elements of fixed cost is examined below:

##### 4.2.1 Rent charges

Land can be rented on an annual or seasonal basis. It can also be leased for a period of more than one year. In both cases, land is controlled by a method other than ownership. Leasing provides the renter use rights to the land without acquiring ownership or title. Within the general alternatives of renting, /leasing are several options of land control with the common ones being either cash lease or crop shares.

The only rent prevalent and applicable in cane farming at SONY SUGAR, is that of cash land leases. With the cash lease agreement, a fixed price per acre is negotiated for payment to the landowner from the tenant for his use of that land tract for a period long enough to complete a full crop cycle of three harvests. The fixed fee is binding between the two parties irrespective of yields or prices received but ideally, it should be based on the soil type and topography, the size, duration of the contract and previous uses.

Among the contracted farms, 8 farmers had leased land of various hectarages at a total cost of kshs 23,080.00, thus giving an average cost of Kshs 2885.00 per hectare. The land rates were going at about Kshs 2,500 per hectare and the transaction had to be approved by an assistant chief and the sugarcane representative of that sublocation. Similarly, 5 non - contract farms had leased about 11 hectares of land at a total cost of Kshs 14,000.

#### 4.2.2 Interest Charges

Sugarcane establishment and marketing needs a lot of money by local standards. The average cost of producing and marketing contracted cane from one hectare in all the zones is over Kshs.20,000. Very few farmers have such kind of financial resource outlays to penetrate into cane production. They therefore have to source funds from external sources. Indeed, access to credit proved to be an important motivation for farmers in signing cane production contracts with SONY SUGAR. The contract itself makes

provision for credit from the sugar Company, with repayments deducted from the farmers' proceeds when cane is harvested.

Presently, there are no financial institutions set up specifically for the sugarcane farmers in the project area. However, two institutions have been established in the area for general and agricultural businesses. These are the Kenya Commercial Bank (KCB) and the Agricultural Finance Corporation (AFC). The two institutions are owned by the Government of Kenya and were not established especially for sugarcane farmers. During the survey, only four contracted and three non - contracted farmers had been provided with credit from AFC. Due to the absence of other lending institutions to the sugarcane farmers, the sugar company has been acting like a lending institution and extending credit to the contracted farmers. The sugar company issued 92 percent of the contracted farmers with credit for cane production while 8 percent obtained credit from AFC. Thus all contracted farmers had obtained credit of some sort for cane production and marketing .

The credit is advanced to the contracted farmers in kind via the provision of farm inputs and other cane operations such as land preparation, fertilizers, seedcane, planting, weeding, harvesting and transportation of cane to the factory and extension services. Although there could be delays in processing due to inefficiency, the credit is supposed to be disbursed automatically once the farmers enter into contract with the sugar company.

The Sugar company, on the other hand, obtains financing from the government and commercial banks, which it presently advances to

the farmers at an interest rate of 15 percent per annum. The principal and interest are recovered from the farmer's proceeds when cane is harvested and sold to the sugar company. AFC recovers its loan from the proceeds of cane as well by using the sugar company as the recovery agent.

The total interest on loans for contracted plant and first ratoon crop operations is Kshs 3675.70 and Kshs 702.20 respectively.

Currently, the whole credit for plant cane is recovered by deducting plant cane proceeds. Ideally, it should be spreading evenly throughout the three payments for plant cane, first and second ratoon crops.

#### 4.2.3 Machinery and Equipment Charges

The most important machinery and equipment at SONY SUGAR included tractors and implements, victory oxen ploughs and harnesses, hoes, axes, carts and pangas / machetes, all part of fixed capital used for land preparation. On contract farms, all machinery and implements used for cane operations were rented from SONY SUGAR at an average cost of Kshs 12,085.70 per hectare while it was Kshs 1,705.00 for non - contract farms.

#### 4.2.4 Insurance Charges

There are several risks and uncertainties associated with sugarcane farming which ought to be insured against. Cases of uncontrolled burning of several acres of immature sugarcane by arson were very common but unfortunately, no evidence of crop insurance was available during the study.



Table 4.5 Total Cost of Cane Production and Marketing Per Hectare at SONY (Kshs)

	Zone A	Zone B	Zone C	Zone D	Average
<u>Contracted Plant Cane</u>					
Variable Costs	22890.25	23518.70	24062.70	24909.20	23845.20
Fixed Costs	18646.40	18646.40	18646.40	18646.40	18646.40
Total Costs	41536.65	42164.10	42709.10	43555.60	41499.60
<u>Non-Contracted Plant Cane</u>					
Variable Costs	11,622.20	11,682.25	11,972.80	12,522.20	
Fixed Costs	3587.20	3587.20	3587.20	3587.20	
Total Costs	15209.40	15269.45	15560.00	16109.40	
<u>Contracted First Ratoon</u>					
Variable Costs	7,353.20	9,881.80	10,343.80	11,069.20	
Fixed Costs	4,505.00	4,505.00	4,505.00	4,505.00	
Total Costs	11858.20	14386.80	14848.00	15574.20	
<u>Non-Contracted First Ratoon</u>					
Variable Costs	6,290.10	6,690.15	7,040.75	7,590.10	
Fixed Costs	2800.00	2800.00	2800.00	2800.00	
Total Costs	9090.10	9490.15	9840.15	10390.10	

Source : Survey Results -1987.

#### 4.4 The Sugarcane Yield Performance in the Project Area

Sugarcane is a semi permanent crop which is normally harvested at least three times before uprooting to plant a new sugarcane crop. The first sugarcane crop is known as plant cane. The subsequent crops, before uprooting, are known as the first ratoon crop and the second ratoon crop, respectively. While plant cane matures in between 22 to 24 months, the ratoon crop matures in a period of between 18 to 24 months. Under a good level of management, sugarcane yield potentials can be achieved and thus it can also be a very well paying enterprise at the current producer price of Kshs 341.00 per tonne. However, both the contracted and non-contracted farms realize low yields per hectare .

Some indication of the real yield potential of well managed cane can be obtained from the analysis of the yield performance achieved in SONY SUGAR's nucleus estate field trials. Plant cane and the first ratoon crop output average 155.4 and 116.4 tonnes per hectare respectively. However, these levels of production are on a research basis and indeed, a likelihood exists that they may never be achieved on a commercial scale.

Table 4.6 shows the commercial yields per hectare obtained in the nucleus estate and on the contracted farms from 1979 to 1986. At the commercial scale, yields per hectare on both the estate and contracted farms, have declined steadily from the first harvest in 1979.

Table 4.6: Commercial Yields of SONY's Nucleus Estate and the Contracted Farms - 1979 - 1986 (Ton/Ha)

Year	1979	1980	1981	1982	1983	1984	1985	1986
Nucleus plant								
cane	170.4	135.9	127.1	101.2	107.4	68.7	70.8	72.4
Nucleus first								
Ratoon	N/A	81.5	74.9	93.0	67.3	66.5	62.1	N/A
Contracted								
Plant cane	131.5	107.0	127.6	88.8	90.6	72.6	69.6	71.2
Contracted first								
Ratoon	N/A	99.1	68.2	56.8	50.7	36.8	55.9	54.7

Source: South Nyanza Sugar Company Records - 1987  
N/A - Not Available

As Table 4.6 reveals, yield performance has been declining since inception of the project. This is attributed to the effects of cultivation of marginal lands. This is because many farmers are reluctant to use the best portion of their land for cane. For the company's nucleus estate, it could be attributed to the decline of husbandry and management standards. The yield performance of nucleus estate, the contracted and non-contracted farms are much lower than those achieved in agronomy field trials at the project. For comparative purposes, yields performance analysis as registered in contract and non-contract farms during the survey are presented in Table 4.7.

Table 4.7: Comparative Mean Sugarcane Yields in Contracted and Non-Contracted Farms in Tonnes per Hectare

Farm Category	Crop Cycle			
	Plant Cane		First Ratoon Crop	
	Mean	S.E	Mean	S.E
Contracted	75.86	12.94	50.49	6.77
Non-Contracted	66.92	9.49	49.87	5.47

Source: Author's Survey Data - 1987

Table 4.7 shows that the yields realized on farmers plots are one half of the actual yields realized in the company's field agronomy trials. This could be attributed to low agronomic and cultural standards, poor seed material and management. The mean plant cane yield realized in contracted farms survey was 75.86 tonnes per hectare which decreased to 50.49 for the first ratoon crop. Non-contract farms registered even lower yields than the contract farms. For these farmers, mean plant cane yield was 66.92 tonnes per hectare while it was 49.87 tonnes for the first ratoon crop.

#### 4.5 The Income Generating Potential of Sugarcane Farming

The income potential of a farm enterprise is normally analysed on the basis of gross margins which are arrived at by deducting the variable costs of production and marketing from the gross value of output. Government controlled prices or market prices are employed to value output. The variable costs are on the other hand are

#### 4.2.5 Statutory Taxes and levies Charges

Locally manufactured sugar is subjected to indirect taxation by the Government at the rate of kshs 1000.00 per tonne. At the rate of extraction of 10 tonnes of sugarcane to one tonne of sugar, the rate of excise tax to the farmers is therefore kshs 10. 00 per tonne of sugarcane produced. This tax affects the contracted and non - contracted farmers equally.

