THE IMPACT OF SUGARCANE FARMING ON HOUSEHOLD FOOD SECURITY IN BELGUT DIVISION

BY CHEBII KILEL BSc (AGRICULTURE) Hons.

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DECLARATION

This thesis is my original work and has not been presented in any other university

Signed .....

Chebii Kilel
(Candidate)

This Thesis has been submitted for examination for examination with my approval as university supervisor

Signed .....

Dr. E.N. Ndegwa

DEDICATION

To my dear parents Elijah and Asenath for their sacrifices and encouragements and my husband H.C. Kibet for his encouragements and patience.

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ABSTRACT

Agricultural sector plays an important role in the economy of Kenya. This sector has been developed with the aims of attaining economic growth, assuring equity in such growth and stability of farm incomes as well as a wider participation by small scale farmers and large scale farmers in cash crop production and meeting the country's domestic food requirements. The most important cash crops in the study area are coffee, tea, sugarcane and occasionally maize.

The study addressed itself to the food security situations among households involved in sugarcane farming in Belgut Division of Kericho District. The study proceeded by assessing the food situations of these households as depicted by production of different crops and sugarcane and land allocation among different crops. Since women are the people mostly engaged in farming activities in the rural areas and are traditionally charged with the responsibility of feeding household members, the study was interested to know the effects of cash crop farming on women's ability to feed their households.

The study uses data obtained from household based field questionnaires administered to sugarcane farmers. The study analyses data as pertains to the socio-economic characteristics of farmers, the general farming systems in the Division,types of crops grown

and acreage allocated to each crop before and after sugarcane was introduced in the Division.

Analysis of the farming systems showed that there are two types of farming systems in the Division, namely food crop and cash crop farming systems falling under the control of women and men respectively. Analysis on the allocation of land holdings between different crops shows that with the introduction of sugarcane acreage under food crops has decline while that under cash crops has increased with sugarcane taking a higher portion of holdings. The study found that there was a significant difference in acreage under food crops before and after the introduction of sugarcane. Analysis of food output and acreage showed that food output is dependent on acreage, as acreage under food crops decreases food output also decreases.

The analysis has also shown that while food demands are high due to family sizes food purchases are low because of low and unpredictable incomes accruing to sugarcane farmers. The availability of factors of land to women who traditionally play an important role in ensuring food security at the household level was found to have declined with the introduction of sugarcane because it is men who decide what to plant on difference part of the farm. Since men have more interest in cane production, food production suffers.

The study makes the following recommendation, that due to high levels of food insecurity in the Division, as result of sugarcane introduction, households should be encouraged to produce food sufficient to feed the households before venturing in to sugarcane. The formulation of agricultural policies should also be integrated to minimize the opportunity cost incurred in the process of trying to achieve cash crop and food crop objectives.

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CHAPTER ONE

1.0 INTRODUCTION

In recent years, food has become an issue of serious national concern in many countries, following widespread hunger in many developing countries. Aggregate world food production has only grown marginally faster than the population and consumption per capita has been increasing in many parts of the world with the exception of Sub-Saharan Africa and south Asia (FAO 1970a). Studies have predicted a widening gap between projected trends in consumption and production among developing countries as a group. Projections for the year 2000 and beyond suggest that, due to increase in population and income growth, demand for food and other agricultural products will continue to rise by over 3% (UN Report 1984/1985).

World Bank report of 1991, states that per capita agricultural output in Africa has been declining continuously since the 1960s. In 1970s, when the population growth reached close to 3% p.a, food production was less than 1.8%p.a, resulting in the deterioration of domestic per capita food supply. The situation worsened in early 1980s as food production increased at only 1% against 3.1% increase in population. In the aftermath of deteriorating food production and general economic stagnation, Africa

witnessed chronic food shortages, increasing malnutrition and untold human misery and suffering in the 1970s and 1980s (World Bank 1991).

These chronically declining level of per capita agricultural production have forced increasing levels of food imports claiming about 20% of Sub-Saharan Africa's total export revenues in 1986, and critically undermining Africa's development effort (UN Report 1984)

That Kenya now faces a serious shortage of certain food commodities is now clearly evident. Adverse weather conditions and other factors surrounding the country's economic management, particularly it's agricultural sector coupled with a massive influx of refugees and high population increase have seen to this situation. According to ''The Standard'' newspaper of 24th June 1992, a statement released by the Ministry of Supplies and Marketing, indicated that Kenya is now solely relying on imported maize until local supplies become adequate. The Government's policy of ensuring the country's self-sufficiency in white maize had been achieved since independence but the last 2 years have seen production drop sharply. In 1990/91 the drop reached a level of 25 million bags followed by 26 million bags the following year. Consumption on the other hand had reached 29.5 million bags in 1991/92

and was projected at 30.4 million bags in 1992/93 season.(Standard, 24th June 1992)

This situation has forced the country to draw it's maize supply requirements from the strategic reserve stock which is now depleted and rigorous importation has been put in place. At the beginning of the 1992 season, the National Cereals and Produce Board had about 200,000 tonnes of maize compared to the official desired strategic reserve of 600,000 tonnes. The balance has had to be imported which is now costing the country a lot of foreign exchange and a lot of resources have been diverted to food importation.

Agriculture is the mainstay of Kenyas economy, providing as it does the basis for the development of other sectors of the economy. The overall thrust of agricultural policy is first to achieve internal food self-sufficiency, second to maintain adequate levels of strategic reserves and third, to generate additional surplus for export. This policy will help the government in attaining it's objective of food security. To achieve this the government and non-governmental organisations have undertaken various programmes, such as school feeding programme, freedom from hunger programme, national grain storage programme and food security programmes.

1.1 PROBLEM STATEMENT

Commercialization of the rural sector is considered a cornerstone of successful economic development. It allows increased participation of individuals and households in the domestic and international exchange economy. Through realization of comparative advantage, it is supposed to benefit not only individual rural families but also the agricultural sector and the economy as a whole.

Commercialization may have many facets in this context. Generally, it describes an individual's or a household's economic transactions with others. This may be both in cash and kind, the latter playing a considerable role in many traditional communities. Transactions may relate to agricultural produce, indicating that a certain proportion of a farm's output is not produced for subsistence but for sale. They may also relate to inputs, indicating that a farms production technology depends to a certain extent on external inputs. Also a household may be commercialized by earning off farm income, mostly from labour employment outside the household's farm.

The effects of commercialization of agriculture, more commonly called cash cropping continues to be contentious. Proponents of commercialization see it as a means of improving the overall welfare of small farm households and providing employment to rural landless.

However critics argue that not only have most of the potential benefits not materialized, but in many cases, cash cropping has caused a deterioration in the household's food security (I.F.P.R.I. Report 1984)

The introduction of a cash crop which requires vast amounts of land in an area that previously depended upon subsistence production may come at the expense of limited land, labour, capital and financial resources. One may therefore expect that the households in the region concerned may have become insecure with respect to food supplies. However this is not always the case. The same or even more quantities of food may be produced depending on the existing situation (improved technology, incentives and institutional support system) with respect to resource availability and allocation .

The region could be having large tracts of idle land, so the introduction of a cash crop does not necessarily reduce outputs of food products. Commercialization may increase awareness of the affected households about the usefulness of land as a productive resource. In this respect it is expected that land will be utilised more effectively to yield greater outputs of food products from the same or even smaller quantities of land.

Cash cropping may be supported on the grounds that it will not only raise the income of the

participating households but may also improve their nutritional situation, provided there is a preference for better nutrition and provided the households are able to express these preferences and get access to increased food supplies. While high preferences of food may be achieved, realization of preferences and market access may not be achieved in cases of market or policy failure. Insufficient food consumption to meet nutritional requirements is closely related to poverty, and a significant portion of increasing incomes among the poor would be expected to be spent on more food. If low-income farmers capture at least part of the economic surplus generated from shifts from subsistence to cash cropping, and if a part of these people are food insecure, one would expect that their food security would improve. Also this money may be utilized on other activities like educational and health services that will help in improving the household's standards of living.

Cash cropping also offers employment to many people who are directly/or indirectly linked to the cash crop enterprise, i.e about 250,000 people are in the cash crop enterprise (CBS 1990). It also saves the country a lot of foreign exchange which could have been used in importing the commodity that is now locally produced. The country earns about K£708,723,000 (CBS 1990) from cash crop exports. The

money saved can be used in improving education, health, infrastructure, among others.

Commercialization of agriculture has several shortcomings which may be cited. It is alleged that it leads to food shortages in the participating households that produce solely for the market. Over dependence on a single cash crop is very risky especially when one considers the vagaries of weather and price fluctuations. There is a difference between a given quantity of food produce held by rural households at the family store and an equivalent value of money held in the bank. Prices farmers pay to purchase food is generally higher than implicit prices they would pay by producing their own food. Therefore, producing for own consumption is cheaper than purchasing an equivalent amount of food from the market. A shift from subsistence to commercial production reduces food consumption at the local, regional and national level for a given level of income.

There has also been a bias by most governments of developing countries, whereby most attention has been traditionally placed on supplying the urban wage-earner with reliable low cost food. These food programmes have either ignored the rural population or operated at the expense of the welfare of the rural communities. It is in the rural areas where

agricultural commercialization is taking place. With the existing biases, it means that the rural households will be more insecure as far as food is concern. It is also now clear that urban-oriented food policies can stand in the way of a country's quest for food security.

Many of the fundamental food supply problems are rooted in the rural areas due to production variability, inadequate physical infrastructure, imperfect market system, poverty, consumer and producer prices administratively set at inappropriate levels, inadequate transport, storage and handling facilities.

From the above, it can be expected that even if the marketing system for food products in the cash crop area operated sufficiently well to fill the food gap, other factors could contribute to food insecurity. Also the cash income generated may not be sufficient to purchase the food requirements of the participating households and at the same time leave them surplus income which could be re-invested in an attempt to improve their standards of living.

Africa has been undergoing agricultural commercialization since the beginning of the century. This has mainly been done with the hope of improving its economic base. Kenya too has been involved in the process of commercialization, this has occurred at

various levels, mainly national to household level. Different cash crops have been introduced in different parts of the country. Different cash crops have been found to be well adapted to different parts with varying levels of success and have had different effects on the economic status of the areas involved.

Belgut Division has been undergoing a transition from subsistence to cash cropping. Many households have been involved in the new enterprise. Sugarcane was introduced in the Division in the late 1970s and early part of the 1980s. The introduction was not official, but it came gradually with the influence from Kisumu District. Sugarcane was introduced as a cash crop with the hope of raising the households level of incomes thus improving their purchasing power. Currently sugarcane occupies about 10,000 ha in the Division.

Before sugarcane was introduced in the Division, food crop production with a little cash cropping were the main systems of crop production in the area. The households used to produce various types of food crops with cereals being given first priority in terms of land allocation. Food crops included maize, beans, millet, sorghum, all types of vegetables, and various traditional food crops. These types of foods produced were meant to supply the households with sufficient food supplies and the surplus was sold to earn the

households extra cash. Food crop production had also been a women's affair in the area with men playing minimal roles. Women have all along been given the control of food production, with men only helping in such tasks as ploughing with animals and sometimes in transporting food after harvest. As women were involved in food crops men on the other hand were involved in cash crop production with women only helping with labour. Before cane introduction, the main cash crops in the area did not require large tracts of land and there was therefore little competition between cash crops and food crops. Since sugarcane requires large tracts of land for it to be economically undertaken, this has caused a stiff competition between cash crops and food crops.

There were only two types of cash crops: coffee and tea. But this has since changed with sugarcane introduction. At the moment, the household land holding is divided among various crop activities, and these activities have to compete with one another for space. Due to higher gross margins from sugarcane most, farmers have abandoned the production of other crops and have taken to sugarcane. Sugarcane has been expanded at the expense of food production and this is likely to lead to reduced food production, which is likely to lead to household food insecurity.

It is in the light of the above that the study

will assess the food security situation of the households involved in sugarcane production in the Division. The study will assess the food situation of these households as depicted by the production of different crops and sugarcane. The assessment will include an examination of the extent to which sugarcane farming generates farm level income for farmers in the Division. It will also examine the extent to which such incomes have enabled households to purchase their food requirements and other expenditure and investment, where traditional food crops have been replaced by cash crops.

1.2. OBJECTIVES OF THE STUDY

The broad objective of the study is to look at the extent to which sugarcane farmers in Belgut Division are able to meet their family food requirements. Following the introduction of sugarcane in the Division. This will be done by :

1.2.1 Examine the systems of crop production in Belgut Division

1.2.2 Assessing the effects of sugarcane farming on household income and household food security (availability, affordability, accessibility and reliability)

1.2.3 Examine how sugarcane farming affects the participation of women in crop production.

1.3 HYPOTHESES

1.3.1 The introduction of sugarcane farming in Belgut Division has reduced the amount of land available for the production of other crops, especially food crops, causing reduced food production leading to increased household level food insecurity.

1.3.2 Household food security is linked to women's control and access to income and physical food resource (own production). As women become more marginalised in both cash crop production and the control of income, the ability of women to take charge over family food requirements is likely to decline.

1.4 Operational Concepts and Definitions

1. **Household:** it refers collectively to family members and servants in one house (KBS definition). Following the above definition of household by KBS, the term is used here in a broad sense. It includes members of the family resident on the farm and away attending school or engaged in wage/salary, employment or operating non-farm business activities.

2. **Food Security:** refers to arrangements whereby people are assured a minimum adequate levels of (food) grain supply in periods of normal as well

as poor harvests. It is access by all people to the basic food they need at all times for an active and healthy life (World Bank 1986). The above definition has two elements. First it implies the availability of food through production, storage or imports, and second, access by all people to food by having the income to buy it or the financial or other resources to grow it.

The concept of food security implies that household food requirements are available, accessible, affordable when and where needed in sufficient quantity and quality.

3. Commercialization/cash cropping: is used to refer to a situation where crops are produced largely for the market. In the study, the term will be used to refer to non-food crops produced solely for the market.

1.5. FOOD SECURITY FRAMEWORK

The framework takes a systems approach to understanding the factors which affect food security. It is divided into three parts:

(i) Farm production

(ii) Food purchase

(iii) Individual consumption and nutrition

Farm production and food purchases are concerned with the factors influencing food supply and access at

the household level, the supply and disposal of own food and other farm production, and supply through food purchases. Many households combine these strategies.

Within each part, the factors affecting food security fall into three areas of analysis: access to the control of resources, task and time allocation, and decision making.

1.5.1. FACTORS THAT AFFECT FOOD SECURITY

1. FARM PRODUCTION

This factors includes household level food supply and disposal from own production. This is applicable primarily to small scale farm households. With increasing integration into the market economy, household food security can be adversely affected by: less diversity in production; a heavier workload for women; neglect of subsistence production; and overselling and neglect in food preparation.

Areas for concern in food security analysis are the availability and allocation of land and labour between food and non-food production; the production of minor crops for risk reduction and dietary diversity; the output and allocation of food crops for home consumption and storage or for sale; and the allocation of time between production and household reproduction tasks.

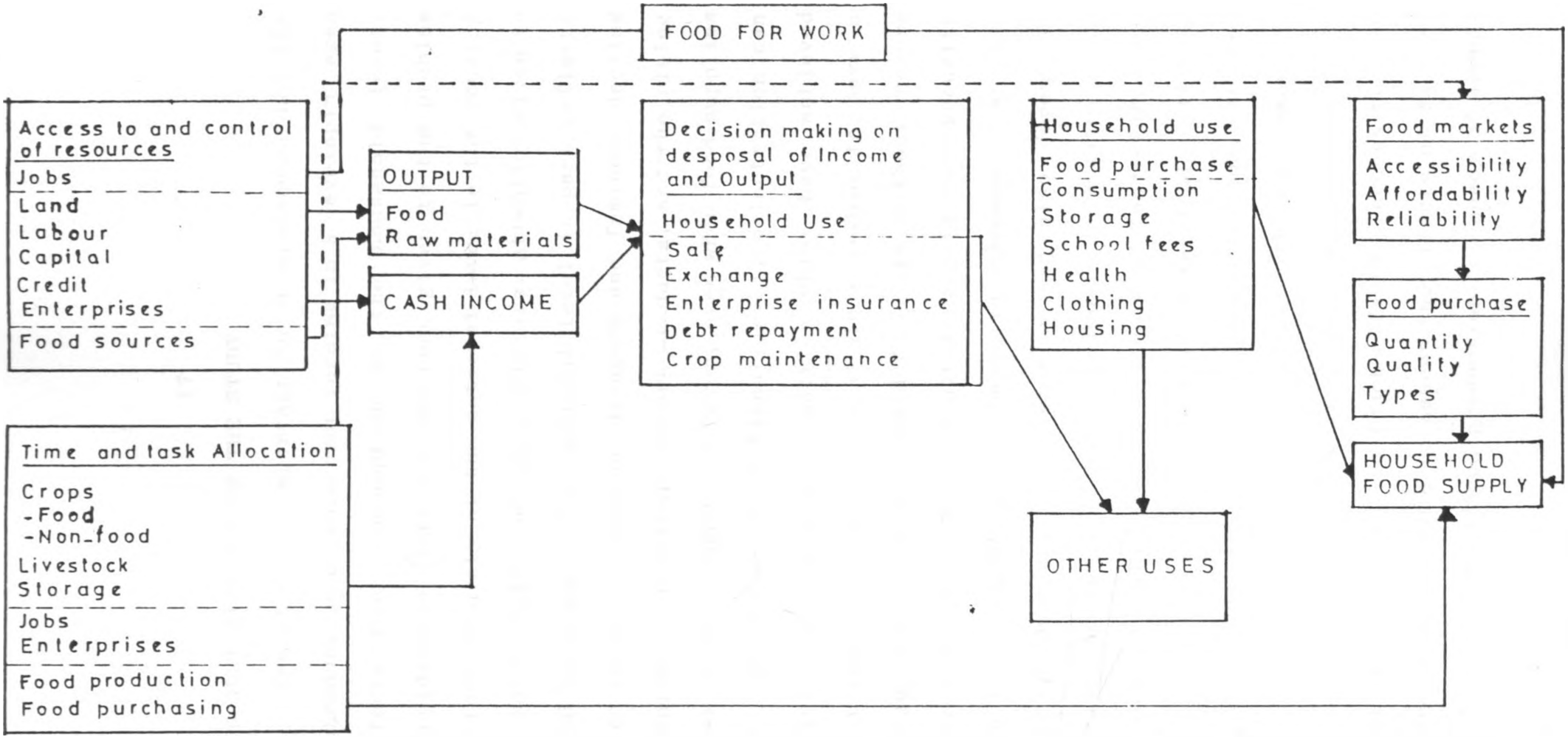
2. FOOD PURCHASES

If households do not obtain all of their food from their own production, they could obtain food from barter, or in-kind payment for work. This applies to cash crop farmers who purchase the food they consume. Areas of concern for food security analysis are the availability and the accessibility to food supplies, the available resources for and tasks of independent enterprises, the actual sources of household income including cash and in-kind), who makes decisions about expenditures, and how those decisions affect food supply to the household.

3. INDIVIDUAL CONSUMPTION

Once food has reached the household, it is prepared and served to members of the household. Within the household, a number of factors affect individual consumption. Consumption will depend on amount, frequency and access to food.

FOOD SECURITY FRAMEWORK



1.6 JUSTIFICATION OF THE STUDY

The study is important in understanding how the introduction of cash crop farming in a developing area affects food consumption at the household level. Considerable attention has been given to the problem of food security at the national level in the country by policy makers and many scholars. Attention given to food security at the national level in part reflects concern over recurring droughts and famines, decling earnings from primary export products, and the rising cost of food imports. However, even when food supplies are adequate at the national level, malnutrition can persist and even in countries which have achieved aggregate food security, it is possible to have a large number of households/ people without secure sources of food. Even though household food security can be assessed on the basis of aggregate national food production, food security can also depend on ability of families and individuals to acquire food. A country could have large stocks of food-stuffs and at the same time have households without adequate food supplies due to lack of access to food. At the national level, the concern is with food security focused on supply, but it is at the household level that it is possible to track effective access to food where it is possible to assess the effects of factors such as household food production, adequacy of income

and the actual intakes of foods as well as the nutritional value of food consumed.

There has also been contradictions on government policies. Food policies have emphasised food self-sufficiency with strategic reserves, while cash crop policies have emphasised increased production of cash crops so as to earn the country foreign exchange, but little has been done to ensure that cash crops do not expand at the expense of food production.

