

UNIVERSITY OF NAIROBI

SOCIO-ECONOMIC CAUSES OF FOOD SCARCITY

IN SEMI-ARID AREAS:

THE CASE OF KIBAUNI LOCATION

(MACHAKOS)

BY

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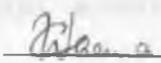
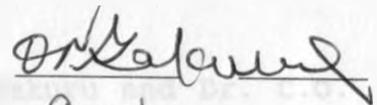
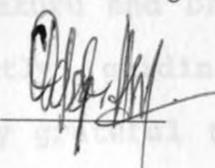
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I am entirely responsible for any errors that may be found in this work. My respondents, supervisors and other sources of information should not be held accountable for any shortcomings which may occur in this work.

DEDICATION

I dedicate this work to my dear children Nthenya and Muema for their encouragement, support and tolerance of my long work sessions at the computer.

ABSTRACT

This study investigates some of the social and economic factors that precipitate food shortages in semi-arid areas - the case of Kibauni location, Machakos district.

The study is based on the assumption that social and economic factors in harmony with others influence the occurrence of food scarcity in semi-arid areas. They do this by hindering adequate production of food for subsistence consumption.

A sample of 147 respondents, randomly drawn from a sample frame of 800 households was interviewed. Supplementary data was gathered through case studies of 5 people while additional information was acquired from agricultural offices and research stations.

Interview schedules were employed as the main research instruments. However, unstructured interviews were administered to the 5 key informants (Village elders). Field notes were taken during the research and some have been used in this work.

The study found out that the major socio-economic factors that caused food scarcity in this area were inadequate male participation in food production activities, dependence on food as a source of income, communal land

ownership and restricted child participation in food production.

It was further found out that food shortages in semi-arid area is also influenced by inadequate draught power and farm equipment, and interference of farm activities by the performance of household chores. However, factors such as the farmers' marital status, educational level and traditional beliefs and practices pertaining to food production and consumption did not have a significant influence on food shortages.

It was concluded that there is dire need to intervene and reduce the impact of those socio-economic factors which interfere with food production and sufficiency in this area. It was recommended that selling of subsistence food should be discouraged, boost the cultivation of cash crops and encourage more male participation in all food production activities.

To ensure the realisation of these recommendations, agricultural officers should be deployed to such areas. Administration officers should be sensitised to assist in ways which will improve food production and consumption in semi-arid areas.

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CHAPTER ONE.

I.1: Introduction.

Hunger, a consequence of food scarcity at a national, regional or local level has become one of Africa's major problems. World Bank reports (1989) attribute this to declining agricultural production, high population growth rates, deteriorating infrastructure, unstable political systems and civil wars, stagnating industrial production and falling standards of living. Prior to the attribution of food scarcity to these variables, the scarcity was associated with weather related problems mainly droughts and floods. However, with time and experience, agriculturalists argue that the occurrence of food shortages and the hunger that ensues are more of a social fact than a natural one. Consequently, food shortages are as a result of human activities rather than consequences of nature.

Some scholars have attributed food scarcity in marginal areas to the failure of social systems to meet the challenges of nature that affect agricultural production. Achebe (1990:3) observes that in the last five years, and especially after the 1983/84 drought in most African countries, there has developed a converged opinion between African governments and international organizations that Africa is a special emergency case in terms of food scarcity. Besides, World Bank (1989) agricultural statistics are extremely discouraging in comparison to Africa's high population growth rates. Present crop yields in Africa are

reported to be lower than any other region in the world for most of the important staple food crops as these yields are noted to be below the estimated potential.

For this reason, Harrison (1987:19) remarks that, "For almost two decades now, food production in Africa has failed to keep up with the growth of the population." According to his findings, even though the total food production has increased, it has not been fast enough to keep pace with population growth rate. Africa's population is currently growing at a rate of 3.2% a year, faster than elsewhere in the world and food production per person has fallen by around 12% between 1965 and 1982 just before the 1983/84 drought according to Achebe (1990). Kenya has been no exception to this falling agricultural food production.

Agriculture is Kenya's major economic activity and the country's rural settlement is greatly influenced by climate. Areas of high agricultural potential support more people than the lower and arid and semi-arid areas which have come to be characterised by frequent and consistent food shortages. Small scale farmers continue to live, cultivate and keep livestock on their communal or individually owned land and suffer food shortages almost every year. They use the same modes of food production with little variation every year and are hardly in a position to produce enough food to sustain them from one season to the next as Owako (1969) put it.

Since food scarcity has been noted to be a product of interaction between socio-economic factors and an area's climate, the magnitude of the scarcity varies from one household to another. These variations take form in terms of the time duration in which the households experience food shortages and the nutritional status of household members. Food scarcity would be influenced by an interplay of various socio-economic factors in the different homesteads at different times. Even in the same farming community, some families, who due to shortage of agricultural labour-force or lack of draught power will go hungry as a result of delayed sowing and weeding. But those with sufficient manpower and own draught animals required in food production, will plant in good time and have relatively better yields than their counterparts.