#### 4.3 The Total Costs of Sugarcane Farming

The total costs of producing and marketing sugarcane per hectare in the contracted and non-contracted farms is summed up in Table 4.5. As table 4.5 indicates, the total costs of sugarcane farming increases progressively from the actual distance a farmer is placed from the factory. This is because while the fixed costs are standard in all the zones, transportation costs increase with distance from the factory and is the major cause of divergence from zone to zone.

defined to include the costs of: land preparation, seeds, planting, weeding, fertilizers, pesticides, harvesting and transportation of farm produce to where they are marketed.

The gross margins per hectare were calculated for plant cane and the first ratoon crops in order to facilitate the comparison of the income generating potential of contracted and non-contracted sugarcane farming. In this study, the gross margins considered were for only plant cane and the first ratoon crop in each of the two systems of cane farming.

This arose from the fact that during the field survey, data was only available for plant cane and the first ratoon crop in the non - contracted sugarcane farms. The gross values of sugarcane and the associated variable costs of production and marketing contracted plant cane and the first ratoon crop are presented in Tables 4.8 and Table 4.9 respectively. Their gross margins are on the other hand summarized in Table 4.12. For the purposes of comparison, the gross values of sugarcane and the associated variable costs of production and marketing costs for non - contracted plant cane and the first ratoon crop are also presented in Tables 4.10 and 4.11 respectively. Table 4.12 on the other hand, summarizes the gross margins obtained per zone for each farming system at SONY SUGAR. The gross margins obtained differ from zone to zone due to the differnt rates levied for transportation of harvested cane.

Table 4.8  
The Gross Value and the Associated Variable Costs of Operating One Hectare of Contracted Plant Cane

REVENUE						
Yield	Unit	Price per Unit		Gross Revenue		
76	tonne	341		25916		
VARIABLE COSTS						
Input Item	Quantity	Rate of Charge	Total amount Charged	Loan Period (Months)	Interest at 15% Per Year	Total Cost
Surveying	1 Ha	150 /Ha	150	22	41.25	919.25
Bush Clearing	4 Hrs	896/HR	3476	24	1042.8	4518.25
Ploughing	1 Ha	1424/HR	1424	23	409.4	1822.8
Furrowing	1 ha	425.25/HA	425	22	983.3	4350.3
Seed cane	8 tons	426.25/Ton	3412	22	983.3	4350.3
Planting	15MDS	33.31/ MD	482	22	132.55	614.55
1st weeding	13MDS	33.31/MD	433.05	21	113.7	564.75
2nd weeding	13MDS	33.31/MD	433.05	20	108.25	541.25
1st oxen weeding	1 HA	300/HA	300	19	71.25	341.25
3rd weeding	13MDS	33.31/MD	433.05	18	97.45	530.5
2nd oxen weeding	1 HA	300/HA	300	17	63.75	363.75
4th weeding	13MDS	33.31/MD	433.05	16	86.6	519.7
DAP (3 BAGS)	150 KGS	286/BAG	858	22	236.25	1095.2
Urea ( 2 BAGS)	100 KGS	168/BAG	336	18	75.6	411.6
Fertilizing	2MDS	33.31/MD	66.6	20	16.65	83.25
Harvesting	76 TONS	25.95/TON	1972.2			1972.2
Transportation Zone A	76 TON	63/TON	4780			4780
Transportation Zone B	76 TONS	71/TON	5396			5396
Transportation Zone C	76 TONS	78/TON	5928			5928
Transportation Zone D	76 TONS	89/TON	6764			6764
SONY Administration Levy	76 TONS	3/TON	228			228
SOC Levy	76 TONS	3.95/TON	300.2			300.2
TOTAL VARIABLE COSTS		Zone A	Zone B	Zone C	Zone D	
		22890.25	23518.7	24062.7	24909.2	

Source: Survey Results : SONY SUGAR – 1987

Table 4.9  
The Gross Value and Associated Variable costs of Operating One Hectare of Contracted First Ratoon Croc

REVENUE MEAN YIELD 50	UNIT TONNE	PRICE PER UNIT 341	GROSS REVENUE (KSHS) 17050				
<b>VARIABLE COSTS</b>							
INPUT ITEM	UNIT	QUANTITY	RATE OF CHARGE	TOTAL AMOUNT CHARGED	LOAN PERIOD (MONTHS)	INTEREST AT 15 %	TOTAL ITEM COST
Trash lining & Chopping	MD	10	33.31	333.1	18	74.95	408.05
1st Oxen Weeding	HA	1	300	18	18	67.5	367.5
Fertilizer (DAP)	BAG	3	286	858	18	193.05	1051.05
Fertilizer (Urea)	BAG	2	168	336	13	54.6	396
1 st Weeding	MDS	15	33.31	499.65	16	99.95	599.6
2 nd Weeding	MDS	13	33.31	433.05	15	81.2	514.25
3rd Weeding	MDS	14	33.31	466.35	14	81.6	1095.2
2nd Oxen Weeding	HA	1	300	300	13	48.75	348.75
Harvesting	TON	50	25.95	1712			1712
Transportation Zone A	TON	50	63	3150			3150
Transportation Zone B	TON	50	71	3550			3550
Transportation Zone C	TON	50	78	3900			3900
Transportation Zone D	TON	50	89	4450			4450
SONY Administration Levy	TON	50	3	150			150
SOC Levy	TON	50	3.95	197.5			197.5
<b>TOTAL VARIABLE COSTS</b>	<b>ZONE A</b>	<b>ZONE B</b>	<b>ZONE C</b>	<b>ZONE D</b>			
	11222.25	11622.35	11972.25	12522.25			

Source: Survey Results at SONY SUGAR - 1987



Table 4.10

The Gross Value and Associated Variable Costs of Operating One Hectare of Non - Contracted Plant Cane

REVENUE

Yield 66	Unit tonne	Price per Unit 341	Gross Revenue 22506
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VARIABLE COSTS

Input Item	Quantity	Rate of Charge	Total amount Charged		
Land Preparation	1 HA	1389 /HA	1389		
Seed cane	8 TONS	15.6/TON	205.6		
Planting	15MDS	21.8/ MD	327.1		
Gapping	1.4 MDS	21.8/MD	30.2		
Weeding	48MDS	21.8 /MD	1042.6		
DAP (1 BAG)	50 KGS	250/BAG	250		
Urea ( 1 BAG)	50 KGS	138/BAG	138		
Fertilizing	1MD	21.8/MD	21.8		
Harvesting	66 TONS	25.95/TON	1713		
Transportation Zone A	66 TONS	63/TON	4158		
Transportation Zone B	66 TONS	71/TON	4686		
Transportation Zone C	66 TONS	78/TON	5148		
Transportation Zone D	66 TONS	89/TON	5874		
SONY Administration Levy	66 TONS	3/TON	189		
Total Variable Costs		Zone A	Zone B	Zone C	Zone D
		9454.3	9992.3	10454.3	11180.3

Source: Survey Data from SONY SUGAR Outgrowers - 1987

Table 4.11

The Gross value and Associated Variable Costs of Operating One Hectare of Non- Contracted First Ratoon Crop

REVENUE	UNIT	PRICE	GROSS REVENUE		
MEAN YIELD/HA		PER UNIT	(KSHS)		
50	TONNE	341	17050		
VARIABLE COSTS					
INPUT	UNIT	QUANTITY	RATE	TOTAL	TOTAL
ITEM			OF	AMOUNT	ITEM
			CHARGE	CHARGED	COST
Trash lining & Chopping	MD	10	33.31	333.1	333.1
1st Oxen Weeding	HA	1	300	300	300
Fertilizer (DAP)	bag	2	387.5	775	775
Fertilizer (Urea)	bag	1	168	168	168
1 st Weeding	MDS	15	33.31	499.65	499.65
1 st Oxen Weeding	HA	1	300	300	300
2nd Weeding	MDS	14	33.31	466.35	466.65
2nd Oxen Weeding	HA	1	300	300	300
Harvesting	TON	50	25.95	1712	1712
Transportation Zone A	TON	50	63	3150	3150
Transportation Zone B	TON	50	71	3550	3550
Transportation Zone C	TON	50	78	3900	3900
Transportation Zone D	TON	50	89	4450	4450
SONY Administration Levy	TON	50	3	150	150
TOTAL VARIABLE COSTS	ZONE A	ZONE B	ZONE C	ZONE D	
	6290.1	6670.1	7070.1	7590.1	

Source : Survey Data - 1987

Table 4.12 : Summary of Gross Margins of Sugarcane Farming in Contracted and Non contracted Farms (Kshs/Ha)

Zone	A	B	C	D	Average
Contracted Plant Cane	3025.8	2397.3	1853.3	1006.8	2070.8
Contracted First Ratoon	5827.3	5427.3	5055.8	4527.3	5209.3
Non Contracted Plant Cane	13041.7	12603.7	12051.7	11325.7	12255.7
Non Contracted First Ratoon	10759.9	10379.9	9979.9	9459.9	10144.9

Source: Author's computation from Survey Results - 1987

Tables 4.8, 4.9, 4.10, 4.11 and 4.12, indicate the income potential in terms of gross margins that can be obtained from the operation of one hectare of contracted plant cane and the first ratoon crop in each system of cane farming.