The focus on women when discussing the issue of food security at the household level is important because women dominate food production in the country because most of them have been left in the rural areas when men go to look for jobs in towns. Therefore, women have the main responsibility for meeting the families nutritional needs. They are, therefore important integral participants in the food production process and in the purchase of food for the family. In the rural areas, women are the main actors in food production, purchasing, and processing, even, when it is accepted that men's activities and decisions as well as those taken jointly by men and women affect food security.

Most of the studies done have mainly addressed the issue of the relationship between cash crops and food crops and have only addressed household food security in passing. In addition, the preoccupation of

the country in recent years with the implementation of macroeconomic policies at the national level has meant that less attention has been paid on the implications of expanding cash crop production on the households' ability to meet their food requirements. This study is intended to critically assess the effects of cash crops on food security at the household level.

1.7. METHODOLOGY

The approach that was used in the study comprise three stages. The first phase was that of data collection, the second was that of data analysis and the third was that of interpretation of the findings.

1.7.1 DATA COLLECTION AND TYPES OF DATA

The study entailed two types of data; primary and secondary. Primary data was collected through formal interviews by use of household questionnaire and personal interviews with the relevant persons and agencies including agricultural officers, sugarcane cooperative societies, Muhoroni sugar factory outgrowers manager, officials of National Cereals and Produce Board (NCPB), Ministry of Supplies and Marketing and administrative officers in the area. Personal observations of the existing situation were also made. Secondary data was obtained from publications in libraries on past research work,

official documents particulary from the District and the Divisional Agricultural office and non-governmental organisations involved in food programmes. Such data was useful in determing the world food situation in general and Kenya in particular. Existing maps and photographs were also used.

To get a represetative population size, a list of all registered outgrower cooperative societies from Belgut Division was prepared from outgrower department of East Africa Sugar Industries(EASI) Muhoroni. From this list a random sample size of 50% was selected covering all the regions using simple random sampling method. From this sample a list of all registered farmers was obtained. From this list a five per cent sample of farmers was selected.

The sample size is justified on the grounds that sugarcane farmers have fairly similar characteristics. Even if a smaller size was chosen it would have revealed the common characteristics of the total population.

The focus of the study was on crop production systems, food crop production, sugarcane production, and expenditures on food and non-food goods and service.

To examine the crop labour requirements, and seasonality in Belgut, the data collected included the

types of crops grown, area of land allocated to each crop, yields of each crop per acre as well as when particular crops were planted.

To assess the effects of sugarcane farming on household income and food supply, the data collected included amount of land devoted to sugarcane production, the family savings spent on the development of the crop (capital), family labour requirements, and revenue from the sugarcane crop. To asses effects on food supply , data on the amount of land allocated to food crop production, family labour spent on food production,food out-put, how much food is consumed and that food which is sold was collected.

To examine the relationship between sugarcane growing and household food security, data collected was on the cycle of the sugarcane crop, total revenue from the sugarcane crop (total revenue is divided by the full cycle to get revenue per annum), data on the amount of income spent on food, on education, clothing, and on other goods and services. Also, information of on how much the farmer spends on the sugarcane crop activity and how much he spends on other income generating activities like commerce, buying shares in cooperatives and industry, was collected.

To examine how sugarcane farming affects the participation of women in crop production, data was

gathered on the amount of family land which is easily accessible to women, the fertility of the land, the types of crops grown, and whether she is consulted when making decisions on what to plant, where to plant and when to plant. Also information on her participation on making decisions on spending of household income was also sought.

1.7.2 DATA ANALYSIS

This study made use of the following analytical techniques;

1. Data was first be entered and processed using SPSS.
2. Secondly statistical tools such as (percentage, mean, mode, average), and T-test were also used.

1.8. SCOPE OF THE STUDY

The study has been carried out within the regional planning realm and an integrated approach which takes into consideration such factors as social and economic factors in addition to climatic factors and physical infrastructure which support agriculture. These factors have been considered in identifying constraints and making recommendations of the study. The research has approached the problem from a planners point of view, that is, where in the planning process can attempts be made to improve food security at the household level.

The study was carried out in Belgut Division and

was limited to the sugarcane zone. The focus was on sugarcane growing households.

The study looked at the effects of sugarcane farming on the food security of the participating households. The study proceeded in the tasks by analyzing the acreage, the output and incomes from all types of crops grown, expenditure patterns of farming households and other sources of income, mainly from business, employment and livestock keeping.

1.9 STUDY LIMITATION

The study had a number of limitations. First the primary data collection was done with the researcher and three assistants on foot. Given the spatial area of the zone and the aim of getting a representative sample in the Division, time was inadequate to allow comprehensive areal coverage as the study would have preferred due to low mobility. Secondly, the attempt to obtain objective data from the field respondents especially as regards total acreage, types of crops grown, acreage under each crops and output of each crop before sugarcane was introduced proved difficult. Consequently the researcher had to contend with farmers estimation in most instances rather than on accurately measured data. The study therefore has had to draw conclusions and make recommendations from this estimates.

1.20. ORGANIZATION OF THESIS

The thesis has SIX chapters. Chapter one has given the general introduction of the study. This covers the world food production situation and the food problems encountered. It has also dealt with the importance of agriculture in an economy. It has covered the limitations, the objectives and the food security Framework at the household level.

Chapter two gives the literature review relevant to the study. This is mainly on the work done by other researchers who have dealt with food issues. Chapter three discusses the background of the study. This includes a review of the governments policies on food and cash crops. National food policy and sugar policy has been addressed here. Chapter four discusses the background of the study area. Including its physical and human characteristics. Chapter five discusses the findings of the survey and analysis. Chapter six gives a summary of the findings, conclusion and recommendations of the study both on policy and programmes which could be used to help improve food security at the household level.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

The previous chapter gave an introduction to the study. The food situation in developing countries and in particular Sub-Saharan Africa was also touched. This chapter is dealing with review on literature on studies which are relevant to the study in order to identify gaps which need to be filled.

Studies have shown that commercialization of agriculture has been widely recognized as being essential to overall economic development of the rural areas. Various rural populations have adapted differently to the process of commercialization depending on the resources available to them, economic and social conditions and government policies. Many households benefit in the form of higher income and others may suffer a decline in income.

Export crop production has often been blamed as the cause of food insecurity. Critics of cash cropping contend that if the resources used to produce agricultural exports were used instead to produce food for the local economy, the problem of food insecurity in many developing countries could be significantly reduced or even eliminated.

Agricultural production in developing countries

is carried out by both small and large scale farmers but small scale farmers are the majority. For example in Kenya agricultural production is also carried out by both small scale farmers and large scale farmers (Heyer J. 1976). Among the small scale farmers, farms are less than 2 hectares and very few of these farms are more than 5 hectares in size (Heyer, Senga, Waweru. 1976). It is on these small plots that about 80% of the food stuff consumed by Kenyans is produced. It is also in these small plots that the cultivation of cash crops threatens to take a greater percentage of the acreage.

Agricultural performance in Africa has not been quite favourable in terms of production relative to other regions of the world. This is especially true with food production (Ndegwa, 1986). Different factors are responsible for this poor performance. The Kenya Government Sessional Paper No.4 of 1981, addressed itself to this state of affairs. The reasons invariably includes a rapidly increasing population,inappropriate agricultural and government policies, lack and poor coordination of research, neglect of basic food stuffs especially traditional food crops and finally the international trade which has not been in favour of African countries.

The unfavourable global economic climate has also disadvantaged Africa in its trade with

industrialized nations and the flow of capital. In the 1980s, its terms of trade continually deteriorated, external debts increased, with debt servicing costs claiming some 22.4% of total export earnings (Report of Secretary General 1984/85). Interest rates rose, concessional financing declined in real terms and the overall balanced of payments deteriorated thereby increasing the problem of importing capital goods and spare parts to support its fledging industries. These unfavourable circumstances together with structural defects in African economies have spawned a declining economic growth. Gross domestic production (GDP) which increased at about 3.6% p.a. between 1970 and 1980 has been continuously falling behind population growth .

Donders (1985), explains that the food production problems in Africa are being caused by a multiple of factors but more important amongst these is the mesmeric view by governments about the role of cash crops. It is quite true that the bulk of African countries are not yet developed and most of them still think that the best way to earn foreign exchange is through expansion of cash crops/ export crops. Examples of these can be seen from countries where expansion of cash crops is being stressed at the expense of food crop production. Coffee expansion in South Nyanza and Siaya District of Kenya is a good example of such a belief. Guy Arnold (1982) contends

that while more and more African countries face food crisis, more and more land is going to big agro-business developments run by transnational organizations. This results in a cutback on food production because large areas of land have been turned over to agro-business projects. Examples include South Nyanza Sugar Company and B.A.T. for tobacco production. Arnold (1983) further questions the validity of this kind of transformation, since more and more of the earnings that come from such projects(if any) simply go to purchase foreign food in place of what formerly was grown at home. Thus, Africa has become a continent that produces what she does not eat and eats that she does not produce (Ali Mazuri,1990).

A particular concern of policy makers has been the effect of commercialisation on nutrition. A report by World Food Programme (W.F.P.) shows that the continent of Africa has been losing ground both in terms of absolute incomes per person and in terms of food to feed a population that has been growing at very fast rates. Reasons for Africa's declining ability to feed herself include occurrence of drought, closely linked to this is desertification, further environmental waste, disease and increased deprivation of basic requirements for survival. Other factors are bad planning, mismanagement. (W.F.P. 1989 Report).

W.F.P. gives Africa, particularly Sub-Saharan Africa, the highest priority as expressed in its 1988 Action Plan for Africa, with $1.4 billion worth of ongoing developments projects at the end of 1990.

The long-term and recurrent food crises has been a serious concern of the African Governments and the international community at large. While drought and other natural disasters have aggravated African food problems, the main long-term cause rest with the policies and development strategies that have denied food production its priority as the engine of growth and development. The result has been that African countries have been unable to reach the 'take-off stage' for sustained economic and social development. In short, the problem essentially is that of poor planning and mismanagement of production resources.

The presumption that a region should be self-sufficient in foodstuffs apparently has been fading with realisation that other regions might be able to produce food more cheaply (International Institute for Environment and Development, 1986). This view has undergone dramatic reversal in 1980s so much so that it is now accepted that the concept of self-sufficiency in food stuffs has become very important.

Cereals, which are the primary staple food of most human beings are consumed either directly or in processed forms. Despite ample supplies of cereals at

the world level, the projected inadequacy of production and supplies in a number of developing countries is likely to continue to be of serious concern. Thus while there has been a substantial recovery in Africa from recent drought-affected levels, little improvement in per capita cereal output is projected for 1990s in most low income food-deficit countries in the region. In a number of countries output may actually fall.

Because of severe payments problems, many developing countries will not be able to benefit fully from low international prices of cereals by importing more. Cereal imports of low income food-deficit countries after expanding by over 7% a year in 1970s, are projected to grow through the 1990s at just 1% a year. Although this reflects the success of some countries in expanding production, in many cases, it is due to an inability to produce enough to meet even local import requirements.

The projected market conditions in 1990 based on normal weather and crop conditions, has shown that unfavourable weather and poor harvests in a few countries could dramatically change the projected over supply situation and led to high rises and sharp reductions in stocks that could threaten world food security.

According to reports from Global Information and

Early Warning Systems on food and agriculture, aggregate food aid needs in Sub-Saharan Africa are set to rise sharply in 1992/93 period, mainly reflecting the decline in domestic production in southern Africa and increased import requirements. Global cereal food aid availability, however is predicted to fall slightly, with shipments to low income food deficit countries unlikely to show any improvements. It is now possible that a large proportion of Sub-Saharan Africas food aid needs will not be met in 1992/93 period. Kenya is among 29 Sub-Saharan African countries out of 49 low-income countries worldwide that failed to produce enough food for their people towards the end of 1980s, (Global State of Hunger and Malnutrition Report 1992). Kenya, which was regarded a success story in the 60s and 70s, was confronted with food shortages in 1980s and has had to import relatively large quantities of maize, wheat and milk powder (World Bank 1982).

Kenya now faces the problem of securing adequate food for its rapidly growing population. It has been estimated that among the poorer strata of the population, which include small holder farmers and agricultural labourers energy intake presently reaches 80% of requirements (Shah and Frontiberg 1980: Greer and Thorbecke 1984). There is already a lot of pressure on agricultural land in Kenya and future

increases in agricultural production will depend on possibilities of increasing yields per hectare as well as bringing unused land, often marginal land, under cultivation (Republic of Kenya, 1981).

In Kenya, the current food supply position is extremely precarious with wide spread food shortages among the drought affected people, households displaced by ethnic problems for whom emergency relief is urgently needed and shortages from general low levels of food production among households. Emergency relief assistance is also needed for the increasing refugee population in North Eastern province.

2.2. HARVEST PROSPECTS AND FOOD SUPPLY POSITION IN KENYA FOR 1992/93 PERIOD

A FAO and WFP Crop and Supply Assessment Report (1992) on food supply situation in Kenya and import requirements, including the emergency food aid needs for drought victims and internally displaced people, shows that;

Total 1992/93 maize production, including a forecast of the short rains crop in early 1993 is estimated at 2.4 million tonnes. This is some 200,000 tonnes higher than 1991/92 period, but it is below average. Cereal production in 1992/93 is projected to be a low 210,000 tonnes, due largely to reduction in area planted. The national production of other crops

is expected to be near normal, with food harvest in the west of Kenya offsetting crop failure in the east.

However the current food situation is extremely serious following a below average maize crop in 1991/92 and reduced output of most other crops. National Cereals stocks in July 1992 amounted to only some 200,000 tonnes, with stocks held by farmers reported to be at very low levels. Conditions are severe in those regions where food production has been at very low levels. This is mainly in the arid and semi-arid pastoral areas of north eastern where rainfall has been very low and erratic for the last two years.

The quantities of food that are available meet only a small fraction of the total requirements. The current food requirements is estimated at 1 million tonnes. Commercial imports of some 450,000 tonnes is anticipated, leaving a cereal food aid of about 500,000 tonnes. Additional imports may be required in mid 1993 to meet consumption needs in July and August before the next main seasons harvest become available. Some of these food problems have been caused by factors which could be avoided.

According to Gladwin, one of the most neglected factors in the causation of food shortages has been the extent to which the non-availability of production resources to women affects production. All over Africa

and other parts of developing countries, the large percentage of the population reside in rural areas,and comprise women who are involved in the production of both subsistence food crops and cash crops.In most cases the men have gone to towns in search of jobs. As elsewhere, the non-availability of resources for this endeavour does seemingly affects the level of production, and so do seemingly innocent factors such as the exclusion of women in the planning and execution of developments projects aimed at increasing the production of food. (Gladwin C.H 1984).

The non-involvement of women in development projects, particularly in rural areas, can have a very positive impact in increasing food production (Kathleen, 1984). Similarly, the availability of production resources for the women also impinges on the food production efforts that governments make. One solution to food crisis in Africa is that the technocrats charged with national planning may find effective in enhancing rural development as well as alleviating hunger is the provision of agricultural inputs, and the rationalization of ownership of land or at least facilitating accessibility to land especially to women who are the principle producers of food in Kenya, the making accessibility to new technology possible and making of agricultural extension services available to women in rural areas,

(Gladwin .H, Kathleen .S. and Della .M. April 1984).

The introduction of cash economy in many rural areas has upset the traditional African setting to a system in which money becomes supreme for survival. The role of the women has changed from devoting all their energies to the bringing up of children to engaging in money earning activities, for without money, the very survival of the family may be in jeopardy (Reynolds, 1982).

Traditionally, food crops production is the reserve of women and cash crops the control of men. Commercial agriculture has had the effect of reducing the amount of land and labour available for subsistence food production and thus reduces womens' control over household income. Women are responsible for ensuring the necessary food intakes of the family.

The Government of Kenya accords high priority to the development of the agricultural sector, in order to ensure self-sufficiency in food production and to produce cash crops for export to earn the country foreign exchange with which to purchase imports. With export earnings in mind, Kenya has undertaken the production of various cash crops, the major ones being coffee, tea and horticultural crops. Other cash crops have also been promoted with the hope of diversifying exports, including sugarcane which has been given a high priority especially in the Western and Nyanza

Provinces.

2.3 KENYAN SUGAR INDUSTRY

Kenya Government accords high priority to the development of sugar industry. The government policy is centred on attainment of self-sufficiency in meeting the country's demand for sugar, while in the long run, the government expects to earn foreign exchange through exports. Therefore, the government intends to allocate substantial amounts of resources for the development of the industry.

A long term sugar development programme has been evolved consisting of a number of detailed investment proposals for rehabilitation and expansion of existing sugar complexes and for establishments of new sugar projects (KSA 1991). The expansion of a cash crop like this, may come at the expense of other crops, mainly food crop production.

In fact Kenya had became self-sufficient in sugar for the first time in 1979 (Republic of Kenya; Economic Survey 1985). In 1980 and 1981, there was a small exportable surplus of sugar. By the mid-1980s however, Kenya was again unable to meet her domestic demand for sugar (Report by International Food Policy Research Institute 1989). In 1992, the country still was unable to meet her domestic sugar demands. In 1992/93 period 30,288 tonnes of sugar consumed in

Kenya was imported even though the Government is committed to increasing sugar production to meet domestic needs.

The majority of the primary producers of sugarcane in Kenya are the smallholders. It is expected that the number of smallholders in sugarcane production will continue. The problem which small scale farmers may face is the limited land holding available to families with the result that sugarcane expansion may be realised at the expense of food production.

In a study of the role of the sugar industry in the economy of Lake Victoria Basin (LVB), Odada examines the extent to which sugarcane production contributes to income generation and the industry's potential as a source of employment. Other aspects examined sugar manufacturing technology, elasticity of subsistution between capital and labour and returns to scale among other things. Of relevance to this study is the author's observation that, sugarcane production in the LVB has had to compete for land with cotton and cereals such as maize and beans while in areas away from the Lake, sugarcane has to compete for land with maize, coffee and other cereals (Odada, 1979).

Odada adopted the production function approach to come up with findings and policy recommendations. For example, the study shows that small scale farms are

characterised by economies of scale and he recommends that such farms should be expanded. Such an expansion can only be facilitated by a strong price incentive which would in turn encourage increased sugarcane production in an attempt to meet the government's objective of attaining self-sufficiency in sugar.

Price incentives can only be used in the short run but in the long run surplus sugar can only be exported at a loss because domestic prices of sugar exceeds that prevailing in the world market.

Although Odada's study acknowledged the competition between cash crops and food crops in passing, the study did not comprehensively analyse the trade-off between cash crops and household food security. The current study is intended to fill that gap by focusing on Belgut Division, an area which formerly depended on cash incomes from the sale of tea, coffee and surplus food crops.

Studies done in South Nyanza in 1984/85 by International Food Policy Research Institute (IFPRI), to examine the effects of sugarcane farming on household income and nutritional levels, indicated that there was a significant increase in incomes of sugarcane producers compared with non-producers. Most of the difference in family income in some cases was as much as 73% due to the production of sugarcane (E.Kennedy 1989). Increased income in turn had a

significant, positive, though modest effect on households food intake. Despite significant increments in household income, however, there was a little negative effect on pre-school nutritional states, for instance, there was no significant difference in 60% of the children chosen for the study. This suggests that an increase in income may be a necessary but not sufficient condition for bringing about a significant improvement in child health. This is because gains in nominal income may be entirely offset by the increase of food prices and non-food goods and services.

Another study done in the same area by I.F.P.R.I. between 1985 and 1987, indicated that there was no significant improvement in the nutritional status of the sugarcane growing families as compared to non-growers(I.F.P.R.I. Report of 1987). The study though having some relevance to the current study, IFPRI work is lacking some important aspects. It did not analyze the effects of a cash crop like sugarcane which is quite demanding on the household level food production. The current study is expected to fill this gap.

In a report submitted to the World Bank (Coughlin, Odada, Owino. 1986), on the incentives and management for an integrated agro-industry sugar and sugarcane in Kenya, it was shown that farmers who depend entirely on sugar companies and private

contractors for the supply of farm machinery services, cane production, inputs and financial resources operated with fixed input and output prices. It was also found out that not only are such farmers incomes low but some end up with negative returns after paying service charges in excess of gross value of their cane. Such farmers will have committed their land to sugarcane production, contributed their family's labour toward cane maintenance and the supervision of hired workers but in the end realized negative returns from sugarcane production. Thus the use of family land and family labour would have contributed negative values to family's incomes and consequently to the families ability to meet their basic needs.

Another problem associated with sugarcane production is the high transport cost which reduces the returns to farmers. For example, cane transporters charge about Ksh. 150 per tonne and incase of 10 tonnes the farmers have to pay Ksh. 1500 over and above other charges. Also the lumpiness of cane payments and the long intervals between these payments means that families have to suffer between one lump payment and the next. The study did not identify reasons which are keeping farmers in sugarcane farming despite the low and sometimes negative returns that they get. The study was carried at the national level and therefore did not clearly show the effects at the

household level.

In another study on Mumias sugar scheme, Owinyi (1977), furnishes us with legal treatise that examines the short comings of having families evicted to pave way for the establishment of the sugar company nucleus estate. The families attempts to resist eviction were all in vain. Further more compensation offered to the displaced families was not sufficient for purchasing land in the immediate outgrower zone. This was made difficult by the outgrowers, who sensing an opportunity to become rich by growing sugarcane, created an excessive demand for land. The legal process of land transfer made it difficult for the evicted families to acquire land in the immediate outgrower zones.

Owinyi contents that sugarcane is rapidly replacing maize and cassava, thereby contributing to a large percentage of household income being spent on food purchases. Being legal in profession, the study did not analyze critically the consequences of implanting an agro-industrial complex in Mumias. The study also did not examine the factors contributing to the observed food shortages in Mumias.

Mwandihi (1985) carried out a study in Mumias sugar scheme examining among other things the extent to which agro-industrial innovation in the Kenya sugar industry brings about trade-offs between cash crops

and food crops and also on the contribution of the sugarcane industry to farm level income generation and the manner in which these incomes are shared between consumption and investments. The result of the study indicated that land distribution patterns had been unaffected by the establishment of Mumias sugar scheme. This was because the sugar scheme was set up in a swampy marshy and sparsely populated region where land was idle most of the time. Few people were displaced from their original homes to pave way for the construction of the factory complex. Those displaced could not afford to buy land around because the compensation they were given was lower than the land values in the area, so they had moved out.

Mwandihi also observes that Mumias sugar scheme has not been proned to drought or rain failure, therefore any fluctuations in food crop production have to be explained in terms of changes in crop mix. He established that sugarcane claims a large share of total land holding with the result that land set a side/available for food crops and livestock is greatly reduced. This is because to qualify as a sugarcane outgrower in Mumias sugar scheme, an individual needs to have a minimum of six acres of land. This land must be fertile, well-drained, free from stones and convenient for the operations of sugar company tractors. Most farmers in Mumias have less than 10

acres of land. Therefore once a farmer has contracted as sugarcane outgrower he usually has limited land for food crops and livestock activities. Also the land set aside for these other activities is the relatively less fertile land.

Mwandihi concludes that reduced output of food crops increases the dependence of farmers on the market for food supplies, such supplies come from neighbouring Districts which have also been invaded by sugarcane. As a consequence, food supplies in Mumias have been drastically reduced. Insufficient incomes have repercussion on food purchases and consumption. Lump sum payments are not very helpful in quaranteeing family nutritional requirements especially in cases where men have complete control over cane incomes. The general tendency was that incomes from sugarcane was often spent on purchase of items that do not directly contribute to improving the family's welfare especially their food requirements. Mwandihi's study was carried out in an area where a sugar factory complex had been introduced and therefore people had been displaced. The study also did not examine factors that are keeping farmers in sugarcane farming despite that fact that they get very low incomes. Mwandihi being an economist, took an economic approach and the current study will take a planning approach.

The result of a study carried out by Makwata on

the Mumias sugar scheme, where he examined the degree of return to scale on outgrower cane farmers, supply elasticity of sugarcane farms and the foreign exchange impact of the sugar scheme. His attempt to determine the price elasticity of supply of sugarcane within Mumias is of paramount importance to the present study. It is useful for us to know the price elasticity of cane supply for purposes of planning expansionary or contractionary policies with respect to outgrower farm area. In turn, such policies have implications for food production at the local level.

Makwata acknowledges that the introduction of sugarcane farming on a commercial basis has interfered with the production of food crops. Makwata showed that most farmers had ignored growing food crops because sugarcane was perceived to offer higher returns which response is a rational one because farmers had positively responded to price incentives. Nevertheless, farmers should be equally rational not to devote all their land to sugarcane at the expense of food crops. It is our contention that a family feels more secure with food in the store than with an equivalent amount of money in a bank.

Makwata argues that sugarcane is only a popular crop because of the need for cash and the absence of other distictively competitive cash crops. The latter reason should be treated cautiously because Kakamega

District within which Mumias falls is relatively homogeneous in its agro-climatic conditions. Apart from sugarcane, there are many other cash crops which can provide quick money for example coffee, tea, tobacco and maize, which have a relatively short gestation period. Farmers who grew them would be assured of more frequent payments than is the case with sugarcane which takes almost two years from one harvest to another.

Schluter's findings contradict those of Makwata, that sugarcane lacks a closely competitive cash crop. To Schluter, maize and sugarcane actively competes for land in western Kenya on the basis of domestic cost considerations. Schluter recommends that government policy should aim at raising yields of both maize and sugarcane. In this respect, the price policy plays a significant role in the allocation of resources between this two crops.

Schluter observes that whenever the price of maize falls there follows a substantial increase in area planted under sugarcane and vice versa. In conclusion, the author feels that maize has little potential as an export crop due to high transport costs. On the other hand, sugarcane has a better long term potential whose success will depend on several factors : can marketed maize production rise fast enough to keep pace with growth of domestic demand so

that land can be released from maize to grow more sugarcane?. The success of this task will depend on the rate of adoption of presently available technology, growth in fertilizer use and the long term capacity of the research systems to produce new high yielding seed varieties.

The above study concentrates on price movements for only two commodities (maize and sugarcane). Western Kenya produces a wide rage of crops apart from maize and sugarcane. It is not therefore sufficient to assume that land is allocated depending on the price incentives between sugarcane and maize alone. Whereas maize might lack the potential as an export crop, it remains the most popular staple food for most Kenyans. Therefore, domestic self-sufficiency in food crops as advanced in the National Food Policy paper remains an ambition to be fulfilled at the earliest convenience.

In a study of the Mauritus sugar industry, Brookfield (1984) found out that the industry was efficient, enjoyed many economies of scale and was served by a labour force well versed and skilled in the production of sugar. Despite all the observed advantages that accrue to this industry, Brookfield warns that there is a reverse to the medal. To him, monoculture of sugarcane has brought Mauritus to a position in which the demands of the dominant industry inhibit the development of others.

The sugar industry in Mauritus has led to a progressive reduction in the proportion of smallholders while at the same time sharpening the gap between the big and small farmers. Monoculture of sugarcane implies limited avenues for diversification since all possible activities are either tied, as is sugar, to the export market or also are throttled by the small size and the poverty of the local market. Most land has been reverted to sugarcane and what remains consists of maize in the remote south west and high rent activities such as market gardening near the towns.

Though very much related to the present study. Brookfield's work is deficient in that the study was carried out at a national level. In this respect, there are the usual problems involved with aggregation. No empirical analysis was done to determine the magnitude of monoculture. Brookfield observed a progressive decline in smallholders land but did not show the consequences of the phenomenon leave alone giving policy recommendations.

In his study of the impacts of cash crops on food crop production in Sony Sugar, Awour (1987), found out that there was competition between cash crops and food crops. This competition resulted from the incentives of high incomes from cash crops which was five times more than of most food crops including

maize. Apart from few farmers who had extra land in fallow at the time cash crops were introduced, most farmers displaced food crops and planted cash crops. Awour also found out that due to land problems, there was a shift from growing different varieties of crops to one crop. This in turn had resulted in the reduction in the varieties of food available from household own production. The loss in food consumption from own production may not be marked by increased food purchase because a large proportion of income may be used to purchase non-food goods and services. Alternatively, income could also be spent on high priced foods which may not be balanced, at the expense of low priced stable foods which may not be available in required quantities because cash income may have been taken up for cash crop production. These may be caused by sharp price increases in the local markets, due to inability of existing market system to cope with a situation of rapidly increasing demand, reduced supply of basic food stuffs and the lumpiness of income flows from more or less constant flow of income in terms of food and some income.

Rise in incomes is not always realized, when farmers move to cash crop farming, because farm gate prices of the cash crop may be less than expected due to high transport and marketing costs. Input prices may increase while the productivity of the cash crop

may be lower than expected. For short seasoned crops, farmers could avoid this by moving out of the crop but for perennial cash crops, suspending production can only be done at a substantial cost since the farmer will lose his crop.

Economically and politically, it might be cheaper to meet our domestic food requirements without relying on foreign countries through food imports or food aids.

Some developed countries have used food aid as a weapon for wrinkling political concessions. The use of food aid for diplomatic and political purposes is widespread. Dependence on such aid to meet a large part of domestic food requirements could greatly constraint the political freedom of the recipient countries. Each and every country needs to take a political stand since it is dangerous to national integrity to sacrifice food right for dependence on food aid.

A serious setback of food aid is that it can never be planned for and it is at the donor country's pleasure. Also dependence on food aid to meet a large share of staple food requirements may result in changes in consumption patterns. For example, it is not uncommon to find urban consumption patterns that depend heavily on imported wheat or rice while domestically produced millet, maize and tubers provide

a very large proportion of total calorie intake among rural consumers. Such dual consumption patterns are rampant in most developing countries. Studies and reports indicate that there is a deteriorating food situation in Africa, Kenya not being spared. The food problems in the continent has been caused by a variety of problems, mainly droughts, floods, diseases and pest, wars and a general decline in area under food crops due to shifts to cash cropping. Some problems are under the control of the African Governments and others are beyond control. The introduction of cash crops on a large scale has put the farmers and their households at a disadvantage in times of food crisis.

Reports have shown that the economic situations of a vast majority of rural households in Sub-Sahara Africa is that of subsistence. In that as far as their diet is concerned, they depend on what they grow themselves or from their cattle if they are herdsmen.

Due to this, even if there were no catastrophes, moving out of own food production would still expose the continent to food problems. Studies dealing with cash crops and food crops, especially for those crops which tie up farmers land for long, have not been comprehensively done in that they have only shown that cash cropping affects food production. But the studies have not gone further to show how cash crops affects food production. Studies have also shown that despite

problems that have been associated with cash crops especially sugar in the sugarcane zone, farmers still continue their production. The studies have not shown why farmers still continue in cash crop farming.

The current study covered the gaps left in the previous studies. In particular the study is critically analysed the food situation at the household level in relation to acreage allocation between the main food crops and main cash crops in the area. The study also analysed the relationship between household food security and the role of women in ensuring that their household members are secure as far as food is concern. The study also explored factors that have kept households in cash crop farming despite the income problems associated with them.

CHAPTER THREE

3.0. BACKGROUND TO THE STUDY

The previous chapter dealt with the literature relevant to the study. This chapter is going to address the background to the study. This includes a review of government's agricultural policies on food and cash crops.

3.1. GENERAL AGRICULTURAL POLICY

The agricultural policy has been guided by an overall strategy which aims at attaining agricultural growth, assuring equity in such growth and stability of farm incomes as well as a wider participation by small holders in cash crop agricultural production.

Sessional paper no. 10 of 1965 set the trend by noting the lead role agriculture was expected to play in the Kenyan economy. Agricultural development has been aimed at meeting domestic food requirements, increasing earnings accruing to farmers as well as increased foreign exchange earnings.

3.2 REVIEW OF GOVERNMENT'S EFFORTS TO ENSURE FOOD SECURITY

Ensuring availability of reliable food supplies at affordable prices has been and continues to be a sensitive issue in Kenya.

The five year Development Plans that have been

prepared since independence have tended to treat the food issue rather implicitly. The 1966/70 Development plan had its theme as rapid economic growth and equal distribution. This Development Plan was more concerned with the growth and africanisation of the economy. In the agricultural sector, the main policy activity pursued during the plan period was land consolidation and registration and settlement of the landless people in the newly created settlement schemes in the former white highlands. These programmes together with land transfer to large scale farmers and establishment of Agricultural Development Corporation (ADC) farms in the former scheduled area accounted for most of the ministry's expenditure during the plan period.

The plan period also saw the extension of cash crop farming from former scheduled areas to other areas of the country or former reserves which led to small holders taking cash crop farming. The success of this is borne by the fact that by 1985 small holder agriculture accounted for 63% of sugarcane hectarage, 97% of cotton, 79% of coffee, 62% of tea and 80% of pyrethrum. These being major crops in the economy of the country that time.

The plan period also saw the settlement of the landless and the extension of high levels of agricultural production to small scale farmers and cash crop adoption.

At the start of this plan period, Kenya was undergoing an experience which demonstrated the importance of establishing a comprehensive national food policy and planning many months ahead for the availability of food. This experience was due to a shortage of the basic food stuffs consumed by the majority of the population especially maize, leading to a situation of rationing, high prices, temporary non-availability and widespread famine among the less fortunate members of the population. This took place during the 1963/64 period. These shortages were due to:

(a) Domestic food production was substantially below normal consumption requirements;

(b) A shortfall in 1964 commercial maize planting and failure to move quickly enough to import adequate supplies of overseas maize.

With this experience, the government during that plan period emphasized food production especially in high potential areas, where food could be produced in excess of local consumption needs thereby ensuring that the surplus could then be exported to deficit areas.

The theme of the second National Development Plan of 1970/74 period, was universal freedom from want, disease and exploitation, equal opportunities for advancement, and high and growing per capita incomes

equally distributed among the population. The key strategy of the plan was to direct an increasing share of the total resources available to the nation towards rural development. The primary objective of agricultural development during that plan period was to ensure that adequate food supplies were available at prices which were reasonably low from the consumers point of view but which were still sufficiently high to give the efficient producer a fair return. This objective was however not pursued strongly because during this plan period there was no food problem.

Rural development as emphasized in the second Development Plan was continued in the third Development Plan of 1974/78. The Plan stressed equitable distribution of income and employment creation in addition to rapid economic growth. The policy of emphasising agricultural development as the key to attaining overall national development and a way of attaining income equity especially by encouraging small holders to undertake cash cropping was continued during the plan period.

There are many reasons for this shift in the development policy in favour of rural areas but at the heart of them has been the concern about the mounting unemployment and the rising inequalities in opportunities. This strategy has been promoted because of the realization that people and their land are

Kenya's prime assets. Further still, it is evident that the development of the major towns can not produce sufficient employment opportunities for a fast increasing labour force. Thus, rural development provide an avenue of fostering widespread improvements in productivity, output and employment, all of which would improve the pattern of income distribution while at the same time achieving the required expansion of food production. The central theme of the 1979/83 Development Plan was alleviation of poverty and satisfaction of basic needs, where basic needs referred to minimum standards of household income/ provision of food, nutrition, education, health, housing and water supply. Of these basic needs, food and nutrition form an important part in human life. Up to this period the food issue has not been addressed seriously. It is only this plan which has tried to address it, but has done so in passing, only when it is dealing with provision of basic human needs.

The 1984/88 National Development Plan had its theme as mobilisation of domestic resources for equitable developments. This plan was prepared against a background of a world recession which had spilt over into Kenya in terms of balanced of payments crisis and serious debt ratio. Granted that plan-writing is not the same thing as policy making, it is still correct to say that, for a long time Kenya did not have an

explicit food policy with the exception of price and distribution controls.

The current Development Plan 1989/93 has it's theme as participation for progress. It introduces a good dose of bottom-up strategy to planning. For the plan period growth will continue to be dependant on agriculture, the central goal of which is to make the country self-sufficient in food products. At the same time, production of export crops will be promoted.

The feeding of Kenyans will require increasing supplies of staple foods, principally cereals, pulses and tubers. The production of these items will be stepped up during the plan period to meet the country,s needs for internal self-sufficiency. Up to this period the question of food security has not been explicitly addressed. The country has not addressed the issue explicitly due to the fact that it did not have nationwide food shortages from independence to the end of 1970s with just a few exceptions. It was towards the end of 1979 when the country was caught up with nationwide food shortages which continued almost into 1981. This lead to the publication of Sessional Paper No.4 of 1981 on national food policy.

3.3. NATIONAL FOOD POLICY

The Sessional Paper No.4 of 1981 on National Food Policy (NFP) spells out the government's strategies

and main objectives in dealing with the question of food. The paper identifies meeting an ever increasing demand for food, stemming from a rapidly expanding population and rising per capita income, as one of the goals of Kenya's development policy during the course of that decade.

With this policy in mind the government looks upon the agricultural sector to continue to play the leading role in the country's development and to meet nearly all the country's food requirements from domestic production. The agricultural sector is also expected to continue to generate the most needed foreign exchange earnings and to provide the bulk of employment opportunities.

The main objectives of the national policy are;

(i) To maintain a position of broad self-sufficiency in the foodstuffs in order to enable the nation to feed without using scarce foreign exchange on food imports;

(ii) To achieve a calculated degree of security of food supply to every area of the country ; and

(iii) To ensure that these foodstuffs are distributed in such a way that every member of the population has a nutritionally adequate diet (Sessional Paper No.4 1981).

Although the NFP was a response to increasing food production and marketing crises resulting in

shortages of the major staples (especially maize) at that time, the theme of the paper is still valid up to now.

The paper outlines various programmes and policy measures that the government intends to institute in order to come to grips with the food problem. The policy is geared towards development of self-sufficiency in food production and proper nutrition for all Kenyans. It's objective is to ensure that all food needs are met by domestic production.

Agricultural expansion is part of the national development, creating opportunities of good health, employment and trade. The national Food Policy provides guidelines for decision making and all major issues related to food production and food distribution.

Among the subjects covered are;

(i) Price policy;
(ii) Agricultural inputs policy;
(iii) Research and extension policy;
(iv) Food security policy;
(v) Processing and marketing policy;
(vi) Agricultural trade policy;
(vii) Nutritional policy;
(viii) Resource development policy; and
(ix) Employment policy.

The central objective of the NFP is to ensure

that an adequate supply of nutritionally balanced foods is available in all parts of the country at all times. Given current resource constraints, the immediate aims of food security policy would be to obtain a calculated degree of security at the lowest cost. This would be achieved through;

- Increasing food production in all areas of the country;
- Emphasizing drought resistant crops such as sorghum, millet in dryland areas.
- The establishment of a food commodity monitoring and reporting system;
- Improved monitoring and forecasting of weather conditions in the main agricultural zones, and wider dissemination of information and expected weather trends;
- Regulation of food exports to maintain domestic supplies and importation of food as necessary to meet nutritional requirements; and
- accumulation of multi-commodity strategic food reserve from domestic surpluses and grains supplied on concessional terms to be used during periods of crop failure or other emergency situations.

Increase in population and incomes are normally cited as major causes of high demand for food. However, food shortages in a particular region may

emanate from government policies which interfere with the production and marketing of the various food crops. For example policies that restrict the movement of certain foodstuffs imply that the region which experience low levels of food production or crop failures will definitely be affected .

Critisms of this NFP is directed to it's lack of strategy details and finance interventions which would enable promoting and achieving it's objectives. The NFP like all other policies is a statement of what is intended to be achieved. It only suggests possible line of action. The policy fails to say how the laid down objectives will be achieved during implementation. The argument here is that if the anticipated resource requirements and machinery are not available then NFP will not be operational. The NFP is based on what is required rather than what is possible given the existing resources.

3.4. NATIONAL SUGAR POLICY

Government's policy for the sugar sector is not unified or coded as such. A number of direct policy statements are found in various development plans and sessional papers. But the government's policy is based on the overall objective of attaining self-sufficiency. To meet this objective the government has since independence, pursued a strategy of investing in new sugar schemes and carrying out expansion in

existing facilities. Following this strategy five new factories were built in the late 60s and early 70s to boost the domestic sugar production which hitherto had depended on the privately owned mills established in 1920s at Miwani and Ramisi.

The government owns directly between 75% and 100% of the equity in each the factories at Muhoroni, chemelil, Mumias, Nzoia and Sonny.

Since independence, sugar production has gone up rapidly from about 30,000 tonnes to 442,000 tonnes in 1989 (KSA 1991). Domestic consumption has also experienced considerable growth over the years from 100,000 tonnes in 1963 to 489,000 tonnes in 1989. Before independence, domestic sugar production was inadequate and had to be supplemented with imports in order to meet local demand.

The governments policy of self-sufficiency has meant that the sugar industry had to be developed as an import substitution industry with objectives of;

(i) Providing sugar for domestic consumption;

(ii) Saving scare foreign exchange;

(iii) Generating income and occupation for farmers engaged in cane production at the farm level.

These objectives are set within the broad agricultural and food policy which aimed at ;

(a) Increased food production;

(b) Growth in agricultural employment;

(c) Poverty alleviation;

(d) Broad self-sufficiency in main foodstuffs;

(e) Resource conservation;

(f) achieving a degree of food security for each area of the country.