The contracted farmer's average output is 75.86 and 50.49 tonnes per hectare for plant cane and the first ratoon crop respectively. This type of farmer realizes gross margins ranging from Kshs 45.75 to Kshs 137.50 per hectare per month for those in zones A to D respectively, from the plant crop. During this period the labour requirements on plant cane averages 236.4 man-days per hectare. For the first ratoon crop, which has an average gestation period

18 months, and requires an average of 64.5 man-days, the gross margin per hectare per month improves to an average range of Kshs 251.50 to Kshs 323.75 for farms in zones A to D respectively. Although the yields realized for ratoon crops are much lower, the higher gross margin of the first ratoon crop mainly stem from the fact that some plant cane operations such as bush clearing, surveying, ploughing, harrowing, furrowing and planting are only performed once and are not repeated for the subsequent ratoon crops. In the ratoon crops, the variable costs are reduced to merely those of crop maintenance and marketing.

The non contracted farmers average output per hectare is 66.0 and 50.0 tonnes for plant cane and the first ratoon crop respectively. The tables indicates that the respective gross margins per hectare per month average Kshs 560.90 and Kshs 563.10 for plant cane and the first ratoon crop. Thus the gross margins of non-contract farms for both plant and first ratoon crops are, when compared with those of contracted farms almost double in the case of the first ratoon crop and nearly six times for plant cane.

The labour requirements on non-contracted plant cane average 115 man-days over the same 22 months period of the crop cycle. Comparatively, contracted plant cane labour requirement at 236.4 man-days is double that of non - contracted cane. A rational farmer would therefore be expected to prefer non - contracted cane production if he was short of labour. However, the situation is complex because the contract stipulates that the company may provide labour in case of shortages. Thus, where a household

labour problem is envisaged to occur, there may be stiff competition to join the contracted scheme.

In summary, Table 4.12 indicates that the total variable costs differ from zone to zone due to the different rates harvested sugarcane is charged for transportation. The luckiest farmer falls in zone A while the unlucky one falls in zone D.

Table 4.12 also shows that the gross margins per hectare ranges from kshs 1006.80 for plant cane farms in zone D to kshs 3025.80 for plant cane farms in zone A. On average farmers in zone D get 33.3 percent lower gross margins than farmers in Zone A. Farmers in Zones B and C obtain 22 % and 13 % lower gross margins than those in Zone A of plant cane farmers. The same pattern is repeated for contracted and non contract farms in other zones. This is an indication that distance from the factory gate is a significant factor in influencing the gross margins that farmers can obtain from sugarcane farming .

However, sugarcane is a semi - perennial plant in that a complete crop cycle involves at least three harvests of plant cane, the first and second ratoon crops. Plant cane alone takes a minimum gestation period of 24 months while the two ratoons take an average of 18 months each. Hence the annual crops case of summing up the gross margins from plant cane, the first and second ratoon crops and then dividing it by the average number of years of the crop cycle to arrive at an annualized gross value can not be applied here.

Therefore, the gross margin analysis applicable to annual crops

cannot be applied to sugarcane. This is because the time when income is obtained from sugarcane determines how valuable the benefit is to the farmer. Also investment opportunities generally take a long time to start yielding streams of benefits. Hence, while the bulk of investment costs for sugarcane are incurred upto planting time, however, the first stream of income occurs 24 months later. The returns to cane are therefore accrued in lumpsum and far ahead in the future after 24, 42 and 60 months for plant cane, first ratoon and second ratoon crops respectively. Hence the value of streams of benefits in form of gross margins must be standardized to provide a proper basis for comparison of the income generating capacity of the two systems. This has been achieved by reducing the streams of benefits to their present worth or value using the discounting principle. This is a process of calculating the present value of a sum of money due some time in the future. The present value of future cash flows differ depending on rate of discounting factors employed e.g 20 % or 10 %. The discounting principle is based on the fact that in economic and financial analyses of agricultural projects, the changing value of money over time must be considered.

The difference in the value of the same sum of money in two different periods is determined by the discount factor.

The discounted cashflow of sugarcane gross margins at 15% discount rate in contracted and non-contracted farms has been worked out and is presented in the Table 4.13

Table 4.13 Discounted Cash Flow of Sugarcane at 15 %  
Discount Rates in Contracted and Non Contracted  
Farms

Contracted Farms					
Year.	1	2	3	4	5
15 % DF	0.869	0.756	0.658	0.572	0.497
Discounted Gross Margin at 15 % DF	0	1565	0	2980	
Non - Contracted Farms					
Year.	1	2	3	4	5
15 % DF	0.869	0.756	0.658	0.572	0.497
Discounted Gross Margin Value at 15 % DF	0	9266	0	5803	0

Source: Author's computation from Survey Results - 1987

From Table 4.13, it is shown that the discounted mean gross margins per hectare for contracted and the non - contracted plant cane farms is Kshs 1565.00 and Kshs 96266.00 respectively at 15 % discounting factor.

#### 4.6 The Contracted Farmers' Welfare

An agro-processing firm can use more than one method to obtain raw materials for processing. It can procure them from either her nucleus farms or contract farmers to grow on their behalf or obtain them from the open market purchases. The second option is the source of contract farming executed via entering into a contract . The contract is legal document drawn up between the sugarcane farmer and the sugar company after negotiations. It contains provisions stipulating and clearly spelling out the roles and obligations of the respective parties involved in the contract. Thus the contract was analysed for shortcomings and violations on the assumption that the contract was not mutually beneficial but exploitative following complaints by farmers that they were helpless in dealing with the other party, the Sugar company. Most contracted farmers interviewed about the contract were of the opinion that the company could be earning more than their fair shares out of the contract. The situation is even worse considering that many of the contracted farmers have little or no formal education. As the study found out, about 58 percent of those sampled had either basic education or none at all. This may imply that most of the farmers were not making informed rational choices when they were entering into contract with the sugar company. Table 4.14 contains a summary of responses obtained when farmers were asked specific issues about the contract agreement and its execution.



It is only rational that two parties negotiating a contract should let each side know the contents of the package before it is sealed. That 88 percent of the farmers were not aware of what they were going in for implies that they were not making a rational choice to enter into cane production on contract basis. Thus one party (sugar company) could take advantage of the farmers' ignorance and manipulate them in an exploitative manner. The end result is that farmers may end up not benefiting from the contracted sugarcane farming when commercial charges are strictly enforced by the sugar company. During the survey, it was found that what the farmers who enter into contract without knowing its contents sign is a one page text. The rest of the pages in the document are left behind with the sugar company. In several cases, they were issued to the farmer one year later after signing the contract.

Table 4.14: The Contracted Farmers' Views on the Contractual  
Terms (%)

	No. of Farmers	Percentage
Farmer read contract terms before signing the Contract Document	6	12
Farmer collected Contract manual after entering Contract with Company	44	88
Farmer understood implications and consequences of Contract	34	68
Farmer satisfied with modalities of contract operation	39	78
Farmer will renew contract upon its expiry	31	62
Farmer not paid for cane within month after delivery	46	92

Source: Author's Field Survey - 1987

The study could not establish whether this was deliberate. However, what was equally strange was the revelation as shown in Table 4.14 that although 88 percent of the farmers had not read the contract document before signing it, majority of them, 68 percent, indicated that they understood the implications and consequences of entering into contract with the sugar company. This was attributed to the widely spread local information network about contract farming of sugarcane in the scheme. In fact most

farmers knew what their neighbours had earned from sugarcane in any given harvest. It was therefore not surprising to note that 62 percent indicated that they will renew the contract upon its expiry.

A closer examination of the contract operation reveals a list of violations of the contract by the sugar company. Quite a good number of the farmers registered dissatisfaction with the manner the contract was executed mainly through violations.

For instance there is the provision in the contract that the Sugar company shall

"pay to the outgrower the value of the outgrower's cane at the designated price within 30 days of its delivery at the factory. From such a payment the company shall be entitled to deduct all sums due from the outgrower to the company including but not limited to the costs billed to the contracted farmer". This provision is almost always abused by the sugar company.

During the survey, 92 percent of the farmers were paid more than two months being behind schedule. Furthermore, deductions such as frequent forced contributions towards community projects by the Provincial Administration and Sugar company at fixed rates per farmer were very common from their proceeds. Indeed, under such loopholes, the farmer becomes helpless in dealing with the sugar company.

In its wording, the contract is written in such a way that the company absolves itself of all the responsibilities and leaves the risks to be borne by the farmer. For instance, the provision quoted below perhaps needs an advocate to interpret it to the

"If the performance of this Agreement or any part thereof shall become impossible of performance by either party due to force majeure the party in default shall not be responsible to the other party for such non-performance and, without prejudice to the generality to the other term, the following events shall for the purpose of this Agreement fall within the meaning of the term "force majeure": fire and/or explosion at the factory, flood, earthquake, tempest, war, civil commotion, riot, arson, sabotage of labour strikes, lockouts or other industrial disputes, transport or equipment, shortage of supplies, fuel, power, non availability of shipping space or railway services, inability to effect delivery of sugar produce or to transport sugarcane because of road conditions and any other causes beyond the control of the parties hereto or such that no reasonable measure of vigilance on the part of the parties hereto or their agents could have prevented".

Hence provisions such as the above one were not drawn up by the farmers although the company employs them to come up with all sorts of reasons not be blamed in the course of not performing their part of the contract. The results show that the contractual arrangements at SONY SUGAR increasingly exposes the contracted farmers to risks.