(g) Ensuring efficient distribution, nutrition and diet; and

(h) Expansion of agricultural exports (Republic of Kenya 1982 and Republic of Kenya 1986).

3.5 DISCUSSIONS

In conclusion, while the general agricultural policy has tended to stress the importance of the agricultural sector in the economy, especially in meeting domestic food requirements and in earning the country foreign exchange, but the food and cash crop policies are conflicting.

The main problem with the policies is that they have been formulated independently with out regard to the effects of one policy on the other. The fulfilment of any of the stipulated objectives in the NFP involves an opportunity cost and vice versa for the objectives stipulated in the sugar policy. These opportunity costs have not been taken care of in the formulation of different agricultural policies.

Government's policy on food is geared at attaining internal self-sufficiency and achievement of

a calculated degree of security of food supply to every area of the country. While the government's policy on cash crops has been to produce sufficient quantities of cash crops so that they can be exported to earn the country foreign exchange and help raise incomes accruing to farmers from the sale of these cash crops. With increased earnings from the sale of cash crops, there is expected to be a demand for various goods and services within the country and this will stimulate off-farm activities in the small urban centres which are likely to benefit from improved infrastructure.

Therefore, cash cropping as a means of raising households levels of incomes has not been attained because despite it's introduction, household's incomes are still low.

CHAPTER FOUR

4.0. BACKGROUND OF THE STUDY AREA

This chapter analyses the background of the study area. These includes the location, physical characteristics and demographic profile.

4.1. LOCATION AND AREAL EXTENT

Belgut Division is located in Kericho District as shown in map 1. Belgut is one of the 9 Divisions which forms Kericho\Bomet Districts. The other Divisions are Londiani, Kipkelion, Fort Ternan, Bureti, Konoin, Bomet, Chepalungu and Sigor.

The Division covers the western part of the District (map 2) and borders Kisumu District to the west, Kisii District to south west, Bureti Division to the east and Fort ternan to the north west.

The Division covers six administrative locations and 23 sub-locations. The locations are Soin, Mosop, Kiptere, Waldai, Kapsaos and Chakaik. The Division covers an area of about 1040sq km of which 448.5sq km is suitable for arable cultivation and only about 233 sq km is under agricultural use.

There are 4 major agricultural zones in the district. These are;

(i) Upper highland which covers an area of 887.5 sq km;

(ii) Lower highlands which covers an area of

2662.05sq km;

(iii) Upper midlands which covers an area of 1250qs km;

(iv) Lower midlands which covers an area of 175 sq Km.

4.2. RELIEF AND DRAINAGE

The area lies along the south western edge of Kenya Highlands forming a hilly shelf between the Mau escarpment and the lowlands of Nyanza. Most of the Division is characterised by undulating topography that gradually develops to a flatter terrain in the south. The overall slope of the land is from east to west. Consequently drainage is also in that direction, cutting through deep valleys and gorges.

The altitude varies from 2700m from the eastern part to about 1800m from the southern part and falls to about 1500m in the west bordering Kisumu. On average the area lies above 2000m and it is for this reason that it enjoys a cool climate throughout the year. Rivers are spread evenly within the division and this gives it's inhabitants easy access to water.

The sugarcane zone is in the southern part which is generally flat and is suitable for mechanisation. But as one moves eastwards the topography changes, characterised by small valleys and rocky hills and these makes mechanization a problem. There are also

many rivers with no developed bridges making mechanization a problem.

4.3. CLIMATE AND VEGETATION

The change in altitude and other factors cause the temperatures to vary from 20 degree celcious along the border with Kisumu District to 18 degrees celcious around Kericho town. Rainfall though variable, is generally adequate for agricultural production . The annual rainfall varies from 1800mm to 2200mm around Kericho town and from 1400mm to 1800mm around the forest area. The driest parts of the Division are those which borders Kisumu and Narok Districts. The wettest months are April and May and the dry months are from December to March. However there is good distribution of rainfall throughout the year.

The vegetation of the District varies greatly, to the east and around Kericho town, the vegetation is mainly that of tropical equatorial forests. To the south of the town we have the tropical forests, then followed by tropical savannah, then to savannah grassland to the border of Kisumu District, Savannah grasslands extends beyond the border into Kisumu District. The Division is covered mostly by tropical savannah and savannah grasslands. Sugarcane was first planted in the savannah zone but has gradually moved to the tropical savannah zone. The main crops which

does very well here are maize, millet, sorghum, coffee. The area has a medium to long cropping season. The main types of grass are the rhodes grass, bana and high grass savannah. Sugarcane being a type of grass is expected to adopt well to the area given that the long grasses are well adapted to the same conditions.

The Division is in a District which ranks among the highest potential agricultural Districts in the Rift Valley and the republic at large. About 90% of the total area is cultivable land.

The area can be classified into two ecological zones based on soil types, rainfall and altitude;

(i) High potential zone: This is well suited for agriculture and forestry. The soils here changes from clay dark to dark loam in texture.

(ii) Medium potential zone: The land is suited for coffee and maize growing and for both beef and dairy farming. Towards the south this area stretches towards the western section of the division bordering both Kisumu and Kisii districts, where maize and sugarcane are grown and dairy cattle kept only to a small scale.

TABLE 4.1 GROSS MARGINS OF MAIN CROPS

crop	gross margin/year/ha
Sugarcane	8,062.40
Maize	1,596.20
Coffee	4,394.30
dairy	4,430.00
Tea	5,539.00

SOURCE: KSA 1991.

Sugarcane has a higher cross margin per hectare per year as compared to other crops in the Division. This higher cross margins show why most farmers in the Division have ventured in to sugarcane production as their major crop.

In conclusion the importance of rainfall distribution is that it allows farming to be practised through out the year. The long rain periods normally being associated with staple crops like maize while the short rain periods can be used for the growing of short season crops like vegetables. Therefore occupying the households thought out the year and also helping them get incomes during the dry periods following the short rains through sale of vegetables which are normally in short supply during this time.

Both the mean temperatures and annual rainfall show that the Division is largely medium to high potential where rainfed crop cultivation is possible for a variety of crops ranging from low rainfall crops

in the southern part like millet and cassava to high rain to high rainfall crops in the eastern parts like maize, tea and coffee.

4.4. SOILS AND LAND USE PATTERNS

Soils in the division are very variable. The elevated areas are dominated by typical Kikuyu red loam while the lower areas are dominated by black cotton soils. The central parts of the Division are dominated by dark red friable clays (latasolic) and the lower parts by black clay soils (Grunosolic) with impeded drainage. Those soils founded in the borders of Kipkelion Division are prone to water logging.

TABLE 4.2 SOIL TYPES

SOIL TYPE	AREA(SQ.KM)	LAND USE PATTERNS
Clay	1,659	(High potential) tea, pyrethrum, dairy, cattle, maize.
Loam	886	(Medium potential) tea, dairy cattle, coffee, sugarcane, beef cattle.
Black cotton soils	989	Cotton, beef,zebu cattle, maize and bee-keeping

SOURCE: Kericho District Development Plan 1989.

Sugarcane does very well in loam cotton soils but in the study area it has moved to the high potential

zone replacing tea, maize, cattle and pyrethrum. In the high potential area (clay soils) sugarcane needs a longer period to mature.

4.5. DEMOGRAPHIC PROFILE

The Division covers an area of 1040sq.Km with a population of 249979 as per 1988 Kericho District Development plan, with a density of about 247 persons per sq.km. Using a growth rate of 3%p.a, the expected population in 1993 is 294597 with a density of 292 persons per sq.km. The 1983 CBS population projections was 223,714 for the division, this shows that the rate of population growth in the Division has been constant.

Parts of the Division are drier than other areas of the District especially the areas bordering Kisumu District, where on account of low rainfall, these areas have lower population than average density for the District.

4.6. TRANSPORT AND COMMUNICATION

The area is served by a national road, the Kericho-Kisumu (via Kericho) high way. The District has a total of 118 classified roads, of these 37 are in Belgut Division. All the roads in the area are complete with 13.5% of them not functioning due to poor maintenance and due to the fact that some of

these roads have wooden bridges which have either been swept a way or submerged during rainy season. 62.2% of the roads are fully utilized, while 24.3% are overutilized this is due to agricultural activities in the Division especially in transportation of tea and sugar cane.

The Division has a total of 15 unclassified roads, of these roads 7% are incomplete. This is because these roads are earth roads and gravelling work is incomplete. 14% are complete but not functioning , this is due to the fact that they are earth roads and bridges and culverts have not been built and they cannot be used. 7% are functioning inadequately because the roads require major bridges. 65% are fully utilized and 7% are overutilized.

Other communication services like telephones were introduced recently and those who can afford have installed them in their homes.

Roads are very important in sugarcane production, because transport is the single most expensive mechanisation in the sugar industry. Infrastructure plays an important role in sugarcane transport because transport is affected by the nature of roads available in a given area.

If there are poor roads in a given area then the rate of sugarcane harvesting and transporting becomes very slow. It is even worst in earth roads because it

is impossible to transport cane during the raining season. Therefore, the poor roads in the Division have been a major constraint to the development of the sugar industry .

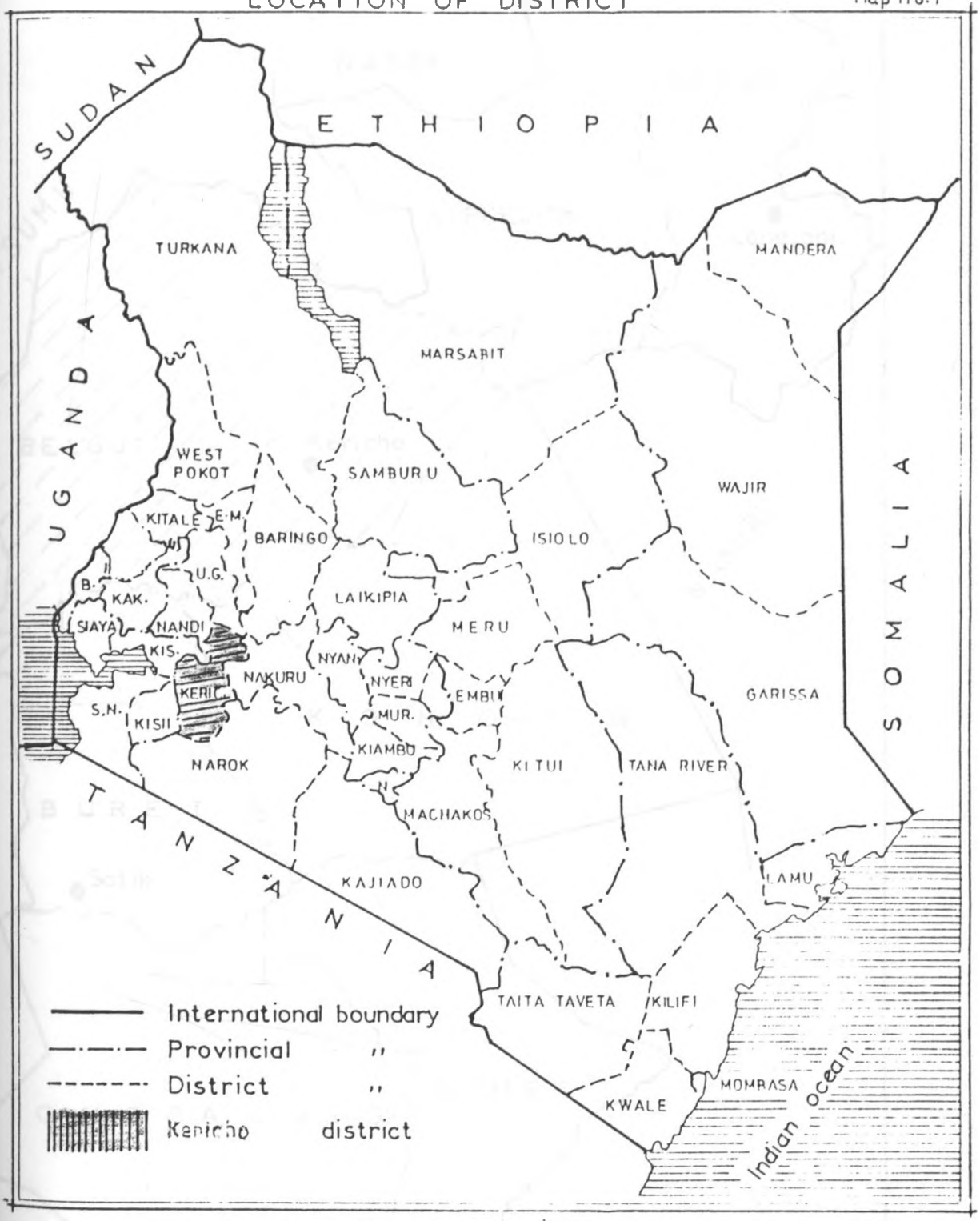
Physical characteristics and the location of an area is very important in the study because the location of agricultural activities. Agricultural activities are located in areas where climatic conditions are suitable for their developments, mostly where conditions will allow for their maximum production. Physical characteristics are also important in transporting of agricultural products, because the determine the nature and the conditions of the transport network.

Demographic characteristics are important in determing the availability of labour required for agricultural production.

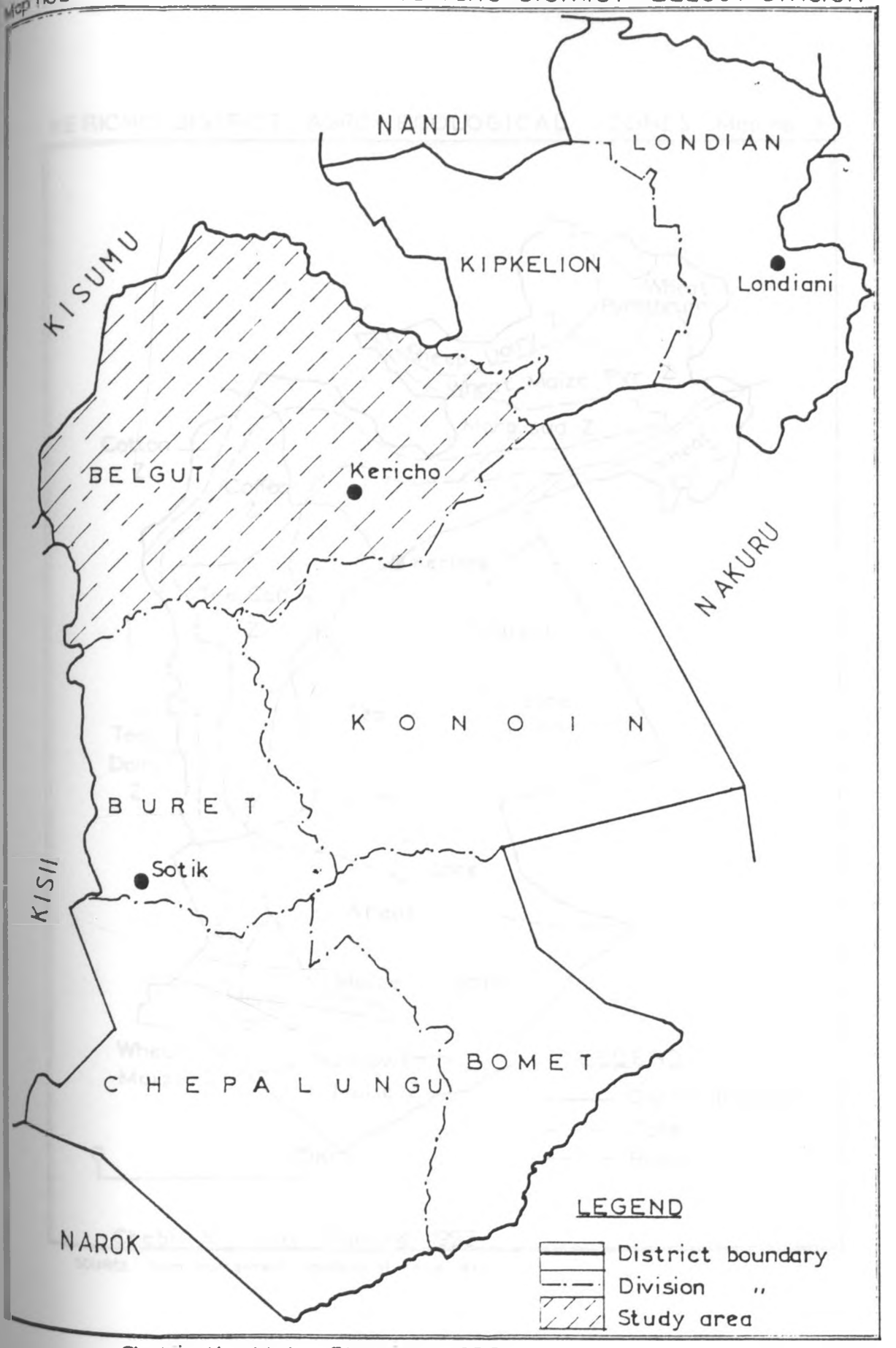
In conclusion, the analysis of such factors such as the natural conditions including soil, climate, physical infrastructure as well as the demographic factors reveal that there is a scope for diverse agricultural developments in the Division given the diverse nature of the soils and vegetation types. Also the climatic conditions and vegetation are suitable for sugarcane and other cash crops development.

LOCATION OF DISTRICT

Map No.1

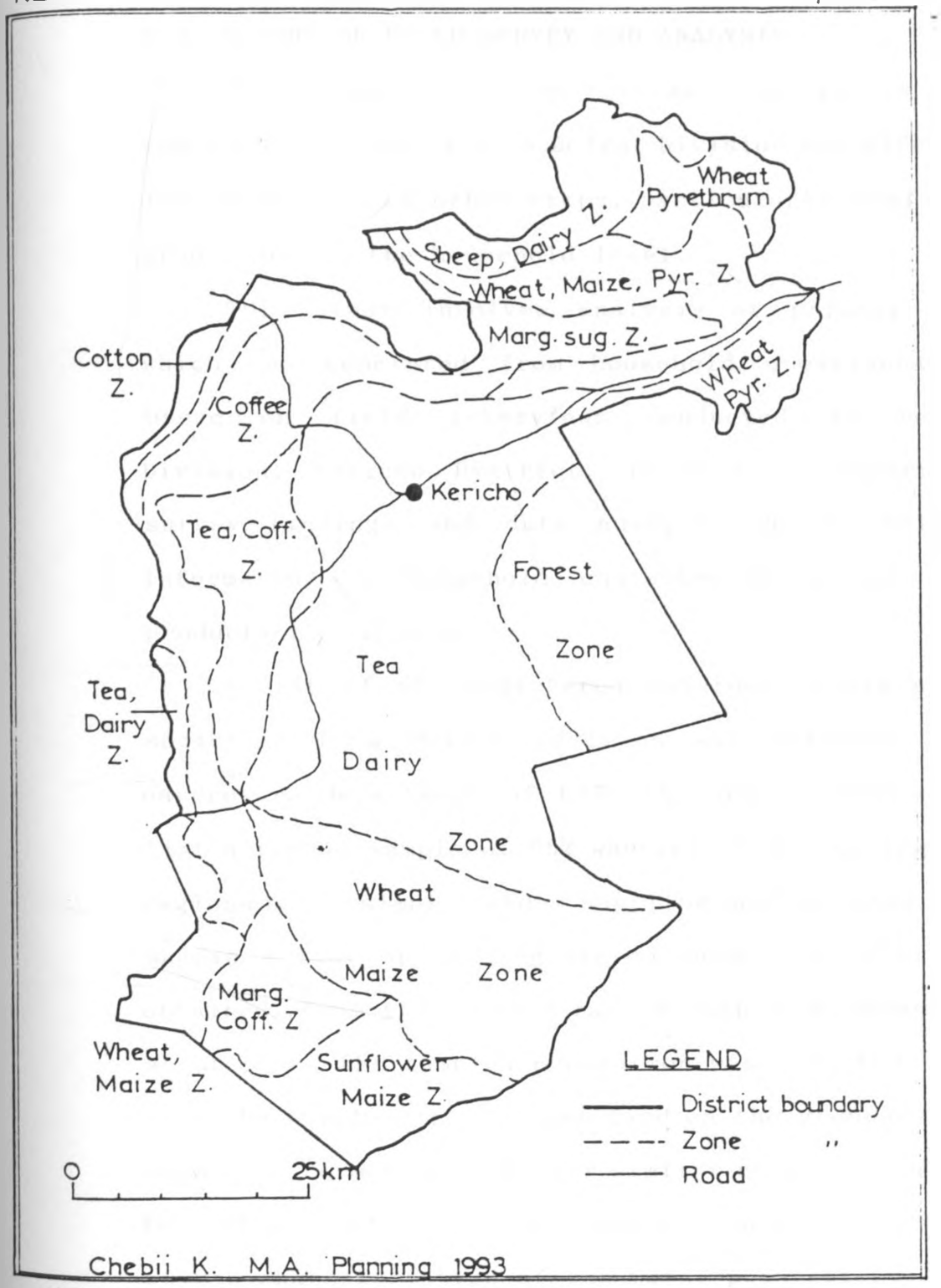


Map no2 REGIONAL CONTEXT– KERICHO DISTRICT - BELGUT DIVISION



Chebii K. M.A. Planning 1993

KERICHO DISTRICT AGRO-ECOLOGICAL ZONES Map no. 3



Chebii K. M.A. Planning 1993

SOURCE: Farm management handbook of Kenya 1982

CHAPTER FIVE

5.0 REPORT OF FIELD SURVEY AND ANALYSIS

This chapter is an attempt to assess how sugarcane introduction in Belgut Division has affected the production of other crops, particularly food crop production at the household level.

This study involves analysis of primary data which was generated from household questionnaires based on field interviews conducted in Belgut Division, Kericho District. It gives a report of survey findings and data analysis which includes information on household characteristics and crop production analysis.

A list of all registered outgrower cooperative societies from Belgut Division was obtained from outgrowers department of EASI (Muhoroni). Form this list a random sample of 50% was selected covering all regions using simple random sampling method. From this sample a list of all registered farmers in them was obtained. From this list a random sample representing about 5% of the sampled population was selected.

The sample size is justified on the grounds that sugarcane farmers have fairly similar characteristics. Even if a smaller size was chosen it would reveal the common characteristics of the total population.

5.1. RESPONDENTS

A total of 80 households were interviewed in the

field, 70% of them were headed by men and 30% were headed by women. The average household size was found to be 6 for the sampled population. 30% of the population in the Division is aged below 14 years and therefore not available for farm work being either in school or too young to help in farm work. The dominant age-group is between 20-35 years. The rate of emigration in the Division is very low especially for women, therefore this group is available to provide labour in the farm if they are not in formal employment. 35 years and above accounts for about 20%. They too provide labour if they are not in formal employment.

76% of the farmers interviewed were married, 11.3% were separated and 12.5% were single. Only 2.5% of the interviewed farmers did not have any formal education, 50% had gone upto primary school, 41.3% had gone upto secondary school and 6.3% had gone beyond secondary level.

5.2. FARM HOUSEHOLD INCOME SOURCES

It was found that households have 3 sources of income as shown in table 5.1. These are agriculture, business and off-farm employment. Very few households were engaged in off-farm employment and business and therefore incomes from these sources were very minimal.

TABLE 5.1 FREQUENCY DISTRIBUTION OF INCOME SOURCES

Source of income	Frequency
Agriculture	46.3
Agriculture/employment	42.5
Agriculture/business	10.0
Employment	1.3

SOURCE: Field survey 1992

46.3% of the sampled households had agriculture as their only source of income, while 42.5% had agriculture and formal employment as their source of income. From this it can be seen that agriculture is the main source of employment in the study area, such that if agriculture failed many households would suffer. Those who rely on agriculture and business were 10% and a very small percentage (1.3%) relied on formal employment only.

Incomes resulted from the sale of cash crops as well as sale of surplus food crops. The incomes from this source were quite substantial. Incomes from other sources which included business and formal employment were low but are important since they supplement incomes from agriculture. The contribution from these sources are shown in the table 5.2.

TABLE 5.2 HOUSEHOLD INCOME BY SOURCE

Source	average amount p.a	amount as % of total ave. income
Farming	30,400	87.99
Business	2500	7.24
Off-farm employment	1650	4.78
Total	34,550	100

SOURCE: Field survey 1992.

The average gross-income of households is Ksh. 34550, with Ksh. 30,400 coming from farming, Ksh. 2500 from business and Ksh. 1650 from off-farm employment as shown intable 5.2 above.

The analysis showed that incomes from sugarcane averaged Ksh.18,700, and Ksh.11,700 came from the sale of other farm products.

5.3. LABOUR SOURCES

Of the 80 households only 8 did not have any of their members employed in the farm, while 72 households had between 1 and 7 members. On average about 3 members per household of 6 were employed in the farm, which is about 50% of the population in the area. People in off farm employment were very few, 14 households did not have any of their members in off-farm employment, while the rest had between one and two members, with an average of one member per household. Therefore off-farm employment is not a

major source of income in the area and more efforts should be made to improve agriculture production. The rest of the household members were either very young at home or in school.

5.4. FARM HOLDINGS AND OWNERSHIP

The average farm holding per household was 10.8 acres at the time of study.

TABLE 5.3 FREQUENCY DISTRIBUTION OF LAND HOLDINGS

Acreage	No. of HHs
0 - 5	31
5.1 - 10	26
10.1 -15	12
15.1 -20	1
20.1 - 25	3
over 25	7

SOURCE: Field survey 1992.

From the analysis it was found that most farmers owns between 0 and 10 acres. The majority own between 0 and 5 acres as shown in table 5.3 above. Those with 0 acreage were either in their parents farms or in those farms owned by friends or relatives who were living in other parts of the division or had moved out to settlement schemes. Few households own more than 10 acres. Only 11 households had over 15 acres. Therefore farming in the division is mainly small scale.

TABLE 5.4 FREQUENCY DISTRIBUTION OF FARM OWNERSHIP

Ownership	Frequency
individual	65.4
parents	25.0
relatives and friends	9.6

SOURCE: Field survey 1992.

It was found that 65.4% of the households interviewed owned the land they were living in, and therefore did have total control on farming activities in those farms. 34.6% did not own the land they were living in, of these 77.8% were living in their parents farms, and 22.2% were in farms owned by their relatives or friends. Most of those who did not own land had limitations on what to do on the farm. In most cases it was the real owners who were carrying out farming in those farms. Households who were living in their own farms had all the rights on the activities taking place and some had divided their holding between cash crops and food crops. While those who were living in other peoples farms had limited rights, it was found that the real owners were more concern with cash crops and had left little on in extreme cases no piece for food production for those living in their farms. This had affected the levels of food production.

53.8% of the interviewed households either owned or leased other farms apart from the ones they were

staying in, the acreage ranged from one to 20 acres but averaged 4 acres. Most of it was far from the homestead, on an average distance of 4.5 Km.

5.5. PATTERNS OF LAND USE

TABLE 5.5 Acreage under individual activities

Activity	Acreage
Food crops	2.7
Cash crops	6.6
Livestock	1.0

SOURCE: Field survey 1992.

Land was generally put into 3 main activities namely cash crops, food crops and livestock production. More emphasis has been given to cash crop production with more land having been allocated to sugarcane crop. 0.5 acres was under housing.

Before sugarcane was introduced into the area, the main crops were maize and beans, where a larger portion of the land had been allocated to the production of these crops, but this has since changed with sugarcane introduction.

TABLE 5.6 acreage under individual crops before and after sugarcane introduction

crop	acreage before cane introduction	acreage after cane introduction
maize	3.1	0.8
beans	2.6	0.5
millet/sorghum	0.5	0.2
green vegetables	0.5	0.3
potatoes	0.3	0.2
tomatoes	0.4	0.2
fruits	0.8	0.5
bananas	0.3	0.2
tea	0.7	0.7
coffee	0.7	0.7
napier grass	0.5	0.2
sugarcane	-	5.1

SOURCE: Field survey 1992 and Kericho District Development Plan 1978/84.

From the table above it has been shown that the acreage under food crops has changed with the introduction of sugarcane in the Division. The figures show that total acreage under food crops currently is lower than total acreage under cash crops, with sugarcane taking a higher portion than tea and coffee. Sugarcane is taking over 53.1% of the total farm area currently. Before sugarcane was introduced in the Division the acreage under food crops was higher than that under cash crops combined.

64.3% of the leased acreage was under sugarcane,

an indication that sugarcane has become a main crop in the area. It was found that those farms currently under sugarcane were previously under other crops particularly maize. This is because the other main crops in the area (tea and coffee) are protected, so the farmers could not get rid of them as they did with maize which is a seasonal crop and not protected. It was also found that previously farmers used to lease extra farms for maize production but this has since been replaced with sugarcane. 21% of the leased farms were under maize at the time of study this is about a 1/3 of that under sugarcane. Therefore, food crops have been gradually replaced with sugarcane, and if the present trend continues food will be wiped out with time.

The farms which were not under crops were under livestock, this was about 10%. This is not enough to support profitable livestock production in the area. Zero grazing in the area has not been practised due to a number of factors. First, land had not become a problem until recently and so farmers have not prepared themselves for land intensification. There is also the problem of water. All the households interviewed relied on getting water from the river and is a major limitation to zero grazing. There is also the problem of commitment in the side of the farmers because very few of them have seriously considered

land intensification.

Most farmers were leasing grazing lands but it was found that they are no longer as easily available as they used to be. The main reason being that the farmers who want to grow sugarcane pay better than those who want it for grazing. It is also possible to double lease in the case of sugarcane because when a farmer intercrops he pays double and it is not the case with livestock. Though sugarcane could be a good source of silage, it is not enough to sustain livestock production since it becomes available only when cane is being harvested, and that is once in at least 24 months. Also the Nyanza sugar belt where Belgut sugarcane falls burns it's sugarcane during harvests and this makes silage unavailable or if available is not readily accepted by livestock who are used to fresh grass.

Molasses is a very good source of animal feed, and is available as a by-product of sugarcane processing. Since sugarcane is processed in the factories, it becomes available there from where it is sold to farmers who are willing to buy. In the study area, it is only a few farmers who afford to buy it regularly while the majority can not. This makes it use by the areas livestock to be very low.

Soin location had the highest percentage of hired farms by other farmers. This is because it is located

in the southern part bordering Kisumu District which is almost 100% sugarcane zone and sugarcane does better here than in the areas beyond it. Mosop location had 34.1%, under sugarcane because the crop was recently introduced in this area. At the rate at which it has gone up,this percentage is expected to increase further.

Average acreage per household has not been negatively affected with the introduction of sugarcane in the Division. Before sugarcane was introduced acreage varied from 1 to 57 acres, with majority of the farmers having between 3 and 10 acres. 12 households had 5 acres, while 4 farmers had 20 acres and above. Average acreage at that time was 9.3 acres, (Field Survey 1992).

With the introduction of sugarcane, few households have sold part of their farms. It was found that 61 (89.7%) had not sold any of their farms. Those who had, had sold between one and two acres, average sold was o.147 acres. This is because those households who cannot afford to venture into sugarcane, can lease out their farms to those who can without necessarily having to sell and therefore retain the ownership.

The introduction of sugarcane has infact caused the average land available to households for farming to increase from 9.3 acres to 10.8 acres, because some farmers have bought farms elsewhere but the increase

has not been accompanied by higher levels of food crop production.

5.6. SYSTEMS OF CROP PRODUCTION

There are two main types of crops produced in the area. These are cash crops and food crops. Cash crops are those crops grown mainly for the market while food crops are those grown mainly for subsistence; that is home consumption and the surplus sold to earn the household some extra income.

The cash crops include tea, coffee and sugarcane and the main food crops include maize, beans, millet, potatoes, tomatoes, bananas, fruits, and green vegetables. Napier grass is grown mainly for livestock. It was found that there are many households who are going into sugarcane production. This is an indication that sugarcane farming is on the increase and the land holdings which were previously under food crops have been taken. This has caused a decrease in food outputs leading to food insecurity.

The main reason which is driving households in to sugarcane farming is the perceived high profits that has been associated with it, though the analysis shows that this profits are not really that good. These farmers were found to assume that the large sums of money that they get at once are profits. They argued that they would prefer this large amounts than the

smaller amounts because they can undertake better and bigger tasks than they would with small amounts.

They also argued that they get better yields from cane than from other agricultural activities in the area.

5.7. INFORMATION ABOUT SUGARCANE CROP AND ASSOCIATED PROBLEMS

Sugarcane was introduced in the study area on a small scale in the late 1970s, but large scale production was in the early 1980s upto mid of that period. It was first introduced in those parts of the District bordering Kisumu District. With time it was found that it has moved to other parts of the District further a way from the border.

Initially it was only one zone (A) which was producing sugarcane in the Division, but at the time of study it had moved upto zone D, and it is expected to increase further if this present trend continues. As sugarcane moves across the Division it replaces other crops, mainly maize, tea and coffee which previously were the main crops in the area.

Acreage which was under sugarcane at the time of study varied from one household to the other depending on the size of their holdings. But on average it was found to be 5 acres. This too is expected to change with time as more farmers join and devote more acreage

to sugarcane production.

5.7.1. LAND PREPARATION AND COSTS

Sugarcane in the Division falls under the Nyanza Sugar Belt (NSB) - (East Africa Sugar Industries-Muhoroni factory).

Sugarcane in the Division is carried out by outgrower farmers who are either contracted by the factory or on their own. Contract is mainly carried out through block operations, where the farmer is only required to commit his/her land and the factory carries out all the other operations until the cane is harvested, then deduct what they spent plus interest and pays the farmer the difference. This is only profitable in large farms.

In cases where the factory has contracted the farmers, it was found out that the intensity of land preparation is not as thorough as in the nucleus estate, yet the company charges farmers high rates for poorly done jobs. This has been found to lower the farmers income.

On average it was established that farmers spent about Ksh. 2000 per acre on land preparation .

5.7.2. SEED CANE PRODUCTION AND PROCUREMENT

Seed cane as an input, its quality and the quality of the planting operation determine the original strength of the crop, at the beginning of the growing cycle. It is therefore important that seed

cane growth is exposed to careful husbandry practices and handling.

EASI and it's outgrower farmers does not use seed cane from nurseries. Instead, the first crop of a healthy sugarcane in the zone is used for seed cane. This cane is not certified and therefore affects yields of sugarcane crop.

For farmers who are not contracted, they use cane from around their farms, either from their own or from their neighbours. This reduces the transport costs. But in cases where farmers have to transport seed cane for long distances, it becomes very expensive. For the contract farmers they pay more because the factory can pick cane from any part of the zone without taking into account the distance. The factory charges for seed cane at one and half times the rate of burnt cane.

Therefore seed cane is an expensive item for farmers, especially when it is transported from the nursery to the farm.The cost of seed cane is charged per tonne . These costs were found to be uniform throughout the EASI zone. At the time of the study, EASI was charging Ksh. 20 per tonne. This is the highest rate among all the rates in the sugarcane growing areas of the country. It has been found that the percentage difference between the lowest and the highest cost for outgrowers is 36.6% (KSA 1992). This

means that a farmer at EASI spends 36.6% more on seed cane compared to the farmers in Nzoia company which charges the least . The farmers in other factories fall within the range of zero to 36.6% with Nzoia farmer paying the least.

They are also labour and time cost which are supplied by the farmer which are not quantified. This adds to the cost of seed cane.

5.7.3. SUGARCANE MAINTENANCE

This operation include weed control measures and fertilizer application. Weed control involves either hand weeding and/or herbicide application. In the study area, hand weeding was the main practise used by non-contract farmers and would occasionally use herbicide where weeds grow very fast, making hand weeding ineffective. It was also found out that some farmers use both methods of weed control. This is more effective and less expensive.

The factory uses herbicides more in weed control than hand weeding. It was found that it is only in few occasions that they use hand weeding. Herbicide weed control is encouraged in those places with labour shortages or where manual labour tends to be expensive. Know how is highly required for efficient application of herbicides. It is also encouraged for those crops which have high returns per unit of input. Though this may be the case it was found to affect

returns to farmers negatively, especially those contracted by the factory. Costs of herbicides are controlled by the factory management.

In general, it was found that manual hand weeding is still the most widespread method of weed control in the sugar industry. There are about four weedings per crop cycle.

5.7.4. FERTILIZER APPLICATION

Fertilizer alone may not be a major factor in increasing yields. Other factors like time of application, rainfall and number of weeding also play a role.

From the field survey it was found that farmers rarely apply fertilizers to their crops and for those who do it, they only apply to the first or second ratoon crops. This low rate of fertilizer application has greatly affected yields of sugarcane in the area, affecting incomes.

The nucleus estate and contract farmers apply fertilizers and in this farms yields are higher (KSA 1991).

Farmers get fertilizers from the factory through their cooperative societies, non-contract farmers pay cash on delivery or sometimes take credits through cooperatives while contract farmers do not pay until their cane is harvested, when the factory make their deductions.

5.7.5. CANE HARVESTING AND TRANSPORT

Sugarcane harvesting is a labour intensive operation and is totally non-mechanised in the Kenyan sugar industry. Availability of cane cutting labour is therefore subjected to labour supply peaks and deficiency periods. Sugarcane cutting in the NSB has been found to be 100% cheaper to the farmer than his counterparts in Western sugar belt (KSA 1990) because cane is burnt for cutting in the NSB. Cost of harvesting burnt cane is lower than that of green cane, but burning makes the cane to deteriorate faster, therefore decreasing the quality.

The study area falls under NSB and therefore cane harvesting is burnt. Burning is done by the farmer himself or using hired labour in the case of non-contract farmers. Burning is only done after the farmer has been given consent by the factory management. Since harvesting is a very intensive operation most farmers were found to prefer factory labour because it is more reliable. Few farmers preferred to use their own labour, because it is cheaper though very unreliable and often very slow.

Cane loading is mechanised in some places, while in others it is done manually, mainly by labour hired by the tractor owner.

5.7.6. SUGARCANE TRANSPORT

Transport is the single most expensive agricultural mechanisation in the sugar industry. Sugarcane transport forms an important link between the farmer and the factory.

Infrastructure plays an important role in sugarcane transport because transport is affected directly by the nature of roads available in a given factory zone, the prevailing weather conditions, machinery type and organizational management. Transport cycle is made up of loading, road travel, weighing and the off loading operations.

Roads in the study are very poor, and they become worse during the rainy season therefore hampering the transport of sugarcane. During the field survey it was found that in some places when it rains, cane has been left to overmature for even upto four years and this reduces the tonnage therefore reducing earnings to the affected farmers.

Cane transporters charges the farmers per zone. Most part of the study area is in zone D, and farmers pay Ksh.100 per tonne. Since this zone is the furthest it means that cane has to travel for a long distance and due to the effects of poor roads farmers loss a lot of cane in form of spillage losses.

5.7.7. COST OF SUGARCANE PRODUCTION

It was found out that the cost of sugarcane production varies from place to place and from one farm to another. On average it was established that a farmer needs about Ksh.6400 per acre for the development of his crop. However the cost was found to vary from Ksh.3300 to Ksh.9000. The difference is mainly due to the extent to which each farmer does his land preparation, the types and amounts of inputs used and transport costs which also depends on distance to the factory.

It was also found that charges for cane cutting varied a lot. Those farmers who use labour from around their farms were found to pay less than those who use factory labour.

Average total income for the first crop was found to be about Ksh.15,800 per acre and ranges from Ksh.11,000 to Ksh.19,500. Average net income was found to be about Ksh.10,000, and ranges from Ksh.3,400 on the lower side to Ksh.15,000 on the higher side.

Expenditures on the first ratooned crop were found to be lower than those of the first crop and so is the net income. The important thing to be done at this stage is the timely removal of trash, weeding and fertilizer application. These are crucial if yields are going to be maintained. Expenditures on the second and subsequent ratoons become lower and so does the

income. These lower incomes become very crucial to household food security especially those who depend solely on cane incomes for food purchases.

It was found that, for sugarcane to be economically viable, cane harvesting should not go beyond two ratoons, because beyond this, returns become very low and in some cases might be negative. In the study area most farmers either went upto the second or third ratoon. The few who went beyond this are those who were planning to get out of sugarcane crop.

5.8. FOOD CROPS AND CASH CROPS PRODUCTION SITUATION

The field survey showed that 50 out of 80 households were planning to extend acreage under sugarcane production, while 25 were planning to extend acreage under food crops. 5 were planning to extend acreage under both types of crops. These are the ones who had large farms and at the time of study most of it was lying fallow, therefore they could extend both types of crops without affecting the output of any. While those who were envisaging of extending either acreage under sugarcane or food crops had limited land sizes and expansion of one would affect the other negatively.

These large number of households going to sugarcane farming indicate that it is on the increase

in the study area.

The farmers who were envisaging of extending acreage under food crops cited food shortages as their main reason. They argued that food shortages was becoming a main problem in the study area, even those who had money could not get food because it can not be found in the markets.