On the other hand, non - contracted cane farmers would have liked to dispose off their crop to the higher paying jaggeries if this practice was not officially banned. Thus their only outlet also remains to be the white sugar company. But the process of non-contracted cane being accepted for harvest is long and tedious. Moreover, the farmers are not assured that payments will not be delayed for cane delivered to the factory due to the fact that the 30 days interval between delivery and payments in the contract does not cover them.

Also debt is a problem with crops which have long lead times before the first harvest such as cane where the growers may have to wait for more than 24 months to earn any revenue. Loans are necessary to carry the farmer over this period and high levels of indebtedness can sometimes occur and accumulate. Faced with such a dilemma, most non-contracted farmers without any other outlay of

finances to meet immediate basic needs such as school fees sell their crop while still standing on their farms to sugarcane merchants in the area. These merchants consist of businessmen who after the deal take title to the plot and the sugarcane crop on it until it is harvested and transported to the sugar factory. During the transaction the initial plot owner is paid on the spot.

The trader then processes the harvesting and transportation of the cane to the factory alleging that it belongs to his plot. This behaviour on the part of non-contracted farmers was very prevalent in the area during the study period. However, farmers' participation in such a parallel market may be viewed as a last resort after several frustrations from the suhar company. Similarly, it could appear that the sugarcane traders earn good margins to survive in this business and perhaps the loser may be the farmer.

#### 4.7 HYPOTHESIS TESTING

The three hypotheses formulated under this study were tested in this section.

The first hypothesis stated that " there is no significant difference in cane yields between the contracted and non-contracted farms against an alternative hypothesis that there is a significant difference in cane yields between the two systems of cane production at SONY SUGAR " .

The yield potential of well managed cane farms obtained from the analysis of the yield performance achieved in SONY SUGAR's nucleus estate field trials indicates that plant cane and the first ratoon crop output averages 155.4 and 116.4 tonnes per hectare respectively. However, these levels of production are on a research basis and indeed, a likelihood exists that they may never be achieved on a commercial scale.

The mean plant cane yield realized in contracted plant cane farms survey was 75.86 tonnes per hectare which decreased to 50.49 tonnes for the first ratoon crop. Non-contract farms registered even lower yields than the contract farms. For these farmers, mean plant cane yield was 66.92 tonnes per hectare while it was 49.87 for the first ratoon crop.

The mean yields achieved for contracted ( $\bar{X}_c$ ) and the non-contracted ( $\bar{X}_{nc}$ ) systems of sugarcane production respectively

were determined and used to test the first hypothesis using the difference between two means methodology. i.e.  $H_0: \bar{x}_1 - \bar{x}_2 = 0$  against the alternative hypothesis

$$H_A: \bar{x}_1 - \bar{x}_2 \neq 0$$

To test the first hypothesis, statistical significance tests were performed using the formula for the comparison of two means. Data obtained from two independent samples as presented in Table 4.7 was used and the results of hypothesis testing are presented in Table 4.15:

Table 4.15: Results of the Analysis of Mean Sugarcane Yields in Contracted and Non-Contracted Farms

Farm Category	Crop Cycle			
	Plant Cane		First Ratoon Crop	
	Mean	S.E	Mean	S.E
Contracted	75.86	12.94	50.49	6.77
Non-Contracted	66.92	9.49	49.87	5.47
Z - Calc.		3.72		2.5
z - Tab .		1.98		1.98

Source: Author's Survey Data - 1987

The analysis of the survey data shows that the calculated z- values are 3.72 for plant cane and 2.5 for the first ratoon crop respectively while tabulated z-value was 1.98 in both cases at 95% confidence level. Thus there is a difference between the

yields obtained in contracted and non-contracted plant cane.

On average then, plant cane yield performance was observed to be higher in contracted farms than on the non-contracted ones. This was the expected considering that these farmers are supposed to be adequately supplied with inputs and other services relating to sugarcane production. However, their performance is still below the technical potential achieved in the company's field trials in both plant and the first ratoon crops.

The dismal performance of contracted farmers vis-a-vis that of the company field trials could be attributed to fact that the plots currently allocated to cane are the least fertile and suitable portions of their farms. The initial objective of the sugar company was to contract the farmer's best portion of the farm for sugarcane production. However, this policy has met with a lot of local resistance as the same fertile part is normally set aside for subsistence crops particularly maize. As the problem of cane procurement and excess capacity continue to persistently plague the factory, even marginal plots are now contracted and the most suitable portions left for the farmers' subsistence crops. Not much cane can be realized from this change of policy in the selection of cane plots. This negligence on the part of the company means that the yield performance will continue to remain poor on contracted farmers' plots. The sugar company should encourage the contracted farmers to aim at higher yields than the present ones. Presently, any farmer who shows minimum interest to be contracted is automatically recruited even on marginal land as a result of



persistent cane shortage faced by the factory.

The low yields in farmers' plots may also be attributed to other factors. These include the varieties of cane grown and the level of management. All contracted farmers planted company approved varieties which are assumed to have been specifically bred for higher yields and a shorter maturation period besides being resistant to pests, disease, waterlogging and droughts. The non-contracted farmers use the locally available varieties which have not been tested for any of the above traits.

Further evidence gathered during this study suggest that the other cause of poor yields on the contract farms arises from the contract agreement. It diminishes the control by farmers over their land and decisions on all aspects of cane farming. The contract Agreement covers input, operational and marketing decisions such that the farmer's freedom on these are curtailed. Thus, it could be argued that in contracted farms the sugar company acts as the manager. The company is quite specific on the kind of product they want from the farmer and stipulate stringent control over him. One could safely argue that the company's management is poor and largely responsible for the poor yields in contracted farms. It was initially thought that the farmers' formal level of education could be used as a useful guide to assess the managerial ability of cane producers. However, a closer examination of the contract reveals that farm management is shifted from the contracted farmers' hands into those of the sugar company. Indeed, from the moment the contract is sealed the

farmer loses effective control over what can be done at his farm. Thus the decision making power is relinquished to the company under the contract such that the farmer is made to buy and plant a seed cane variety chosen by the company, supplied with fertilizer prescribed by the same company and forced to adhere to very rigorous procedures in producing the crop. Perhaps this is explained by the fact that 58 percent of the sampled contracted farmers had only basic or no formal education at all, thus rendering them vulnerable to manipulations by the sugar company.

The second hypothesis stated that "no significant difference exists between contracted and non-contracted farms in the unit cost of producing and marketing sugarcane per hectare".

The 1984 - 88 South Nyanza District Development Plan reports that many contracted farmers feel that they are cheated as they believe they are weak in bargaining and negotiating for the contract on equal terms with SONY SUGAR. They therefore have difficulties in accepting that the contract is beneficial and the income obtained is a reasonable representation of what they could get under market forces. They dispute several inputs related deductions made from their gross receipts which makes most of them fail to repay cane - related expenses as well as meet their financial obligations. As a result of distrusting the company, the contracted producers keep their own records of accounts and transactions and explore other lower cost alternatives of inputs needed to produce cane other than company supplies. Many of the contracted farmers feel that the costs of sugarcane production and marketing per hectare are much

lower than those which the sugar company charges them for the various farm-level operations and recovers from their gross cane receipts. Furthermore, they are suspicious that the costs of the cane operations are inflated and claim that the company may be over pricing inputs or perhaps using them beyond their optimal economic levels.

The non - contracted farmers on the other hand manage their farms without the intervention of the sugar company and are accordingly expected to incur lower production and marketing costs per hectare than the contracted ones.

Against this background, the costs of all the sugarcane operations were summed up separately for contracted and non-contracted farms and used to test the second hypothesis using the difference of two means methodology.

A null hypothesis was formulated that there is no differences in the average costs of production and marketing sugarcane between the contracted and non-contracted farms, that is,

$$H_0: \bar{X}_n = \bar{X}_{nc} \quad \Leftrightarrow \quad \bar{X}_n - \bar{X}_{nc} = 0 \quad (4.0)$$

against the alternative hypothesis that the pair of means under comparison were not equal.

$$H_A: \bar{X}_n \neq \bar{X}_{nc} \quad \Leftrightarrow \quad \bar{X}_n - \bar{X}_{nc} \neq 0 \quad (4.1)$$

The t - statistic is employed to evaluate the differences between

the two sample means. The t - statistic is derived as follows:

$$t = \frac{\bar{X}_c - \bar{X}_{nc}}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \quad (4.2)$$

Where: t = t - statistic

$\bar{X}_c - \bar{X}_{nc}$  = differences in average costs per hectare for

the two sample groups of non-contracted and contracted farms respectively

$S_1$  = Standard error of contracted farms mean costs per hectare

$S_2$  = standard error of non-contract farms' mean costs per hectare

$n_1$  = sample size of contract farms

$n_2$  = sample size of non-contract farms

In order to carry out the test of this hypothesis, the mean costs of contracted plant cane and the first ratoon crop production and marketing per hectare were calculated for each zone.