Recent adjustment in cereal prices has made cereal production to be more economical and most farmers would rather venture into it than going into sugarcane where payments are very unpredictable and infrequent. Farmers also have found incomes from food crops (mainly maize and beans) to be more regular, and they can therefore plan for it comfortably. The crop and its disposal is also under the control of the farmer while in the case of sugarcane they have to wait for the factory management to decide when to harvest the farmers cane and even when they finally decide to harvest payments are made after about 6 or more months. These payments are also paid in irregular phases. Initially they are paid 60% of the total earnings and the remaing 40% is paid very much latter. This makes them very unpredictable and therefore improperly spent.

Those who were envisaging of extending acreage under sugarcane cited high incomes as their main reason.

It was established that 20 households had increased acreage under food crop in the last five years prior to the study period. The rest had either had it constant or had reduced. This shows that maize is no longer being given the priority that it used to get. If the present trend continues then in future maize will have to be literally imported to the Division from other areas. It is also unlikely that it will be possible to get maize easily since the areas bordering the Division have overtime shifted from food crop production to different types of cash crops. Kisumu District on the southern part grows mainly sugarcane. The eastern and the north eastern part bordering Kericho town and Bomet District is mainly under tea and pyrethrum crops. Kisii District to the south east is also under tea and pyrethrum, holdings in these areas are very small and there might be no surplus for sale to the neighbouring areas. This means that food to the Division will have to imported from distant Districts at a higher cost than it was produced in the Division.

5.9. EFFECTS OF SUGARCANE FARMING ON HOUSEHOLD INCOME

TABLE 5.7 Average household income per annum from crops before and after sugarcane introduction.

crop type	ave. income p.a before introduction	ave. income after introduction
maize	6160	1500
beans	1090	300
millet	100	80
vegetables	400	-
bananas	600	220
tea	4800	4800
napier grass	-	-
coffee	5700	3500
fruits	550	200
potatoes	840	250
tomatoes	1800	850
sugarcane	-	18,700
TOTAL INCOME	22,040	30,400

SOURCE: Field survey 1992.

From the figures in the table it can be seen that total income p.a from crops before sugarcane introduction was Ksh.22040, and after sugarcane introduction incomes have changed to Ksh.30,400. This is an increase of Ksh. 8360. This change of incomes may be attributed to better incomes from sugarcane , because at the same time incomes from other crops has drastically gone down. But, these changes in incomes have been accompanied by high inflations rates in the

country in general and the hustle and delays which are often encountered in sugarcane production. Therefore, the value of Ksh.8360 at the time of study is lower than before sugarcane introduction. The prices of commodities have also changed and farmers now have to pay more when they make purchases.

5.10. EFFECTS OF SUGARCANE FARMING ON HOUSEHOLD FOOD SUPPLY

One of the hypothesis of the study was that the introduction of sugarcane farming in Belgut Division had reduced the amount of land available for the production of other crops especially food crops causing reduced food production leading to increased household level food insecurity.

Testing of this hypothesis requires data on the average land holding per household before and after the introduction of sugarcane in the Division. Also data on average food output before and after sugarcane introduction is required. Also data on the allocation of holding between sugarcane and the main food crops is required for testing of the hypothesis. These are important to show reasons of change in food output. Changes in food output can be attributed to different factors. Among these are adverse weather conditions, like floods, droughts, also reduced use of inorganic fertilizers, less land being devoted to food crop

production, a lot of land subdivisions or farmers could have simply stopped production of these crops.

The major food crops in the study area are maize, beans, and millet/sorghum. The farmers were asked how much of each they produced before and after they introduced sugarcane in their farms. Before refers to that period prior to the introduction of sugarcane and after refers to the study period. This information was based on the farmers mental recollection, in some cases nA (valid observations before sugarcane introduction) and nB (valid observations after sugarcane introduction) are not the same because some farmers could not remember the acreage under some crops before they planted sugarcane.

To test for significance of difference between two sample means, we use the formula

$$Zc = \frac{\overline{X}B - \overline{X}A}{\sqrt{\frac{\sigma^2 B}{nB} + \frac{\sigma^2 A}{nA}}}$$

i) Zc - computed Z-statistics

ii) $\overline{X}_B$ - arithmetic mean of output of food crops before sugarcane was established

iii) $\overline{X}_A$ - arithmetic mean of output of food crops after sugarcane introduction

iv) σ_B - variance of food crops produced before

sugarcane was established

v) σ_A - variance of food crops after sugarcane establishment

vi) nA and nB - sample size nA = nB since it is the same farmers who gave information on the activities before and after sugarcane introduction.

Using T-test at 0.05 significance level (95% level of confidence), the critical value of Z is 1.96. Thus if computed Z statistic (Z_c) is greater that theoretical Z- statistic (Z_t), the hypothesis that there is a significant difference between two means will be accepted.

We assume a normal distribution because the sample size chosen is greater than 30.

- Frequency distribution of some crops is omitted because their output before and after is insignificant
- only 3 main crops are used.
- Also the number of valid observations varied

because not all farmers interviewed gave required information especially on those crops grown befor sugarcane was established.

Food deficit was analyzed in terms of more land being devoted to sugarcane production and less land left for food crop production.

5.10.1. HOUSEHOLD FOOD SUPPLY BEFORE AND AFTER SUGARCANE INTRODUCTION

TABLE 5.8 Frequency distribution of output of maize before and after sugarcane introduction

Frequency of output (bags)	Distribution before sugarcane introduction	Distribution after sugarcane introduction
0 -10	6	22
10.1 - 20	9	28
20.1 - 30	10	19
30.1 - 40	5	2
40.1 - 50	18	-
over 50.1	27	1
mean $\overline{X}$	44.6	17
σ	650	129
n	75	72

SOURCE: Field survey 1992.

TABLE 5.9 Frequency distribution of beans and millet before and after the introduction of sugarcane.

	BEANS		MILLET.	
output (bags)	Dist. Before	Dist. after	Dist. before	Dist. after
0 - 5	39	49	35	26
5.1 - 10	15	11	-	-
10.1 - 15	5	2	2	-
15.1 and above	3	1	4	-
mean $\bar{X}$	8.1	3.5	4.9	0.7
σ	248	14	170	0.5
n	62	63	39	26

SOURCE :field survey 1992

To find average cereal output before and after sugarcane introduction in the Division,

The mean cereal output before sugarcane introduction was 56.1 bags and with the introduction of sugarcane the mean output has changed to 21.6 bags.

To test for significance of difference between mean cereal output before and after sugarcane introduction.

Using t-test at 0.05 degrees,

The value of t observed = 8.47 and value of t expected = 1.67

Therefore $t_0 > t_e$. Therefore there is a significance difference in mean cereal output before and after sugarcane introduction.

The mean difference is 34.5 bags.

This difference in cereal output can be attributed to many factors, these include drought, floods, low levels of inorganic fertilizers, decling land holdings per household, less land being allocated to cereal production or households have simply stopped food production.

5.11. LAND HOLDING DISTRIBUTION

Size of land holdings before and after the introduction of sugarcane in the Division is important to test the significance of difference in the land holding pattern between the periods before and after sugarcane was introduced. This is important to know whether the introduction of sugarcane has had any impact on the distribution of land holdings per household in the area.

Farmers were asked the amount of land holdings they had before and after they introduced sugarcane on their holdings and the holdings they had at the time of study.

TABLE 5.10 Frequency distribution of average land holdings before and after sugarcane introduction.

Acreage	Dist. before cane introduction	Dist. after cane introduction
0 - 5	31	31
5.1 - 10	26	26
10.1 - 15	8	12
15.1 - 20	2	1
20.1 - 25	2	3
over 25.1	4	7
mean x	9.3	10.8
σ	103.6	134.6
n(valid observations)	73	80

SOURCE: Field survey 1992.

To test for the significance of difference between mean acreage before and after the introduction of sugarcane. Using Z test at 0.05 degrees, using the paired sample test equation, the valid cases are 73. The average land holdings before the introduction of sugarcane in the Division was 9.3 acres and the average landholding after the introduction of sugarcane was 11.4 acres. The value of t observed is 3.25 and t expected is 1.67. As such $t_0 > t_e$. Therefore, there is significant difference between land holdings before and after sugarcane introduction.

It was established that the land holdings have increased from 9.3 acres to 11.4 acres, a difference

of 2.1 acres. Increase in size of land holdings in the Division has been attributed to the fact that farmers have been able to buy farms from their neighbours who have moved to settlement schemes mainly in Nandi and Nakuru Districts. Others were found to have moved to other settlement schemes in the District mainly Sotik Highlands and Kipkelion areas as a result of land adjudication as proposed in 1964/70 Development Plan.

From the findings, the size of landholdings per household cannot be used to explain decline in food shortages because the holdings have not decreased. From the results there should have been an increase in food output because acreage per household has increased. It seems that changes in the food production will be explained by other factors other than changes in land holding. This is because the same farmers gave information on land holdings before and after sugarcane introduction.Food shortages can be explained in terms of diminishing land holdings allocated to crop production.

5.12. PRODUCTION ANALYSES

5.12.1. AVERAGE TOTAL ACREAGE UNDER CROPS BEFORE AND AFTER SUGARCANE INTRODUCTION

TABLE 5.11 acreage under individual crops before and after sugarcane introduction

crop	acreage before cane introduction	acreage after cane introduction
maize	3.1	0.8
beans	2.6	0.5
millet/sorghum	0.5	0.2
green vegetables	0.5	0.3
potatoes	0.3	0.2
tomatoes	0.4	0.2
fruits	0.8	0.5
bananas	0.3	0.2
tea	0.7	0.7
coffee	0.7	0.7
napier grass	0.5	0.2
sugarcane	-	5.1

SOURCE: Field survey 1992.

Testing if there is a significant difference in land allocated to crop production before and after sugarcane introduction, using t-test at 0.05 degrees. The mean acreage under crops before sugarcane introduction was 6.4 acres and after sugarcane introduction the acreage has changed to 7.2 acres. Value of t observed = 1.74 and value of t expected = 1.64.Therefore to > t_e, and there is a significant

difference in acreage under crops before and after sugarcane introduction. With the introduction of sugarcane acreage under other crops has increased from 6.4 acres to 7.3 acres, a change of 0.9 acres.

Therefore land as a factor of production cannot be used to explain decline in food output in the Division because it has increased in size. Then it follows that changes in food output will be explained by other factors other than land allocated to crop production, i.e. mainly land allocation between food crops and cash crops production.

5.12.2. AVERAGE ACREAGE UNDER CEREALS BEFORE AND AFTER SUGARCANE PRODUCTION

From the field survey it was established that the major food crops in the area are cereals which includes maize, beans and millet/sorghum. These formed the main food used by households. They are either produced or purchased and consumed by a majority of households.

Testing if there is a significant difference in acreage under cereals before and after sugarcane introduction, t-test at 0.05 degrees,

The mean acreage under cereals before sugarcane introduction was 6.2 acres and after the introduction of sugarcane acreage has changed to 3.4 acres. Value of t observed = 6.67 and t expected = 1.67. Therefore

to> te , there is a significant difference in cereal acreage before and after the introduction of sugarcane. The mean difference is 2.3 acres, a significant reduction.

Reduction in acreage under cereals is an important factor which explains changes in food output in the Division. The results have shown that there is a relationship between acreage and cereal output, as the acreage under cereals declines so is the output.

Changes in land allocated to cereal production can be explained by several factors. These include changes in crop mix at the farm level or households have simply stopped farming and moved to other employment opportunities like off-farm employment and business. From the field survey, it was found that agriculture is the main source of employment, employing about 50% of the working age population. It was also found out that off-farm employment is very minimal in the Division employing about 1.3% of the working age population. The level of business activities were very low to offer meaningful source of income. Therefore, these activities cannot explain the changes in cereal output.

The factor which can explain changes in acreage under cereals is the crop mix at the farm level and livestock production. The main crops found other than food crops in the Division include sugarcane, coffee,

tea and others used to supplement cereals.

5.12.3. MEAN ACREAGE UNDER OTHER TYPES OF CROPS AND LIVESTOCK BEFORE AND AFTER SUGARCANE INTRODUCTION

5.12.3.1. Mean acreage under tea and coffee before and after sugarcane introduction

Tea and coffee were the other main cash crops in the area apart from sugarcane. Formerly, they were the only two competing cash crops.

To test for significance of difference in mean acreage under coffee and tea, using t-test at 0.05 degrees, The mean acreage under these crops before sugarcane introduction was 0.74 acres and after sugarcane introduction the acreage was 0.71 acres.

The value of t observed = 0.054 and t expected = 1.69 therefore $t_o < t_e$. Therefore, there is no significant difference in mean acreage under tea and coffee before and after sugarcane introduction. The mean difference is 0.029 which is quite insignificant.

Therefore, there has been no significant change in acreage under these crops because, tea and coffee are protected crops. So farmers have not been able to displace them, and also acreage under their production has not increased because they are no longer popular with the farmers as they used to be. Farmers have ventured into sugarcane which is the current major crop in the study area.

5.12.4. Mean acreage under other types food crops before and after sugarcane introduction

The other types of food crops includes vegetables and fruits which are mainly used together with cereals.

To test for significance of difference between mean acreage before and after sugarcane introduction. Using t-test at 0.05 degrees:

The mean acreage under these crops before sugarcane introduction was 0.84 acres and the mean acreage after sugarcane introduction was 0.42 acres.

The value of t observed = 4.61 and t expected = 1.68, therefore $t_0 > t_e$. Therefore, there is a significant difference in acreage under other food crops before and after sugarcane introduction. The mean difference is 0.42 acres, quite a significant difference. Since there is a relationship between acreage and output, decline in acreage under these crops has caused a decline in their outputs.

5.12.5. Mean acreage under livestock before and after sugarcane introduction

The main livestock kept in the study area includes cows, goats, sheep, donkeys and chicken. Chicken and donkeys are kept on a very small scale.

The mean acreage under livestock before sugarcane introduction was 3.6 acres and after sugarcane

introduction acreage has changed to 2.2 acres a difference of 1.4 acres. The difference is quite significant.

5.12.6. Allocation of land holdings between sugarcane and cereals

Testing for significance of difference between mean acreage under sugarcane and mean acreage under cereals, using t-test at 0.05 degrees,

The mean acreage under sugarcane at the time of study was 5.6 acres and the mean acreage under cereals was 3.9 acres,

Value of t observed = 3.5 and t expected = 1.67. Therefore $t_0 > t_e$, Therefore there is a significant difference in land holding allocated to sugarcane and land holding allocated to food production. The mean difference is 2.2 acres.

This factor will explain the decline in acreage allocated to food production which has led to decline in food output in the Division.

It has been found that, though the acreage under all the crops has increased since sugarcane was introduced in the Division, acreage under individual crops has changed very much. Acreage under cereals which are the main food crops in the area has declined significantly, while that under sugarcane which previously was non.existent has changed and at the time of study stood at 5.6 acres. This acreage must

have come as other crops,mainly food crops are displaced.

From the results, it has been found out that with the introduction of sugarcane, land available for the production of food crops has declined. Acreage under tea and coffee has not been affected significantly but that of food crops has been reduced. This reduction in acreage under food crop production must be one of the causes, although a main one of food shortages in the Division.

From the tests carried out, it was found that there is a significant difference in the food output before and after sugarcane introduction.

The average land holdings in the Division has not changed with the introduction of sugarcane, infact the average holding has increased from 9.3 acres to 11.4 acres.

The effects of adverse weather can not explain food shortages because as far as Kericho District is concerned, records do not show that it has been proned to any adverse weather conditions. Soils though having been used continually do not need a lot of inorganic fertilizers. This is because the area still has natural fertility. Output per acre has not changed . This shows that the soils are still fertile.

Therefore, changes in food output can only be explained in terms of changes in crop mix at the farm

level. Therefore the observed decline in the levels of food crop output is due to larger proportion of land being devoted to sugarcane production, therefore reducing land allocatedto food crops.

5.13.0 PARTICIPATION OF WOMEN IN FARMING

Women are important actors in food production because within the households there are asymmetric rights and obligations. In rural Africa women incur obligations to grow food crops for home consumption, gather fuel and water to cook and rear children. In return, men meet certain cash needs of the household and usually are responsible for the allocation of land. This results in differential incentives due to difference in efforts (World Bank 1990).

Men will tend to allocate land to those activities which will generate more cash so as to meet their obligations and this may come at the expense of land used for crop production for home consumption. This causes food insecurity especially in cases where the available limited land normally used for food production is taken by cash crops.

Therefore, Women's participation in farming is very important as far as household food security is concerned. In rural Africa, the problems of food are predominantly but not exclusively in the rural small holder sector. Evidence have shown that at the

household level, women are the key actors in a number of areas, as producers of food crops, main food processors and cooks and as managers of intra-household food distribution.

5.13.1 ROLE OF BELGUT WOMEN IN FOOD PRODUCTION

This section is going to give a summary of the role of the Kalenjin woman in the changing economy. The Kalenjins for a long time were a pastoral community, and its only recently when they started moving to other economic activities.

Among the Kalenjins, men were the owners of the livestock and were involved in herding them. Boys were also involved in looking after the cattle as it was the only way that they could be introduced to the activity. Before land sub-divisions, the Kalenjins used to move with their cattle from one place to another in search of pasture, salt and water for the livestock. Movement tended to be seasonal, and men would move with their livestock and stay a way from home for as long as four months. The decision to move the livestock and on where to stay were made by men alone and at no time was the consent of the woman sought.

As men were busy looking after the livestock, women on the other hand were involved in taking care of the family. This involved the bringing up of

children and ensuring that the family is fed. They were also involved in the milking of cattle and in the distribution of milk between and within households. Women were also involved in looking after calves, making sure that they were fed and watered. Women managed to look after the calves by making sure that the family got some milk and at the same time leave some for the calves, in an effort to ensure the wellbeing of the family and the future of the herd. In cases of milk shortages, the women would ensure that milk is preserved for the young ones and the calves.

With the coming of diversified sources of food, the Kalenjin woman in an effort to meet her familiy's food requirements got involved in tilling the land, planting of food crops, harvesting and processing. Sorghum and millet were the main cereals planted and the women used to work very hard to ensure that they planted and processed enough to satisfy the households food requirements. Women were also involved in getting vegetables to supplement cereals. Vegetables were mainly got from the forests and women used to move in groups.

With the introduction of the cash economy, the role of the women in providing food for the family in the Division has changed. The number of livestock kept has decreased with the decreasing land holdings due to land sub-division and the type of livestock kept has

changed. Farmers mainly keep grade or improved cattle. Cattle herding and milking has now become the women's work. But the milk is no longer under her control nor used by the family as before. Instead, she milks and delivers it to buyers to earn the family some income. The man is the one to collect this money from buyers and uses the milk to meet other needs which do not always benefit the family directly, especially that of food.

Land has also been divided among various crop activities apart from that of livestock. In the Division it is mainly divided among cash crops and food crops. The men control the cash crop production while women are more concerned with food crop production in an attempt to meet her family's food requirements. On the other hand, men are the ones who own the land and are therefore,the main decision makers, deciding on what activity to be undertaken and the size of land holding to be allocated to it.

This changes in the Division especially involving the ownership of land and the introduction of the cash economy has had implications on the role of women in ensuring that their family's get enough food. They have lost access to milk production and to land which is an important factor of food production, therefore changing access to household food sources. The assumption that men would use incomes to buy food has

not happened because when a source of food is taken away from women to men, men will use the money for other things which will not help the food requirements of the households as shown from the field findings below.

From the field survey, it was found that less than 50% household heads had part of their farm holdings accessible to their wives. These holdings were found to be very small compared to the total family holdings.

The holdings varied in size from one family to another, on average it was from 0.2 acres to 1.0 acres. In very few cases, the holdings went as high as 125 acres. This was mainly in those households headed by women or where men were a way from home in towns working. In most cases women were found to be sub-ordinates and did not own any land.

Therefore, land as a factor of production in the study area has\is limiting the contribution of women to agricultural production. This is because even in cases where women had access to farm holdings, still they did not have much control and the head of the household can change and put other crops mainly cash crops of their own choice on the very holdings which are supposed to be used by their wives.

78.6% of these holdings available to women were under food crops, most of it was for home consumption

and incase of surpluses it is sold in the local markets so as to earn household more income with which to purchase other foods not produced at home. These small holdings which are under the control of women has greatly affected the amounts of food produced at the household level in the study area. In general it was found that availability from own production was very small. Most households did not produce enough food that could last them from one harvest season to the next. In some cases some households did not produce food at all, this was the case with those who had leased out all their farms to either sugarcane or livestock farmers. Some had devoted all their farms to sugarcane production.

These low levels of own food production, especially when it's control by women was removed has made many households to rely on the market for food. This source was also found to be unreliable in most areas of the Division in some parts of the year especially during bad weather.

21.4% of the holdings available to women, were under both food crops and cash crops. Most of these belonged to those households headed by women and a few by men who were away working in towns. Therefore, the idea of mixed cropping by women is not common. They would rather produce food for home consumption in their small holdings than have cash crops which would

not help solve their immediate food problems.

Most of these holdings were found to be close to the homestead, usually used as home gardens. Distance affects the use of holdings, as the distance increases the intensity of use of land holding decreases. Most were found to be fertile. This was attributed to the fact that women do continually apply fertilizers to them. This is important because though the holdings are small, yields from them are high and thus help food situation in households for sometime.

The introduction of sugarcane in the area was an important move and it required much thought because it takes a lot of land, labour and capital and therefore needed a lot of consultation, but it was found that 57% of the household heads did not consult their wives before they introduced it. Therefore, in the area, cash cropping and all that goes with it is a man's affair and women have nothing to do with it. This is because to many of these farmers, women do not own anything, while for the few who consulted their wives, is because they saw them as a source of labour. This is because sugarcane farming is a labour intensive activity, and women are the only ones who can provide it patiently. Others, who did consult their wives did so because their wives were in wage employment and therefore were needed to contribute in terms of finance needed to establish the crop.

Apart from land, capital is also an important factor of production. 27% of the women members of the households did not have access to income at all because capital is the reserve of men. While 16.7% of the few who had access, controlled about 20% of the total household income. Only 1.3% women had access and controlled about 50% of the household income. This was the highest amount of income controlled by women in the study area.

This affects the level at which women can contribute to food production and this has in turn affected household food production and food production in the area as a whole, resulting in food insecurity.

5.14. HOUSEHOLDS EXPENDITURES

Expenditures by households is influenced by disposable incomes available to households. The disposable incomes in turn determine the purchasing power of households.

Commodity purchases competes with one another for the same household income. It was found that food purchasing competes with other non-food expenses for the same household income. The various competing uses for the same household income are shown in table 5.12.

TABLE 5.12 PROPORTIONS OF INCOMES SPENT ON VARIOUS ACTIVITIES

Type of expenditure	Amount	% of total income
cane maintenance	6400	18.52
investment	1000	2.89
purchase oflivestoc	1100	3.18
improvt of housing	2100	6.08
educ and health	6800	19.68
Food and clothing	3500	10.13
dev of other crops	1400	4.05
purchase of land	360	1.04
settling of debts	8130	23.53
others	500	1.45
savings	4000	11.57
total expenditure	35290	102.12

SOURCE: Field survey 1992

From the total expenditure pattern, it was observed that households spend more than their incomes. It was found that they spend about 102%, a difference of 2%. This therefore, means either the households did not give the right information on their earnings or on their expenditures. Also, it could be true that households spend more than their earnings and that extra money spent must be coming from borrowing from friends or relatives and in some cases from farmers cooperative societies.

From the analysis it was found that settling of debts takes the highest percentage of total household

income it takes about 23.53%. This is due to the long intervals between cane incomes and households are forced to survive through borrowing and taking of loans. Education and health takes the second highest percentage at 19.68%, mainly because many people preferred private health facilities due to better services they offer. It was also observed that the cost of education has gone up generally. This has forced households to spend more on these services.

Cane maintenance also takes a major percentage of the incomes. This is due to the high costs of inputs and labour. It takes about 18.52%.

Savings in the bank was found to be about 11.57%, the duration whereby this amount remains in the bank was not established, but given the high rate of borrowing and high incidence of food shortages, this amount is expected to stay in the bank for only a short time. Food and clothing, though very essential for survival was found to take about 10.13% of total income. This is because the lumpsums of money which sugarcane farmers earn cannot be spread easily throughout the year and instead it is used for other things which come up after budgeting has been done. This makes households to be vulnerable to food insecurity, especially for those who have agriculture as their only source of income. Also given the tight expenditure patterns and cases of sharp increases in

food prices incidence of food insecurity are likely to be high.

Part of the debts was found to be used for food purchases, but borrowing is very unreliable due to the risks involved. This is so given that sometimes farmers wait for more than 36 months to earn incomes. Those households who rely on borrowed money to purchase food are very insecure as far as food is concerned.

Given the high demand on incomes by various activities, mainly cane maintenance, education, health and high incidence of borrowing, households who rely on agricultural incomes to purchase foods from the markets are prone to food insecurity. This situation is made worse in households where men control incomes. In most cases they were found to channel cash incomes to other non-food goods and services.

The other types of expenditures were not very demanding on incomes. These were investment in commerce and industry which takes about 2.89%. In general, it was observed that there were low levels of investments in the area. Purchasing of livestock took about 3.18%, and many households were not buying livestock because the small holdings cannot support them.

Improvement of housing took about 6.08%. From the researcher's point of view the improvement of

houses has not been that much, because only a few farmers interviewed had stone walled houses, the rest had only iron sheets as the only improvement of housing.

Development of other crops, mainly food crops,tea and coffee takes about 4.05%. This is because the advent of sugarcane has made many households to devote most of their incomes, time and land holding to its development at the expense of other crops. This has caused a decline in output and quality of these crops.

Purchase of land took a very small percentage of household income, about 1.04%. This is because very few people have either purchased land or sold. Instead they lease it out and retain the ownership. Other expenditures accounted for about 1.15%. This is mainly for purchase of household goods like salt, sugar, meat and vegetables.

5.15. FOOD PROBLEMS IDENTIFIED.

According to World Bank estimates, 450 million people of the world,s population suffer daily from food related problems, mainly due to shortages and malnutrition. Yet since the early 60s, enormous quantities of food have been moved each year from one continent to the other(World Bank 1989).

From the field survey, it was found that only 51% of the interviewed households produced enough food

that could last them till the next harvest season, while 49% did produce little or no food at all. This is because they have either devoted all their land holdings to sugarcane production or in most cases a good portion was under sugarcane production and that which remained was not enough to produce enough food. Some households had also leased out all their land holdings to sugarcane farmers being left with non for their own use. This shows that about 50% of the population in the area do not produce enough food. These households therefore have to look for alternative food sources. The main alternative is food purchasing from the market.

Those people who did not have enough food to last them through out the year had limited alternatives for getting that extra food. 90% of them said they had to buy these food from the markets, either from within or from distant markets. Very few of them did get help from relatives and when they did, it was only during the harvesting season. Government aid does not exist and has never existed in the study area. This is because the area is high potential and has never been prone to any natural catastrophe, and therefore has never been need of government's assistance. It was also found that some people do work for others so that they are paid in terms of food, but this was found to only work during the harvest time, since after this it

becomes expensive to pay with food and would prefer to pay in cash.It was also found that 43% households did not get enough food at the course of every main meal, while 96% said that according to their own judgement their neighbours were having food problems. This they judged from the rate of food borrowing and begging.

Many households who wanted to get food for their households, encountered various problems. As stated earlier almost all these households have to get their food from the market. 80% of the households could not buy food because it was not available in the markets especially in the local area. In cases where they got food in the market, they could not afford it,because food was very expensive, due to high household demand and low supply. This situation was found to have forced many households to cut down on their consumption levels. Some have even been forced to skip meals.

Another major problem encountered by many households was the accessibility to the food sources. For example 70% of the households interviewed were found to travel for very long distances to buy food, this is because food was usually not available in the local markets. In such cases households were forced to travel to towns or other main centres where they could buy food .The National Cereals and Produce Board (NCPB) which is the main government agency in the area

is at the District headquarters (Kericho town) which is quite a distance from some parts of the Division mainly the sugarcane zone. Apart from being far, many people were found to have problems in getting food, because many of those who wanted to buy food had low incomes, while food is sold in bulk, like in the case of maize, it is sold per 90kg bags at Ksh.600 which is very high for low income earners. So these people have had to rely on middlemen who buy and sell to them in smaller quantities but at exorbitant prices, in some places it was found to be about 3 times the original NCPB prices.

There is also the long process one has to go through before getting food from the NCPB. This is because one has to move from one administrator to another before finally purchasing food, in some cases in was found to take upto one month. In some cases people complained of being asked for bribes, while in the majority of cases, it was found that only those who had relatives or friends get served.

It was found that even though some households would have wanted to have more food than they were actually having, they could not get the food either due to lack of money to buy it or because they could not get it in the market. For example, it was found that on average that each household in the area needs to buy about 6 bags of maize each year to supplement

the shortfall. Therefore, using Ksh.600 per bag (NCPB prices at the time of study), it means that each household would require about Ksh.3,600 cash every year set a side for maize purchasing alone. But the number of bags required to be purchased was found to range from 2 to 20 bags, which means households would require from Ksh 1200 to Ksh 12,000 for maize purchasing alone in one year. This means that the income sources must be secure to ensure that households get access to food at all times. But this is not possible for sugarcane households given the nature of cane incomes. There are also other foods needed to supplement maize, this includes beans, meat, milk, to supply proteins.

It was also found that in most cases food was not available in the market and when available was very expensive. Food supply in the Division's market was not reliable and therefore households could not properly plan of when to purchase them.

It was also observed that infrastructure in most parts of the study area are not well developed and do become worse during the rainy season and due to this, transporters temporarily withdraw their vehicles forcing residents to travel long distances on foot to and from the markets. This was found to affect the amount of food a household can purchase and that which they will consume. Thus bad weather situations are

always the seasons in the area when people have severe food shortages. It was found that these food problems only used to exist just before harvesting from April to early July. But of late this situation has been continually felt almost throughout the year. This was attributed to low levels of food outputs caused by diminishing acreage under maize and other food crops. This situation is worsen by delays in cane harvesting which in most cases is the only source of income for many farmers. It was also found that sometime cane payments delay for upto 48 months, which is double the duration it is supposed to take.

Since households have to survive during this period, many of them are forced to live on borrowing money or food. This has resulted in a situation where many of them use a high percentage of their incomes in settling of debts, leaving them with little for investments.

Main food type purchased was maize. 100% of the households who did not produce their own food bought it.The other food types were bought in small quantities, these included beans, millet, sorghum, fruits and various vegetables.

5.16. CAUSES OF FOOD SHORTAGES

A number of problems were cited by households as the main causes of food shortages. These factors

included the diminishing land holding devoted to food crop production, leasing out of farms to sugarcane production, late planting of food crops, low levels of input application, lack of integration between food crops and cash crops and less land available to women for food production.

Diminishing land holdings devoted to food crop production was found to be the main causes of food shortages in the study area. As shown before the average holdings per household has not been very much affected with the introduction of sugarcane in the study area, infact acreage per household has increased with sugar cane introduction. The other change which has occurred is the amount of land holding devoted to food crop production. Land holding per household per se in the area are small. This diminishing land holdings has been caused by inheritances where land has been sub-divided among family members over time. This has resulted in very small holdings which become uneconomical especially when it is divided between food crops and cash crops. The use of these small holdings into sugarcane production has worsen the food problem in the area.

Leasing out of these small holdings by household heads was also found to be a major cause of food shortages. Some household heads were leasing out all their farm holding leaving non for their own food

production. In those households there were no harvests at all. The minimum lease period is five years, especially where cane is grown meaning that those households will have to go without harvesting food crops for at least 5 years.

Another main cause of food shortages is late planting of food crops. 31% of those who produced their own food, planted it on time, while 69% planted late. Late planting was caused by late land preparation due to engagements in other crop activities, mainly sugarcane. Lack of seeds was also a major cause, this was caused by lack of money to purchase them. This delayed planting. Late planting was found to decrease yields per acre.

Lack of money to purchase seeds is mainly due to the limited sources of income. Majority of the households depend on agriculture, few were in off-farm employment and business earned very little incomes. Incomes from sugar cane were found to be very low and unpredictable and households are not been able to plan for their use. This problem has hindered farmers from acquiring capital to improve their food output and to plant on time. Finance was also needed to undertake farm equipments and to pay for hired labour. The problem of labour is closely tied to finance, labour was available if one had money to pay. The problem of finance takes a vicious cycle, low levels of incomes

leads to low levels low levels of food outputs and low levels of food purchases due to low incomes and this will lead to low levels of food available to households threatening household food security.

The problem of finance could be solved by farmers getting loans from the cooperative society, but from the field survey it was found that this loans are only advanced to farmers to develop sugarcane crop. Borrowing from financial institutions like Agricultural Finance Corporation (AFC) was not common since most farmers feared the scheme because of a few cases where defaulters have had their farms auctioned. This is because agricultural production is influenced by circumstances beyond the control of the farmers and when crops fail for one reason or the other and has no other source of income he defaults leading to AFC selling their farms.

Another problem was the low levels of input application, due to high prices of inputs. Decontrolling of input prices, especially fertilizers was found to have made farmers to use little of them and this has affected yields drastically. There was reduced use of fertilizer and certified seeds at the time of study. This was not a major problem though since the soils do not need a lot of fertilizers.

Another cause of food shortages is the overdependence on only one source of food, mainly

maize. Overdependence was also caused by the changing in consumption patterns. This has made many farmers to neglect indigenous foods which can do well in small holdings and in the southern parts of the Division which are drier than the eastern parts. Overdependence on only one food source is very risky especially in cases of diseases and pest which are specific to certain crops. In case such diseases and pest which are specific to maize strike, farmers would lose all their maize crops resulting in food shortages.

There is lack of integration between food crops and cash crops which was found to be a major cause of food shortages. It was found that many households have tended to put more emphasis on cash crop production neglecting food . There is also the problem of selling the little food harvested to generate incomes to the households to solve pressing problems. This is necessitated by the long intervals between sugarcane incomes (payments).

Inefficiency on the side of extension officers was also a main problem, 80% of the households interviewed said they had not had visits from extension officers for the last three years prior to the study period. The absence of extension officers who have been entrusted to guide them on new techniques to adopt has left farmers to work on their on and therefore continue with the old methods which

do not ensure maximum and intensive use of small holdings. Though the government has trained many extension officers, most of them do not have contact with the farmers and instead they were found be to engaged in their own activities.

From the analysis of the literature it was found that women play an important role in ensuring household food security. From the field analysis it was found that factors necessary for food production were not available to women. This non-availability of factors of production to women is another cause of food shortages.

In conclusion this chapter has tried to give field findings and identify the major food problems and their causes in Belgut Division. We have noted that food security is a function of many factors and the factors and the problems that have been identified are not the only ones which if tackled would result in the Division becoming food secure.

The major food problems encountered are shortages which has persisted for a long time unlike before sugarcane was introduced in the Division. Prior to sugarcane introduction food shortages only used to occur just before harvesting. These food shortages have been made worse by the lack of secure sources of income to buy food, mainly because most households (about 80%) have agriculture as their main source of

income. From the analysis the main agricultural activity in the area is sugarcane farming and incomes from it are not regular, coming after 24 months and in some cases after 36 months. Therefore households relying on sugarcane do not have secure source of income. The incomes from sugarcane come in lumpsums and there is a long interval between them.

The lack of secure source of income reduces the purchasing power of households. In most cases households could not afford to buy food even when available in the markets. There was also the problem of accessing the food markets mainly because of the long distance to get to them , poor roads and the long process to be followed especially in the NCPB.

Another problem was the non-availability of food products in the markets. Food supply was found to be very unreliable especially during periods of a cute shortages. These food problems have been caused by some problems.

Of the problems identified the most important causing food shortages is the diminishing land holding devoted to food production, the major holding being taken by sugarcane. We have noted from the analysis that the acreage under sugarcane crop before it was introduced on a large scale was negligible, infact farmers did not have that information, but since the introduction of sugarcane acreage has changed from

zero to about five acres. On the other hand total acreage under food crops has decreased from an average of 6.2 acres to 3.4 acres.

Acreage under other food crops and livestock has also declined while that under other types of cash crops mainly coffee and tea has not changed with the introduction of sugarcane because the crops are protected and farmers have been unable to uproot them.

Other causes of food shortages were the late planting of food crops, farmers being occupied with sugarcane crop including the low levels of inputs due to high input prices and the lack of integration between cash crops and food crops. The role of women though important in food crop production has been neglected with the introduction of sugarcane.

The next chapter will give a summary of the study and recommendations that could be adopted in solving the food problems in Belgut Division.

CHAPTER SIX

6.0. SUMMARY

This chapter gives a summary of field findings, conclusion of the study and makes recommendations in relation to the field findings.

From the definition of food security, an individual is considered food-secure if she/ he can afford and has access at all times to food adequate to sustain an active and healthy life. Therefore, it can be argued that at individual level the primary cause of food insecurity is poverty or lack of secure source of income.

It is true, for example at the national or regional levels, that merely increasing the production or supply of food will not necessarily result in an improvement in food security unless individual consumers can be assured of access to it. Similarly, at the household level, some members of a family may experience less food security than others. For example, in some households where men control all income and in most cases spend most of it in purchasing non-food goods and services or in leisure activities, the mother and the children will in most cases be less food secure than the father. This observation emphasizes the need for policies and action plans to improve food security to be multi-sectoral in nature (Courier Dec. 1989).

Availability of production resources is important but not enough because the nature of their availability to men and women is more important. Access to the available resources is very important because it is with such resources that an individual can make the final determination about how to use it and when.

6.1.SUMMARY OF FINDINGS

This study set out to analyze 3 objectives, these were;

(i) Examining the systems of crop production in the Division.

(ii) Assessing the effects of sugarcane farming on household income and household food security.

(iii) Examine how sugarcane farming affects the participation of women in crop production.

The analysis of the first objective namely, to examine the systems of crop production in the Division, revealed that there are two major types of crops produced in the area. These are cash crops which are mainly produced for market and food crops which are produced mainly for home consumption and in cases of surpluses these are sold to earn households extra income.

The analysis revealed that there has been a change in crop production systems overtime. There was

a preference to cash crop farming at the time of study than was the case previously. Field survey shows that 62.5% of the respondents were thinking of extending acreage under sugarcane crop. It was also found that 53.1% of the total cultivated land was under sugarcane and that the total area under sugarcane on individual respondents farms averaged 42.7%. The rest of the cultivated area is divided among the various crops.

Preference towards sugarcane was explained by the fact that, sugarcane has a higher gross margin compared to other crops as shown in Chapter Four table 4.1. This response to price incentives by households is a rational one. This response has meant the implementation of government policy on cash crops, but this success is at the expense of food crops. Therefore, anticipated high incomes is the main determing factor of the choices of crop activities that households undertake.

The analysis of the objective also revealed that with the changing systems of crop production, the role of women on ensuring household food security has been affected. Men have become involved in cash crop farming devoting most of the land to cash crop production depriving women access to land for food crop production. This has reduced the role of women in ensuring household food security exposing households to food insecurity.

The analysis also revealed that there has been a move to less diversified sources of food and neglection of traditional types of food. Also milk which is an important source of proteins especially for young children is threatened with less land left for livestock production and lack of intensive livestock production systems because farmers are still grazing their livestock and this system requires large parcels of land.

The analysis of the relationship between sugarcane and food crops revealed that there was competition between sugarcane and food crops with sugarcane receiving higher priority in terms of acreage allocated to this crop thereby threatening household food security in the affected households. After analyzing the land factor with a view to establishing the amount of land allocated between food crops and cash crops, it was evident that competition did exist. Apart from a few farmers who had extra land under fallow when sugarcane was introduced, most farmers planted sugarcane on land previously allocated to food crops. From the analysis, it was established that the acreage under food crops has decreased with the introduction of sugarcane while that under sugarcane has increased. This shows that more land has been allocated to sugarcane leaving less and sometimes none for food crop production.

Analysis between food crop output and acreage showed that output depended to a large extent on acreage available. As acreage under food crops decreases, outputs also decreases. Because of low producer prices of food crops, many farmers have expanded acreage under sugarcane with the hope of raising their incomes and have therefore given food production lower priority.

Land intensification as a possible way of increasing production from small land holdings, has not been exploited in the Division mainly due to lack of aggressiveness on the side of farmers. There is also the problem of inefficient and insufficient extension officers who could have given farmers institutional support and techniques of intensification. The problem is compounded by lack of capital and poor allocation of resources. Farmers also lack awareness of the fact that land is a productive resource and this has resulted in it's lack of effective utilization to yield more output, though it is a possible solution to the present land problem in the area.

It was also noted from the analysis that expansion of land under sugarcane has affected food crop production. It has caused the factors of production to be shifted from food crops to sugarcane crop, resulting in a decrease in food supply as

evidenced by general food shortages in the area. It was found that one out of two households interviewed purchased food for home consumption since they did not produce enough or in some cases did not produce any food at all (Field data 1992).