To evaluate whether the differences in means are significant at 0.05 level of significance, the costs data earlier worked out were plugged into the above t - statistic formula with the results tabulated in Table 4.16 below:

Table 4.16: Evaluation of Mean Production Costs per Hectare

Zone A    Zone B    Zone C    Zone D    Average

<u>Contracted Plant Cane</u>					
X <sub>1</sub> (kshs)	41536.65	42164.10	42709.10	43555.60	41499.0
n <sub>1</sub>	22	12	10	6	
S <sub>1</sub> (kshs)	3051	2670	3420	335	
<u>Non-Contracted Plant Cane</u>					
X <sub>2</sub> (kshs)	11,622.20	11,682.25	11,972.80	12,522.20	
n <sub>2</sub>	13	17	14	6	
S <sub>2</sub> (kshs)	2151	2055	2129	208	
t-cal.	12.63	12.95	27.79	27.7	
t-tab	1.31	1.314	2.81	3.3	
<u>Contracted First Ratoon</u>					
X <sub>1</sub> (kshs)	7,353.20	9,881.80	10,343.80	11,069.20	
n <sub>1</sub>	22	12	10	6	
S <sub>1</sub> (Kshs)	2086	2660	2072	2015	
<u>Non-Contracted First Ratoon</u>					
X <sub>2</sub> (kshs)	6,290.10	6,690.15	7,040.75	7,590.1	
n <sub>2</sub>	13	17	14	6	
S <sub>2</sub> (Kshs)	2153	2751	2435	2003	
t-cal	7.26	6.332	7.009	6.006	
t-tab	1.310	1.314	1.321	1.372	

Source: Author's computation from field survey - 1987

In all cases, the t-calculated values exceed the tabulated t-values at 0.05 level of significance. Therefore, the null hypotheses are rejected and the alternative hypotheses are accepted. Accordingly, the average costs of producing and marketing plant cane and the first ratoon crop per hectare are accepted to be higher on contracted farms than on non-contracted ones.

Contracted farmers incur higher average costs of production and marketing cane than the non contract ones for a variety of reasons. First is that cane production technology prescribed for contract farmers and charges for it are excessive and not sustainable. Mechanized cane production should therefore be re-examined with the view of reducing the cost burden on sugarcane farmers. The charges for machinery should be based on the soil types and not on cubic capacities of the machinery specifically used for land preparation. It is therefore recommended that SONY SUGAR should set up a Research and Development (R & D) unit to look for a production technology which would make it more profitable for contract farmers to produce and market cane. As it stands now, the returns to contracted sugarcane farmers are almost completely eroded by sugarcane production and marketing costs. In fact, it is even more profitable for contracted farmers to lease land out for five years rather than to grow sugarcane on it. As a result of the prescribed technology, the returns per hectare of contract plant cane are completely eroded by the costs of production and marketing which on average consume 101.3, 103.7, 105.2 and 110.2 percent of the gross value of plant cane per hectare in zones A,

B, C and D respectively. The same input items took on average of 69.4, 70.3, 73.1 and 77.5 percent of the gross value of plant cane in zones A, B, C and D respectively of non - contract plant cane farms. It is therefore evident that the project has reduced contracted outgrowers' incomes. However, this reduction cannot go too far or the outgrowers may return to their pre - contract farming system. However most outgrowers can not quit as they are locked into the new crop by debts from plant cane.

Of the various operations in sugarcane farming at the project area, the land preparation item constitutes the most important element which on average accounted for 39.1 and 7.5 percent of contracted and non-contracted plant cane values respectively. This is because the sugar company which carries out land preparation for the contracted farms relies exclusively on the indiscriminate use of heavy forms of machinery like the D<sub>5</sub>, D<sub>6</sub> and D<sub>7</sub> crawlers. The non-contract farmers on the other hand prepare their land extensively by use of own oxen equipment.

Although harvesting costs are uniform in all the zones in both systems of farming at SONY, transportation, however, seems to be the second most important cost element. It accounts on average for 18.4, 20.4, 22.4 and 25.4 percent of the gross value of plant cane in zones A, B, C and D respectively for both systems of farming. Thus the distance from the sugar factory is a very important factor in cost considerations and contributes highly to the depression of the farmers' gross margin in the cane enterprises.

Seedcane is another very important cost item which excluding its

transportation cost was by 1987 charged to contracted farmers at the rate of Kshs 407.30 per tonne. This input item takes 17.4 and 0.9 percent of the gross value of contracted and non - contracted plant cane respectively. The mean cost of obtaining contracted seedcane was about Kshs.560.00 per tonne. The only operations that the contract agreement allows farmers to perform on their own include planting, weeding and fertilizer application. These three activities together take up an average of 13.6 and 3.2 percent of the gross value of contracted and non-contracted plant cane respectively. If the contract could allow and encourage farmers to perform the above three activities on their own, their costs of production and marketing may decrease.

3) The third hypothesis is that "there are no significant differences between gross margins per hectare achieved by the contracted farms and those of the non-contracted ones at the SONY SUGAR project".

To facilitate the comparison of whether differences exist in the income generating potential of contracted and non - contracted cane farms, gross margins analysis was employed.

However, the gross margins analysis method has limitations which must be considered when applying it to analyse a farm business. First, gross margin of an enterprise is not necessarily an indication of its profitability as it is only an aspect of an enterprise. Many other items and factors are involved before the



ultimate profitability is declared. Second, confusion and misinterpretation may easily occur unless an insight into exactly how the figures used in gross margin analysis were calculated. For instance, two farmers at the SONY SUGAR may be in the same system of cane production, plant the same cane hectarage, use the same inputs at the same market or company prices, realize the same yield but one of them uses permanent labour while the other employs casual labour. The former's gross margin will be much higher than that of the latter even if the man-days and wage rates were the same. This is because permanent labour is not a variable cost item and is therefore excluded from the gross margin calculation.

Third, gross margin analysis is strictly confined to defined cost areas. It does not take account of the changes that may occur in the fixed cost structure of a farm in the future. It is therefore dangerous to assume in farm planning that all fixed costs will remain constant since some of them will undoubtedly alter and become variable cost and thus affect gross margin, more so when major changes of policy are being considered. Indeed output and costs alter with the scale of an enterprise. Thus an enterprise may not be able to maintain its gross margin per hectare as it expands or contracts. In addition, output and costs change with weather, soil condition and management.

Forth, increasing the hectarage of sugarcane by, for instance, thrice may well increase the gross margins by the same factor, but profits will not necessarily increase by the same factor. This is

because variable costs may rise in greater proportion than gross margin. In fact, Norman cautions that profit is not proportional to gross margin.

Fifth, gross margin analysis has a valuation problem in that it makes no allowance for the various farm complementary inter-relationships between the cane enterprise and others. For instance, from a sugarcane crop, a farmer may obtain fodder for livestock feeding.

Sixth, gross margin analysis gives no immediate guide as to whether attention should be directed towards changing the farm system or towards improvement in the efficiency of the production of the current combination of enterprises. For this, it may require some form of programme planning and examination of the production functions both of which are outside the scope of this study to determine whether the present system can be improved upon and to determine the overall efficiency of production in the system.

Finally, the gross margin analysis procedure gives no guide to which should come first, between restructuring of the system combination of enterprises or improvement of efficiency of each enterprise in the existing mix of enterprises.

Thus, in this study, the gross margin per hectare from plant cane and the first ratoon crop were obtained from the two groups of producers at the scheme and used to test the third hypothesis. However, during the field survey, data for the full crop cycle in non-contracted sugarcane farms was not available. Hence for the

purpose of comparison, the gross margin analysis investigated in the present study only involved plant cane and the first ratoon crop in each system of cane production. The gross margins of contracted and non contracted plant cane have been presented in Tables 4.8 and Table 4.9 respectively, while those of contracted and non contracted first ratoon crops were also presented in Tables 4.10 to 4.11 respectively.

However, sugarcane is a semi - perennial plant in that a complete crop cycle involves at least three harvests of plant cane, the first and second ratoon crops. Plant cane alone takes a minimum gestation period of 24 months while the two ratoons take an average of 18 months each. Hence the annual crops case of summing up the gross margins from plant cane, the first and second ratoon crops and then dividing it by the average number of years of the crop cycle to arrive at an annualized gross value can not be applied here. Therefore, the gross margin analysis applicable to annual crops cannot be applied to sugarcane. This is because the time when income is obtained from sugarcane determines how valuable the benefit is to the farmer. Also investment opportunities generally take a long time to start yielding streams of benefits. Hence, while the bulk of investment costs for sugarcane are incurred upto planting time, however, the first stream of income occurs 24 months later. The returns to cane are therefore accrued in lumpsum and far ahead in the future after 24, 42 and 60 months for plant cane, first ratoon and second ratoon crops respectively. Hence the value of streams of benefits in form of gross margins must be

standardized to provide a proper basis for comparison of the income generating capacity of the two systems. This has been achieved by reducing the streams of benefits to their present worth or value using the discounting principle. This is a process of calculating the present value of a sum of money due some time in the future. The present value of future cash flows differ depending on rate of discounting factors employed e.g 20 % or 10 %. The discounting principle is based on the fact that in economic and financial analyses of agricultural projects, the changing value of money over time must be considered.

The difference in the value of the same sum of money in two different periods is determined by the discount factor.

The discounted cash flow of sugarcane gross margins at 15% discount rate in contracted and non-contracted farms has been worked out and was presented in the Table 4.12.

The figure of 15 % has been chosen because it was the interest rate the farmers were charged by the sugar company for credit.

From Table 4.12 it is shown that the undiscounted average gross margins per hectare for contracted ( $\bar{X}_c$ ) and the non-contracted ( $\bar{X}_{nc}$ )

plant cane farms were Kshs. 2,070.80 and Kshs.12,255.70 respectively. When discounted at 15 %, the mean gross margins per hectare for contracted ( $\bar{X}_c$ ) and the non-contracted ( $\bar{X}_{nc}$ )

plant cane farms dropped to Kshs. 1,565.00 and Kshs.9,266.00

respectively. There would therefore seem from the gross margin analysis that there are marked differences between the two sets of producers' gross margins. In order to evaluate whether the differences between the two gross margins are significant, the third hypothesis was tested at 0.01 level of significance. A null hypothesis was formulated that there are no differences between the two means of contracted and non-contracted farms, that is,

$$H_0: \bar{X}_n = \bar{X}_{nc} \quad \Leftrightarrow \quad \bar{X}_n - \bar{X}_{nc} = 0 \quad (4.3)$$

against the alternative hypothesis that the pair of means under comparison were not equal.

$$H_1: \bar{X}_n \neq \bar{X}_{nc} \quad \Leftrightarrow \quad \bar{X}_n - \bar{X}_{nc} \neq 0 \quad (4.4)$$

Sample data for the test and results are summarized in Table 4.17 below:

Table 4.17: Evaluation of Mean Gross Margins on Contracted and Non-Contracted Plant Cane

$n_1 = 50$	$x_c = 2,070.80$	$S_1 = 1,819.23$
$n_2 = 50$	$x_{nc} = 12,255.70$	$S_2 = 2,130.30$
-----		
Z.- cal	: 2.88	
Z - tab	: 2.58	

Source: Author's computation from survey data.

At a level of significance of 0.01 and substituting into the formula for Z we obtain:

$$Z = \frac{12,255.70 - 2,070.80}{\sqrt{\frac{(2,130.30)^2}{50} + \frac{(1,819.23)^2}{50}}} = 2.88 \quad (4-5)$$

From the above analysis, it is established that the calculated Z-value exceeds the tabulated one. The null hypothesis is therefore rejected and accordingly the alternative one is accepted. Thus, it is concluded that there is a significant difference between the mean gross margins earned per hectare among contracted and non- contracted plant cane farms.

With the exception of labour, the contractual terms between the farmer and sugar company bind the latter to provide all inputs as a package for sugarcane production. Indeed contracted farmers have virtually everything done for them at full cost and are expected to

perform better in terms of gross margins than those not under the contract.

However, there are other several factors which contribute to the depression of the gross margins farmers expect from their cane enterprise. Among the operations which are not repeated for the subsequent ratoon crops, variable cost for land preparation is perhaps the most important item which eats into the gross value of contracted plant cane. On average, the land preparation cost on non-contracted farms is much lower than that on contracted farms, accounting for only 6.3 percent of the gross value of plant cane as opposed to 39.2 percent on the contracted farms. This difference is brought about by the fact that through the contract, contracted farms virtually become the rented property of the SONY SUGAR and hence lose control over the management of their cane farms. They cannot make any decisions on the least cost options of executing the various farm-level operations including land preparation. It is not surprising therefore that contracted farmers exhibit a higher cost of land preparation than non-contracted farmers who have not relegated their farms to the company and thus make every decision on their own.

On the basis of the gross margin analysis above, a rational farmer will not go in for contracted cane production but will rather switch to more competitive and higher rewarding non-contracted cane growing or try any other enterprise with an apparent equivalent competitiveness in the study area.

Contracted and non - contracted cane compete with maize as a

major traditional food and cash crop. More recently, tobacco production has become very popular and together with maize, they pose a very serious threat in competition for the limited resources of production in the study area. However, as will be shown in the analysis of the Contract Agreement, some of the farmers are producing cane by default while others may be doing it for prestige.

Tobacco, on the other hand is also grown in the project area as a cash crop on contract with B.A.T. Oyugi (1984) estimated the gross margin of tobacco per hectare per month to range from KShs. 778.10 to KShs. 2,739.00. Moreover, it is a quicker paying enterprise whose gestation period is only six months. Incomes from the sugarcane enterprise are obtained after every two years. Thus farmers will be better off growing tobacco in the area. Thus if gross margins per hectare are taken as an indication of profitability, then tobacco, improved maize, non-contracted and contracted cane production can be ranked in that descending order as far as the relative profitability of the enterprises are concerned.

Therefore in the two systems of cane production, non - contracted cane is more rewarding than contracted cane production at SONY. However, farmers in both systems would be better off if they produced tobacco instead of sugarcane. Interviewed contracted farmers lauded the non - contract system of cane production in terms of remuneration. Further evidence that the gross margins are too low for contracted farming adduced from a study by Odada



et. al. (op. cit.). The study found that the gross margin for plant cane in contracted farming were KShs.355, -309, -970 and -1554 per hectare in zones A, B, C and D respectively. The government explanation for the poor remuneration is that the cost of growing and processing sugarcane is too high and recommends that it must be reduced substantially if further investment in sugarcane production is considered (Sessional Paper No. 1, 1986 (op. cit.)). The recommendation if implemented will perhaps contribute to the elevation of the gross margin to the sugarcane farmers. It is however worth noting that the government itself is involved in the detailed designation of the prices that contract farmers are charged by the sugar company for the various farm level activities ranging from bush clearing to the transportation of cane to the factory. Even the producer price of cane is fixed. These rigid prescribed input and output prices are used in the gross margin analysis. The solution lies perhaps in the delinking of the sugar company from the sugarcane production , harvesting and transportation sectors so that the functions are taken over by the farmers through their farmer organizations such as sugarcane Farmers cooperatives or farmers outgrowers companies such as SOC. Without this move, there is no hope that the cost of growing sugarcane may be reduced substantially as the solution being sought lies elsewhere other than cane production and marketing costs reductions.

CHAPTER FIVE

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

This study has described and illustrated the diversity associated with contract farming systems, in the forms they take, the effects they have on participants, and their long term viability. This chapter draws some conclusions and policy recommendations about the issues analysed in this study.

The study had set out four objectives. These were first to undertake a review and assessment of the Kenyan sugar industry in general and in particular analyze the economic logic of contracted and non- contracted cane farming. Second, analyse the social impact on the rural community and the ways in which farmers have responded at SONY SUGAR Project. Thirdly, was to determine the unit cost of producing and marketing sugarcane in the two systems and, finally, was to compare the income generating capacity of contracted farms with those of the non-contract ones.

From the analyses and results presented, the following conclusions and recommendations may be drawn.

The first conclusion is that the cost of cane production technology prescribed for contract farmers seems excessive and not sustainable. The role of mechanized cane production should therefore be re-examined with the view of reducing the cost burden on sugarcane farmers. The charges for machinery should be based on the soil types and not on cubic capacities of the machinery specifically used for land preparation. It is therefore recommended that SONY SUGAR should set up a Research and Development (R & D)

unit to look for a production technology which would make it more profitable for contract farmers to produce and market cane. As it stands now, the returns to contracted sugarcane farmers are almost substantially eroded by sugarcane production and marketing costs. In fact, it is even more profitable for contracted farmers to lease land out for five years rather than to grow sugarcane on it.

The second conclusion is that, at the current producer price of Kshs 341.00 per tonne, the returns per hectare of contract plant cane are completely eroded by the costs of production and marketing which on average consumed 101.3, 103.7, 105.2 and 110.2 percent of the gross value of cane per hectare in zones A, B, C and D, respectively. The same input items took on average 69.4, 70.3, 73.1 and 77.5 percent of the gross value of plant cane in zones A, B, C and D, respectively of non - contract plant cane farms. It is, therefore, evident that the project has reduced contracted outgrower incomes. However, this reduction cannot go too far or the outgrower may return to his pre-contract farming system. However, most outgrowers can not quit as they are locked into the new crop by debts from plant cane.

The third conclusion is that the land preparation item constitutes the most important element, which, on average accounted for 39.1 and 7.5 percent of contracted and non-contracted plant cane values respectively. This is because the sugar company which carries out land preparation for the contracted farms relies exclusively on the indiscriminate use of heavy forms of heavy machinery like the D<sub>5</sub>, D<sub>6</sub> and D<sub>7</sub> crawlers. The non-contract farmers, on the other hand,

prepare their land extensively by use of own oxen equipment.

The other conclusion is that while the harvesting costs are uniform in all the zones in both systems of farming at SONY, transportation, however, seems to be the second most important cost element. It accounts, on average, for 18.4, 20.4, 22.4 and 25.4 percent of the gross value of plant cane in zones A, B, C and D, respectively, for both systems of farming. Thus the distance from the sugar factory is a very important factor in cost considerations and contributes highly to the depression of the farmers' gross margin in the cane enterprise.

Seedcane is another very important cost item which, excluding its transportation cost, was charged to contracted farmers at the rate of Kshs 407.30 per tonne. This input item took 17.4 and 0.9 percent of the gross value of contracted and non-contracted plant cane, respectively.

The mean cost of obtaining contracted seedcane was however about KShs.560.00 per tonne. The justification for seedcane to cost more than what mill cane is paid for in contract farms is that it undergoes elaborate treatment before being released to farmers. Cane seed is usually treated chemically for smuts and is cut while young so the owners are paid higher prices. The only sugarcane operations that the contract agreement allows farmers to perform on their own include planting, weeding and fertilizer application. These three activities together take up an average of 13.6 and 3.2 percent of the gross value of contracted and non-contracted plant cane respectively. If the contract could allow and encourage

farmers to perform the above three activities on their own, their net income may rise.