The land problem has forced farmers to shift from diversified sources of food to few sources, mainly maize and beans. This is very risky especially in cases of crop failures.

Therefore, in general, sugarcane though a good income earner has caused general food insecurity in the Division. This was revealed by unavailability of basic food products in the area. But in cases where food was available it was too expensive and most households could not afford as much as they would have wanted. Availability of these food products were found to be very unreliable especially in periods of wide spread shortages.

Infrastructure in the area is generally poor, and transport to the rural areas is very unreliable during the rainy season. At such times, food markets are generally inaccessible. Also availability of staple food in the markets was found to be unreliable.

From the analysis, it was observed that, despite the introduction of sugarcane which is supposed to earn farmers high incomes, the cash flow in the study area is not very different from what it was before

sugarcane was introduced. This is evident in the rate of savings, investments, improvements in housing and general standards of living. From the researchers observations, things have not changed very much. The situation has only improved for those who have other sources of income apart from agriculture.

The incomes from sugarcane has proved to be quite low. This is because farm gate prices are controlled while the costs of inputs has been decontrolled. Decontrolling of input prices has made sugarcane production costs to be high. Also interest rates were found to be high, and in cases where sugarcane stays on the farm for more than two years, the factory continues to charge interest on loans advanced to farmers. It was also found that where the factory has contracted farmers the intensity of land preparation is not as thorough as in the nucleus estates yet the company charges farmers high rates for poorly done jobs and this depresses incomes to farmers. It was also found that the farmers do not use certified seeds and this was found to affect yields which in turn affected incomes. There was also the problem of sugarcane transport charges which was found to be very high and affects farmers net income. Sugarcane is only profitable in large farms yet in the Division the majority of households are small scale with an average of about 10 acres, which also affects incomes from

sugarcane.

The analysis of the household incomes levels before and after sugarcane introduction, revealed that the household incomes have increased. But this increment in household incomes have been accompanied by high inflation rates plus hustles and delays that accompany their payments. Expenditures on the other hand on household goods and services have increased breaking-even the increment of total household income.

Therefore expected high incomes from sugarcane is still a dream in the area.

The analysis of the third objective, how sugarcane farming affects the participation of women in food crop production revealed that the availability of factors of production mainly land and capital to women had declined with the introduction of sugarcane in the area. Average land holding available for women use in the production of food crops for home consumptions were found to be very small to support any meaningful food crop production. It was also found that women did not have total control over these holdings. Men who are the heads of households, and therefore effective decision makers, were reported to have taken land previously devoted to food production and use such land for cash generating activities at the expense of food crop production. This exclusion of women from critical decision making on how family

land is used has contributed to food shortages leading to household food insecurity in the division.

6.2 POLICY RECOMMENDATIONS TO IMPROVE FOOD SECURITY AT THE HOUSEHOLD LEVEL

This section gives recommendations in relation to the study. The role of policies in developing countries like Kenya, is central to the general development process. The effectiveness of these policies will determine to a great extent the rate at which the economy grows. Agriculture is an important sector in the economies of most developing countries. Therefore, agricultural policies are central to their development process. Agricultural policies are also central to food production in developing countries. In all cases, a country will always try to provide enough food for it's citizens.

In Kenya, the bulk of foreign exchange earnings normally come from exports of agricultural products but of late it has not been the case because Kenya's agricultural exports has continued doing poorly in international markets. The country has instead been importing most of agricultural products which it used to produce including commodities such as maize, sugar, rice and wheat.

Various measures can be used to reduce food insecurity at the household level. However, the

approach used should be carefully chosen. Simplistic approaches which are oriented to very short term interventions may divert attention and resources from broader strategies with a better chance of effecting long-term improvements in food situations at the household level.

To have adequate food for the population's requirements, the country needs sound agricultural policies that promote production, preservation and distribution of food to members of the society. It also requires policies that would enable households to have at their disposal adequate food or income to purchase adequate food to meet their requirements at all times.

The central issue that agricultural policies should address themselves to include maximization of domestic food production, prices paid to farmers and the marketing systems for their products. Agricultural policies should also be formulated in such a way that farmers are encouraged to integrate food crops with cash crops production.

6.2.1 POSSIBLE WAYS OF REDUCING FOOD INSECURITY AT THE HOUSEHOLD LEVEL IN BELGUT DIVISION

From the analyses, it has been found that households in Belgut Division have rationally

responded to policies on cash crop farming and also to price incentives that have accompanied these policies. In their positive response households have expanded acreage under cash crops so as to maximise outputs and therefore incomes accruing from cash crops. This positive response has ensured the success of the government policy on cash crops to earn the country foreign exchange.

But the effects of this positive response has been the destabilisation of the traditional economy where food crop production was given priority in terms of time and factors of production allocated to it's production.

The consequence of this response is that the majority of households (about one out of two households in the sugarccane zone) have devoted all or a good part of their land holding under sugarcane leaving little or none for food production. This has resulted in low levels of food outputs in the Division causing severe food shortages at the household level. Therefore, the option which the households responded to might not have been the best in retrospect. Apart from the food problems, the level of debts that households incur is very high, such that they are forced to use a lot of their incomes in settling debts. This is due to the long intervals between cane incomes and also the lumpsum payments of this incomes

and low levels of incomes. Incomes from cane were also found to be generally low due to high production costs of sugarcane coupled by high transport charges, interest rates and deductions which are made by the factory and levy charges by the county council. All these charges depress incomes from sugarcane.

Therefore, even if households who had devoted all their land holding to sugarcane leaving none for food production were to express preferences for food, they would not afford to buy these foods due to low and unpredictable incomes accruing from cane sales. Therefore the food security of these households will be threatened.

To improve the food security of these households, there is need to convince households to get out of this dilemma of the benefits of cash crops. To achieve this, men who are the household heads and therefore effective decision makers, will have to be convinced to change their options. Part of the household farm needs to be left for food production instead of devoting all of it to sugarcane. When this is achieved, household food security will be improved, and therefore the role of women in food production will have been recognized. Women have a noble responsibility of ensuring households food security by growing or purchasing food for home consumption. With more land under food crops, households will be able to

produce more food and even get surpluses. Disposal of these surpluses will be done by households at their own convenient time and therefore, maximising returns and use of incomes generated. Out puts will also be used for food and remains under the control of women.

There is also the possibility of getting more income from the sale of food products. Though the gross margin of sugarcane is higher than that of the major food crops in the Division, sugarcane has a long cycle than cereals. Therefore it is possible for households to get four harvests of maize/millet and six harvests of beans in on sugarcane cycle, which maximise on output and returns. Also given that most households in the Division are small scale farmers and given that cane does well in large farms, it is possible to maximize on cereal production since they do well on small holdings and demand less labour. Surplus food products will be disposed of conveniently by households therefore giving a reliable source of income, reducing high levels of debts that are now incurred by households.

The reliability and frequency of incomes will help improve food production, because households will be able to plant food crops on time, use certified seeds, apply fertilizers and pay for labour used in the farm. This will in turn increase surplus to be disposed of by households which will generate more

income to the households.

With more incomes, households will be able to adopt and afford new farming techniques on intensive use of their land holdings. With intensification of land use, households will be able to get more food from small holdings and if yields can be raised, land, labour and capital would be released land for other crop activities, especially cash crops.

Another important recommendations is to encourage households to take up off-farm employment so as to diversify their sources of incomes. These incomes will also act as cushions during the long intervals of cane incomes. Incomes from off-farm employment can be used on food therefore reducing food insecurity. Households will also be able to invest in other income generating activities that would improve households standard of living.

There is also need for men head of households to involve women in critical decision making involving the use and allocation of household resources. This is because women play the noble role of ensuring food security at the household level. The provision of agricultural inputs and the rationalization of or at least facilitating accessibility of land to women who are the principle producers of food. New technology and extension services should be made available to women, who are the real farmers instead of being given

to men who are rarely involved in practical farming activity.

There is also need to improve earnings accruing from sugarcane and to achieve this, farmers whether contracted or not should be given an upper hand on making decisions on cane maintenance and disposal. With this, they will be able to prepare their farms thoroughly unlike in the case where the factory does it poorly and charges farmers for poorly done jobs. They will also be able to choose the best seeds and location so that they do not incur high transport charges or use poor seed cane, because this was found to affect yields, depressing incomes. Farm gate prices of cane should be decontrolled. This is because up to now farm gate prices of sugarcane are controlled while the input prices are decontrolled. The market forces should be left to operate. Farmers should also be left free to choose on which factory to sell their cane to unlike the present situations where they only sell to the factory that falls within its zone. This is a sort of monopoly and has reduced the efficiency of most factories in the sugar belt.

Also the interest rates charged by the factory on overmature cane should be stopped beyond two years, because delays in cane harvesting is not the mistake of the farmer but that of factory. Instead of charging the farmer interest on over mature cane, the sugar

company concerned should be fined for delaying to harvest farmers cane. There is therefore need for active pressure groups to advocate for farmers interests since cooperatives and unions have failed to articulate them.

There is also need for the Kipsigis County Council which collects levy from sugarcane farmers in the Division and the EASI company to improve the transport net work in the zone. This will ensure timely harvesting of sugarcane and minimise spillage which is very high on poor roads and delays during the rainy season.

It is important to note that when formulating agricultural policies of different commodities at the national level, it is necessary for policy makers to bear in mind the impact of one agricultural commodity policy on the other commodities as has been demonstrated in this study. In Kenya, studies have shown that price policies can affect production of food crops and cash crops respectively. In 1979, unofficial prices of maize fell following a large maize surplus of 1977/79 crop. This resulted in an increase in acreage devoted to sugarcane production in parts of Western Kenya. By the end of that season, maize production had declined while that of sugarcane had increased because of transfer of resources from maize to sugarcane. Therefore, pricing policy is an

important factor in the determination of the availability of food crops in an area and at the household level.

There should also be a re-orientation of agricultural policies, because these policies have concentrated principally on cash crops in order to earn foreign exchange. The corollary of these policies has been a relative de-emphasis of food production for local consumption.

Policy markers should therefore aim at ensuring that food prices remain fairly stable so as to encourage farmers to grow more food crops. This will ensure food security at the national as well as at the household level.

Emphasis on food production should not be seen as being at the expense of cash crops, particularly for export. Complementarity between food crops and cash crops in smallholder farming should be encouraged.

There is also need for the development of a properly distributed food storage system in the District to ensure timely dispatch of food to consumers and hence improve the availability of the food to the needy households. Non-availability of food stuffs was a major problem encountered by households especially during periods of shortages.

There is also need to improve the management of the existing storage facilities to ensure fair access

to food by all. From the field study it was found that most people were not able to get food from these storage facilities because they either did not know anybody or were not able to give bribes. This situation has also been reported in other storage facilities through out the country. This has made food not only unavailable but also unaffordable due to the added cost of bribing.

The marketing systems of major food products in the Division should also be restructured and developed to improve availability and accessibility of food to all those who need food. The policy should ensure that there are adequate supplies of food products at the right place and time when needed. Such policies should also ensure that food products are available at prices which can be afforded by all. Equally important is the need to ensure that the supply of food crops should be consistent.

The government should also promote trade in traditional food crops as part of the program of encouraging traditional food production. Continued monitoring should be undertaken to determine the levels and movements of major food products in order to give early indications on the need to import food and to restrict food exports from potential food deficit areas of the Division.

The role of women in food production should be

promoted. Therefore, the entire public policy framework should be examined as it affects the rights, obligations and activities of women. The approach entails a re-examination of the on going programmes and policies in terms of their impacts on women and particularly their productivity and their capacity to nourish the family. It also entails an understanding of the dynamics of rural households. It is important to know who is doing what activities and tasks both in terms of labour input and decision making whose land is being used and for what purpose and with what resources and information on such activities carried out.

Such an understanding is essential if we want to know what the impacts of policies and programmes is going to be and is essential if the food security problem at the household level is going to be addressed.

Research and extension services were found to be very ineffective in the Division. Therefore, they should be made more effective and designed to treat smallholding as a unit and the farm as a system.

Extension services should be made accessible to women members of the households. This is so given that they are the ones who carry out farming activities more that the men who often gets the service.

The EASI company provides services to the farmer

which are geared towards the development of sugarcane. The company should also be encouraged to extend more extension advice to the farmers over and above the advice related to sugarcane production. The factory extension services to be extended could include provision of credit facilities, fertilizer, weed chemicals and extension staff to advice farmers on better production techniques.

Credit facilities are important because of the long intervals between cane incomes, since this will help farmers to buy inputs for the development of food crops,sugarcane and livestock production. It will also help farmers to purchase food during periods of shortages. The factory could also help farmers with food storage and marketing as has been done by Mumias sugar company through its outgrower department.

6.3 CONCLUSION

In conclusion, the combination of convincing households to produce their own food, price incentives and good policy formulation and production cost structure that will minimize the farmers expenditure will go a long way towards improving household food security in the division.

The major thrust of the farmers efforts should be directed at raising the quality and quantity of food production especially for home consumption. Evidence from the study has shown that food shortages stem

largely from inadequate food production for home consumption and from the low incomes which farmers get from the sale of sugarcane. These factors have made the reliance on food purchase unreliable and often beyond the reach of many families. This situation has made families as a whole vulnerable nutritionally. It is also evident that families with food shortages do not buy sufficient food.

To improve the accessibility of households to available food, the Government should continue to support policies and action plans which will improve income growth and its distribution. In this regard economic growth and improved income distribution would form a main strategy for reducing chronic food insecurity. The sustained reduction in chronic food insecurity would require substantial growth in employment both in the agricultural sector and in other sectors of the economy.

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DEPARTMENT OF URBAN AND REGIONAL PLANNING

UNIVERSITY OF NAIROBI

THE IMPACT OF SUGAR CANE FARMING ON HOUSEHOLD FOOD SECURITY IN BELGUT DIVISION

HOUSEHLOD QUESTIONNAIRE

The information herein will be treated confidently, it will only be used for thesis writing by the student.

Questionnaire number._____.

Household size._____

1. Household head I.Male _____ II. Female
2. Marital status I. single II. married iii. dirvoced iv separeted v others .
3. Farmers highest level of education , i. primary ii. secondary iii. university and above iv. others.
4. State your sources of income.
   (i) Agriculture (ii) Employment (iii) Business (iv) others
5. Do you own this land (i) yes (ii) no.
6. If no who owns it, (i) parents (ii) friends (iii) others (specify).
7. Do you own or hire other farms apart from this you stay in (i) yes (ii) no
8. If yes, what is (i) the size_____(ii) distance from

home ___(iii) crops grow___.(iV) Location____.

9. How much land did you have before sugar cane was introduced in your area____(acres)

10. How much (a) have you sold___(b) do you have at present?__

11. How many of you family members are employed

(a) Employed in the farm? _____

(b) Off farm employment? _____

12 What types of crops did you produce before sugar cane was introduced in your area?

Crop	Acrage	Qty.Crop.	Qty. consumed.	Qty. marketed	price.	Appr. Rev.P.m	Aprox. rev. p.a
Tota l Rev.							

13. The types of livestock before and now.

	Before				present			
Livestock	Number	Area	Qty. Output	Income p.m	Number	Area	Qty. of output.	Income p.m
cows								
goats								
sheep								
donkeys								
others								
Total rev.								

14. Type of business before and after introduction of sugarcane.

Type of business before	Estimated income p.m	Type of present Business	Estimated income p.m	Estimated Annual Income
Total rev.				

15. What type of crops do you produce at present?

Crop	Acrage	Qty.produced	Qty. consumed	Qty. marketed	Aprox. income p.m	Approx. Rev. P.a
Total rev.						

Participation of women

16. How much of your farm is easily accessible by your wife (Figure in acres)._____

17. what types of crops are grown there. (a)food crops (b)cash crops. c. both types of crops.

18. How far is that farm from the house (KM)._____.

19. In your opion, how is the fertility of that farm, i. high ii. medium iii. low

20. Before you introduced sugar cane in to your farm, did your consult your wife, (a) yes (b)no.

21. If no, why?

22. If yes, why?

23. How much of the household income is contrled by your wife

24. What is that income used for, a) food (b)education and clothing c) others (specify).

Information about sugarcane crop

25. (i) Date of establishment (year and month)

(ii) Distance from Factory to tour farm (zone)

(iii) Acreage under sugar cane

(iv) Production Expenditures

(a) Land preparation

(b) Inputs

(c) Planting and weeding

(d) Harvesting and marketing

(e) Other charges - capital levy

and other changes

Total expenditure

(f) Total income

Total Expenditure

Net Income

26. Information about first ratoon crop

Production Expenditure

(a) Land preparation

(b) Inputs

(c) Weeding

(d) Harvesting and marketin

(e) Others

Total Expenditure

Total Income

Net Income

27. Information about 2nd ratoon crop

Production _____ Expenditures

(a) Land preparation

(b) Inputs

(c) Weeding

(d) Harvesting and marketing

Total expenditure

Total Income

Net Income

28. Information on subsequent rationed crops

Production _____ Expenditure

(a) Land preparation

(b) Inputs

(c) Weeding

(d) Harvesting and marketing

(e) Others charges

Total expenditure

Total income

Net Income

29. **Expenditures**

Net income from sugar cane crop, _____.

Type of Expenditure	Amount	% of Total Net Income
Savings in bank		
Cane maintenane		
Investment in commerce and industry		
Purchase of livestock		
Improvement of housing		
Education and health		
Food and clothing		
development of other crops		
Purchasing of land		
Setlling of debts		
others		
Total expenditure		

30. Are you thinking of extending the acreage of land under sugar cane or food crpos? (i) sugar cane (a) yes (b) no (ii)food crop (a) yes (b) no

31. If yes, specify reasons.

(i) due to food shortages (ii) due to lack of land / availability of land (iii) good yields (iv) profits (v) Others(specify).

32. Have you increased the land under maize for the last 5 years? (i) yes (ii) no.

33. If yes, why ?

(i) Availability of labour (ii) Availability of land (iii) Food shortages (iv) Government directives (v) Sugarcane is uneconomical (vi) Others (specify).

34. Has the acreage of land under food crops (maize) caused an increase in food production? (i) yes (ii) no

35. If no, why? (i) labour shortages (ii) Fall in land fertility (iii) Others (specify) .

36. Do you practice intercropping like maize and sugar cane ? (i) yes (ii) no.

37. If yes why do you prefer intercropping to monocroping? (i) Limited land (ii) Lobour shortages and to increase efficiency (iii) to guard aganist crop failure (iv) varied food supply over reduced labour (v) others (specify).

38. Is the food produced from your field enough to feed the household till the next harvest? (i) yes (ii) no

39.If no, where do you get food for that remaining part of the year, (i) buy from the market (b) work inorder

to get daily food (c) help from relatives (d) government aid (e) others (specify).

40. If purchased, how much is purchased ?_____.

41. What problems do you encounter when buying food for your household, (a)not available in the market (b) expensive (c)long distance to the market (d)Lack of transport (e) Others.

42. What types of food do you buy from the market, (a) maize (b) beans (c)vegetables (d) fruits (e) millet and sorghum.(e)others.

43. Do you plant your food in time ? (a) yes (b) no.

44. if no, why ? (i) Lack of labour (ii) lack of seeds (iii) lack of money (iv)late land preparation (v) engagement in other activities (vi) others (specify).

45. In your opinion, why did the farmers change to grow more sugar cane thanmaize.

46. Do you think that sugar cane farming is on the increase ? (i) yes (ii) no (iii) constant (iv) decling (v) donot know.

47. Would you rather replace sugar cane with maize in your farm ? (i) yes (ii) no.

48. If yes, why ? (i) more space for maize production (ii) sugar cane production is uneconomical (iii) lack of labour (iv) lack of market (v) poor transport and infrastructure (vi) others (specify).

49. (a) What types of food do you take for

Breakfast	Lunch	Supper

(b) Type of food given to young children

Breakfast	Lunch	Supper

50. What problems do you face in managing you crop.?
(a) Expensive inputs (b) inputs are not available (c) you farm size is small (d) lack of extension services in you area. (e) others

51. Where did you get you initial capital?
a)loan (b) family saving (C) from friends (d) factory (e) others.

52. What problems do you have managing you income?

(a) lumpiness (b)long interval between incomes (c)others.

53. Do members of your family complain of not geting enough food? (a) yes (b) no

54. If yes, list their complains.

55. What can be done to limit these compaints.

56. Do your neigbours have any food problems? (a) yes (b) no.

57. If yes, list the problems.

58. What is the cause of the problems.

59. How can these be solved.