The other recommendation is that for any farmer who enters cane production on contract with the sugar company, a forward capital budget should be prepared by the company for the plot. This should highlight the expected returns and costs for the whole crop cycle. It is then hoped that the farmers making out a living in the deteriorating sugar scheme environment will no longer enter into cane production by default. This is because armed with information from the budget, if the farmer can understand it at all, the peasant may make a more rational choice. Moreover, the mirage of high income expectations will be erased once and for all when the full costs/returns implications of joining the outgrowers' scheme are understood by the farmers. The budget should include loan recovery schedules on the charges for services and material inputs rendered for cane production under contracted arrangements. This should be made in three evenly distributed payments over the whole production period spread out in a full crop cycle instead of the present policy of recovering the whole of it from the proceeds of plant cane alone. The loan and its recovery component should be well reflected in the sugarcane capital forward budget for each cane plot.

Non-contracted cane production should be recognized as a viable alternative in the scheme area. The analysis and results have shown that this system of cane farming is more rewarding to the farmers than the contracted system of cane production due to low

cost - low output systems. For instance, the average gross margin of Kshs 137.50 per hectare per month in all the zones of contracted plant cane farming is one fifth of the non-contracted one. The project should therefore accommodate and not condemn the non - contracted system as the current company policy seems to be doing. The company should also accept to purchase cane from these farmers as well as providing extension services to them. It is hoped that this system, if organized will constitute a reliable and consistent source of quality cane supply to the factory.

A scientific and modern means of identifying cane maturity should be devised by the company to assist in determining the age of non - contract cane.

Cane farmers who supply the project with sugarcane are paid on a per tonne basis for the cane delivered, irrespective of the cane's sucrose content. Since the company is in the business of manufacturing sugar and not bagasse, a good case is made that cane should be paid on its sucrose or quality content.

The Contract Agreement is written in English legalise and contains clauses, sub - clauses and sub - sub- clauses. It should be reviewed especially in terms of simplification and translation into Kiswahili or dholuo as it was found out in the analysis that only about 20 percent of the farmers are literate and capable of reading English. For those who opt to join the outgrowers' scheme, there should be adequate provision to ensure that they are conversant with the contractual terms including the meaning and benefits associated with this system of cane production. In particular,

the Sugarcane Agreement should be re - written with clarity of roles and obligations of each party spelt out. The loopholes as existing presently should be sealed such that no party is disadvantaged in the execution of the Agreement and that in the event of either party violating it, redress should be stipulated and arbitration initiated. The Agreement is heavily biased in favour of the sugar company, in that there is much about the consequences of a producer failing to carry out his duties and obligations under this agreement, but little about the penalties to be incurred if the sugar company defaults such as delays in payments.

It is interesting to note that there is nothing specifically allowing SONY SUGAR, as a matter of course, to charge interest on outstanding debts, although it is doing so.

In order to rekindle the enthusiasm that the SONY SUGAR pioneers contract farmers had initially, price incentives should be given to them. The two by-products obtained when sugarcane is converted into sugar, namely: baggasse and molasses are used by the company to generate some profit. The millers should use some of this profit to pay farmers some bonuses over and above the fixed producer prices. The company should not declare huge profits and dividends to the Government if farmers are making losses. Means of converting some of these profits and dividends declared to the Government should be investigated so that they are returned to the farmers as bonuses like it happens in other crops such as tea, pyrethrum and coffee in order to reflect the

importance of the farmer in the project.

The uniform guaranteed producer price per zone does not currently enable farmers to either offset fully their costs of participation or leave them with any reasonable returns to their resources committed to cane farming. Indeed, as the study has pointed out, cane producers require a different producer price in each zone to enable them enjoy some profits due to yield differentials and the different zonal transportation rates charged per tonne of cane. There is therefore a clear case for frequent review of these transportation rates.

Non-contracted farmers should organize themselves and form an association that can present their interests more effectively to the company. Currently, they are not represented and never receive any services from the association which caters for the contracted group.

Finally, farmers particularly those on contract should be encouraged to carry as many of the cane production operations as possible using family or casual labour. The Government as a key participant regulator in the project should play a major role in streamlining the farm operations to reward the farmers sufficiently.



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## Appendix I

## THE SOUTH NYANZA SUGAR COMPANY LIMITED

## OUTGROWERS' CANE AGREEMENT

THIS AGREEMENT is made the .... day of .... 19... BETWEEN The South Nyanza Sugar Company Limited a Company incorporated in the Republic of Kenya and having its Registered Office at Nairobi (hereinafter referred to as 'the Company' which expression shall where the context so admits include its successors in the Title and assigns) of the one part AND .....of .... the Registered Owner of Plot No. ....(hereinafter referred to as 'the plot') situated in the location of ... and sub-location of..... of the District .... of the said Republic (hereinafter referred to as 'Outgrower' which expression shall where the context so admits include his heirs successors in title and assigns) of the other part.

WHEREAS

The Company has been incorporated to own and operate a Sugar Factory at Awendo (hereinafter referred to as 'the Factory') aforesaid for the manufacture of mill white sugar and is desirous of purchasing sugar cane from the Outgrower and the desirous of growing sugar cane on the Plot for the purpose of selling it to the Company.

NOW THIS AGREEMENT WITNESSETH as follows:

1.This agreement shall come into force on and from the .. day of.... 19 .... and shall (unless previously determined in accordance with the provisions hereof) remain in force for a period of five years or until one plant and two ratoon crops of sugar cane are harvested on the Plot aforesaid whichever period shall be the less.

PROVIDED THAT the said period may be extended by the parties hereto for such a longer period as shall be mutually agreed subject to the terms

and conditions herein contained by a memorandum of extension and endorsed hereon.

2. Should the Outgrower decide to discontinue the growing of sugar cane on the Plot then he may terminate this Agreement by giving the Company two years written notice of his intention to do so.

PROVIDED however that such notice shall be effective only if the outgrower reimburses the Company in full within the said period of two years all monies owing to the Company in respect of services and materials received by him from the Company upto of such notice in accordance with the terms hereof.

3. If at anytime during the period of the Agreement or any extension hereof the Outgrower ceases to own control or operate the Plot for any reason whatsoever this Agreement shall be deemed terminated on the day following the day of completion of the then current harvest or at any subsequent date that may be decided by the company which shall not be later than the date of expiry of this Agreement or any extension hereof.

4. If either party hereto commit a breach of any term or terms of this Agreement and fails to remedy such breach within thirty (30) days from the receipt of a notice in writing to that effect given by the other party/the party serving such notice may by a further notice in writing and fully served upon the defaulting party terminate this agreement and the Agreement shall stand determined after completion of the then current harvest and delivery of cane therefrom.

PROVIDED always that if the Outgrower fails to clear the Plot for planting within three months of the date of commencement of this Agreement or within such further period as the Company may specify the Company shall be entitled to terminate the Agreement forthwith without giving any prior notice requiring the Outgrower to remedy such failure.

5. If at any time the Company is of the opinion that the sale proceeds of the next cane harvest of the Outgrower will be insufficient to reimburse the Company with

the monies then due to the Company from the Outgrower then and in that case the Company may immediately and without notice to the Outgrower suspend the supply of services and materials to the Outgrower until it is satisfied as to the reimbursement of the monies aforesaid.

5. The terminator of this Agreement shall not prejudice the rights already accrued to and/or the obligations already incurred by either party to the date of termination and shall not prejudice any claim and/or action for damages for breach of contract.

7. If the performance of this Agreement or any part thereof shall become impossible by either party due to force majeure the party in default shall not be responsible to the other party for such non-performance and without prejudice to the generality to the other term the following events shall for all purposes of this Agreement fall with the term 'Force Majeure' fire and/or explosion at the factory, earthquake, tempest war, civil commotion, riot, arson, sabotage of labour, strikes, lock-outs or other industrial disputes breakdown or damage to plant machinery transport or equipment shortage of supplies, fuel, power, non-availability of shipping space or railway services inability to effect delivery of sugar produced or to transport sugar cane because of road conditions and any other causes beyond the control of the parties hereto or such that no reasonable measure of vigilance on the part of the parties hereto or their agents could have prevented.

8. (a) The Company and the Outgrower hereby agree that Sony Outgrowers Company (hereinafter referred to as SOC) is established for the purpose of representing the interests of all outgrowers and co-ordinating such interest with the Company.

(b) The composition of the SOC Board shall be members comprising of four selected members by farmers, District Commissioner, Permanent Secretary, Ministry of Agriculture, Chief Executive (KSA), General Manager (SONY) and a financier.



9. Should the Government of Kenya at any time impose conditions or decrees which are inconsistent with the terms of this Agreement the parties hereto may modify such terms in such a manner as may be agreed or in the absence of such a manner as may be agreed or in the absence of such agreement between the parties the terms hereto shall be modified in such a manner as may be recommended by an independent body (Government appointed agency or Court of Law).

10. The Company shall:

(a) Purchase in each harvest period from the Outgrowers sugar cane in the quantities and the dates specified in writing from time to time to the outgrower in accordance with the terms thereof.

(b) Within the limits imposed by the condition of the roads provide and operate an efficient system of transport (as to which the Company shall be the sole judge) from the Plot to the factory.

PROVIDED THAT in the event that access to the Plot is economically impracticable with the Company's transport (as to which the Company shall be the sole judge) the transport of cane and cutting thereof shall not be the responsibility of the Company but the grower.

(c) Cause the Outgrower's cane to be weighed on arrival at the buying point which shall be the Factory gate or such other place that the Company may at its sole discretion designate and allow the Outgrower or his representative to check the weight maintain in duplicate a written or printed record of the weight of each load of cane delivered and give to the Outgrowers or his representative on the day of delivery one copy of such record (hereinafter referred to as 'the Certificate')

(d) Become the owner of the cane once it has issued to the Outgrower the Certificate.

(e) Have sole and absolute charge of all matters directly or indirectly associated

with the operation of its transport system and the transloading and weighing facilities at the said buying point.

(f) Have absolute charge and control of all equipment machinery, staff and labour concerned with the operations performed by the Company on the Plot PROVIDED THAT the Company shall exercise due care to ensure that the operational costs to be charged to the Outgrowers shall be kept at a reasonable level as to which the Company shall be the sole judge.

(g) Be entitled in the event that the outgrower does not prepare, plant and maintain the Plot and cane in accordance with Clause 11 hereof to carry out all of any such operations on the Plot which the Company shall consider necessary to ensure that the Outgrower's quota of cane satisfactory quality will be delivered on the due date in which case the Company shall further be entitled to deduct the cost of these extra operations from the payment to be made for the Outgrower's cane.

(h) charge interest on any credit that may be allowed by the Company to the Outgrower (such credit to be allowed in exceptional circumstances) at such rate as may from time to time be notified by the Company and be entitled to deduct such interest from the payment due to the Outgrower in respect of the first cane harvest from the Outgrower's land subsequent to the grant of the credit.

(i) Not to be bound by this contract to purchase from the Outgrower any cane which:

(i) has been burnt

(ii) is found by sampling to have a First Expressed Juice with an \_\_\_\_\_  
apparent purity below 80%

(iii) has been harvested by persons other than the Company or its agents. (iv) is not of a variety cultivated from seed cane supplied or approved in writing by the Company.

(v) has not been made available by the Outgrower to the Company on the due date.

(j) Be entitled to return to the Outgrower at the Outgrower's expense any cane rejected at the buying point under the terms of Clause 10 (i) above.

(k) If it agree to accept the burnt cane:

(i) Not be liable to pay for such cane until the time the cane would have been due for harvest under Clause 11 (h) .

(ii) Be titled to deduct a penalty of ten shillings per tonne (or such other amount as may from time to time be agreed) from the payment of such cane.

(l) Operate the Factory for sufficient period in each year to enable the Outgrower to supply all his cane to the Company under the terms of this contract.

PROVIDED THAT the Company may suspend the Factory operation at its discretion when it considers it advisable to do so because of weather conditions or because it requires to carry out maintenance replacelment or repair of its equipment and machinery.

(m) Notify the Ougrower directly through the District Administration of its intention two weeks before starting routine milling operations and one week before routine stopping.

(n) Pay to the Outgrower the value of the Outgrower's cane at the designated price within thirty (30) days of its delivery at the factory. From such payment the Comany shall be entitled to deduct all sums due from the Outgrower to the Company including but not limited to all costs and charges billed to the Outgrower by the Company in respect of land preparation and cultivation services, transport and any other services provided to the Outgrower by the Company or its agents or employees under the terms of this Agreement together with any interest payable under the terms of this Agreement the designated price referred to in this sub-clause shall be the price officially fixed by the Government of the said Republic.

(o) Be entitled to charge the Outgrower for all work, goods and services supplied

to the Outgrower by the Company in accordance with the Company's Schedule of Charges from time to time in force.

PROVIDED THAT

(i) the said charged shall at all times be calculated on the basis of the actual or estimated average cost including administrative or other overheads for the time being of providing the respect work, goods and services to all the contracted Outgrowers.

(ii) The Company shall notify all changes to the Outgrowers and to the Board at least 7 days before they are due to take effect.

1. The Outgrower shall: (a) Cultivate an area of ..... hectares of sugarcane on the Plot in accordance with the terms hereof and for this purpose clear such area for planting within 3 months from the date hereof and it is hereby further agreed that the area shown in this sub-clause is subject to amendment following the final survey carried out by the Company of the land to be cultivated

(b) Offer for harvest and transport by the Company all such cane as is derived from the Plot and no other

(c) Plant up the said area of ..... hectares of without delay as soon as he has received sugar cane which shall be supplied by the Company or its agents at the Plot or as near to the Plot as access conditions permit

(d) Not dispose of his cane or any interest therein to or through any other person without the written consent of the Company such consent to specify the tonnage of cane may be sold the terms on which the sale may take place and the destination of the cane

(e) Be responsible for the preparation of the said area of ..... hectares for the planting of cane, the application of fertilizers and other materials in accordance with the recommendations of the Company and the removal of weeds or other crops from

the said area

PROVIDED THAT if the Company so requires the Outgrower shall allow for all or any such work to be carried out at his cost by the Company and its agents or employees working in conjunction with the Outgrower

(f) Not plant or cultivate any variety of cane other than that supplied or approved of in writing by the Company; and further not to harvest or deliver or cause to be harvested or delivered to the Company any variety of cane other than cane herein before referred to

(g) Either attend himself or send a representative authorised in writing by him to the Factory to witness the cane at the time of delivery and to obtain from the Company, its agents or employees the Certificate showing the net weight of the cane delivered and accepted by the company

(h) Permit the Company or its agents or employees to harvest the Outgrower's cane and prepare all such cane for loading and transport and to load and transport such cane from within the Plot to the Factory in a manner and at the time to be determined by the Company and to deduct the cost of all these operations from the payment for the said cane

PROVIDED THAT in conducting these operations the Company will be responsible for ensuring that the cane is cut close to the ground and that care is taken to facilitate delivery of the Outgrower's cane to the factory in accordance with the terms of this Agreement

(i) At all times allow the Company to enter upon the Plot together with any vehicles equipment machinery or livestock which the Company in its sole discretion shall require and to pass and re-pass thereof as may be necessary.

(i) to inspect the Plot and the cane growing thereon

(ii) to sample the cane

(iii) to gain access to other Outgrower's land, including such construction of access tracks as may be required for the transportation of cane produced by the Outgrower or other Outgrowers and

(iv) to do anything required to be done by either party in terms hereof PROVIDED THAT should the Outgrower fail to facilitate the harvesting of his cane at the appointed time the Company shall be permitted to cut any portion and in such case, the Company will not be liable for any loss or damage suffered by the Outgrower.

PROVIDED ALSO that in exercise of these rights the Company shall take all reasonable care to minimise loss damage or inconvenience to the Outgrower

(j) Maintain his cane cultivation in a manner

which will enable a satisfactory yield to be achieved and for this purpose he shall:-

(i) each month over a period of seven onths in the case of plant cane and four months in the case of ratoon cane remove all weeds or other plants from the cane area;

(ii) Apply at the recommended time and in the recommended quantities all fertilizers and/or other materials recommended by the Company for application;

(iii) Undertake the planting and gapping of his cane area at the time recommended by the Company in order to ensure a high plant population, and (iv) apply all services and goods which he may have obtained from the Company solely for the benefit of his sugarcane crop and for no other purpose

PROVIDED THAT if the Company so requires the Outgrower shall allow all or any such works to be carried out at his cost by the Company and its agents or employees working in conjunction with the Outgrower;

(k) Within seven days of receipt of a written notification from the Company that such operations are necessary to achieve a satisfactory yield of cane allow

unimpeded access to the Company, its agent, employees and its equipment for the purpose of carrying out any or all operations which the Outgrower has failed to carry out or, in the opinion of the Company, is likely to fail to carry out.

PROVIDED THAT such notification shall have either been handed to the Outgrower or his representative and acknowledged or shall have been posted to the Outgrower by registered mail;

(l) Bear all direct and indirect costs of the works, goods and services supplied by the Company under this Agreement and (unless the same are paid earlier) allow such costs to be deducted from payment for cane supplied by the Outgrower.

(m) Permit all monies due from the Outgrower to the Company (including the cost of harvesting preparations for loading, unloading and transporting) to be deducted from the proceeds of cane supplied by the Outgrower to the Company.

(n) Be responsible for maintaining suitable permanent boundary markers and cleared fire breaks for his area of cane.

(o) Be liable to pay the cost of any damage suffered by other Outgrowers as a result of failuer to comply with the terms hereof.

(p) Take precautions against cane fire according to the advice of the Company or its representatives.

(q) Not assign his land or any interest therein or any of his rights or obligations under this Agreement without the written consent of the Company.

12. Any dispute arising at any time between the parties hereto concerning the interpretation and/or implication of any clauses of this Agreement shall be referred to the Outgrower's Board and the decision of the Board shall be final and binding on both the parties to this Agreement.

IN WITNESS WHEREOF the Company by its authorised representative and the Outgrower have hereunder set and subscribed their respective hands the day and year

hereinabove written.

SIGNED, SEALED AND DELIVERED

by the Authorised Representative

of the South Nyanza Sugar Co.

Limited in the presence of:-

SIGNED, SEALED AND DELIVERED

by the within named OUTGROWER

in the presence of:-

Asst./Chief.,

The Farmer hereby appoints Farmer's ID/No. ....

Mr./Mrs. .... Agent's ID/No. ....

the agent of his cane plot.

I have collected cane Agreement

Signed .....Farmer/Agent