Experiences in regard to food shortages vary from "no season" of scarcity to "every season". This means that whereas some households report no experiences of food shortages at all, others say they suffer from food scarcity every season according to findings by Mbithi (1975). In the "every season" responses, there seems to be an interplay of socio-economic factors that negatively affect food production in a household. A farmer who plants and weeds early, owns sufficient land which he has control over; a farmer who hardly depends on his food produce for his major economic needs and keeps abreast with new farming techniques will undoubtedly not suffer from food scarcity unlike the one who does not do as the above.

Therefore, this study attempts to do the following:

- a). Identify several dimensions of the socio-economic factors that influence agricultural production and how they relate to food insufficiency.
- b). Establish the influence of socio-economic factors on adequate food production in terms of male migration, education level, age, divisions of labour, access to and control over land and other agricultural inputs and the consumption patterns.
- c). Examine the impact socio-cultural beliefs and practices on food production and shortages.

1.2 Statement of the Research Problem.

Food scarcity is a world-wide phenomenon. There are reports which indicate that Africa, Asia and Latin America are the most food deficient regions in the world. Available data from World Bank (1984) suggest that 700 Million people in the developing countries lack sufficient food necessary for their daily lives. According to the same World Bank sources (1984:77) between 1970 and 1982, there was a significant decline in total and per capita food production in Kenya. These figures show that the average annual growth rate of per capita production in the country fell from 0.4% in 1960/70 to -1.9% in 1970/82.

However, the most food deficient areas are the arid and the semi-arid zones. Machakos districts falls within this zone; it is characterised by the relatively high potential agricultural areas (the highlands of Mbooni, Kilome, Kangundo and Kathiani) and the low potential zones which receive little rainfall (Mwala, Yatta, Makueni and Kibwezi) lying south-east parts of the district. The Machakos District Dev. Plan (1993-95) states that such areas have the potential of producing drought resistant food crops such as the Katumani Dryland Research Station's maize, (pigeon and cow) peas, cotton, castor oil and sunflower as cash crops.

Prior to early 1980s, most farmers in the semi-arid areas used to produce appreciable quantities of food crops which went to meet part of their domestic needs and even generate income for their households. But for the last ten years or so, most of these areas have experienced successive food

scarcities. Observations reveal that families which used to be relatively self-sufficient in food production have been reduced to buying, begging and dependency on inadequate and irregular relief supplies from the government and other organizations. Since the 1983/84 drought, the food production in the semi-arid areas has been poor.

The 1989/93 Machakos Dev. Plan reveals that there has been a drastic drop in production and the decreased production among the area's drought resistant food crops. The major staple food stuffs in the area under this study are maize, beans, peas (pigeon and cow). However, according to statistics available at the Machakos Agricultural Office, the district's annual maize, beans and peas production is far much lower than the consumption requirements. Records indicate that the present annual maize production is 182,000 tonnes while the requirement is 273,000 tonnes per year. There is a demand of 68,433 tonnes of beans against a production of 55,000 tonnes and the demand for peas is also 68,433 tonnes against an average production of 35,000 tonnes per year. These figures indicate that there is always a deficit and it is most felt in the semi-arid agro-climatic zones where agricultural practices are expensive and unreliable.

The effects of the food shortages in this area are evident because the effects and consequences are noticeable. This is evidenced by several physical, social and economic factors that affect the local community. Malnutrition, the most acute physical expression of food scarcity and poor

feeding is evident especially on women and young children according to KARI (1991) . The shortages of food in such areas may not lead to a direct death toll, but perform a disruptive factor and a definite threat to health and especially among young children and their mothers. Increased nutritional problems and nutritionally related diseases such as diarrhoea are common. UNICEF reports show that mental retardation occurs as a result of protein-caloric deficiency results in severe malnutrition.

Since early 1990s, there has evolved a short-term out migrations by both men and women in search of wage employment. These seasonal migrations intensify between after-harvest and before the onset of the rains, when household food supplies dwindle and family members are threatened by starvation. Normally the migrant workers seek employment in the neighbouring urban centres or rural areas and especially in the relatively high potential agricultural areas. They receive payment either in cash or in kind and carry food back to their families. This seasonal migration has become a traditional routine due to the persistent food shortages in the most semi-arid areas.

However, there are those household members who instead of engaging in this seasonal migration in search of employment take up non-farm activities to raise money for purchasing food. The activities undertaken to feed the family are casual labour, making of illicit brew, selling of crushed stones and heaped sand, rope making, basket weaving, charcoal burning and voluntary road repairs with an

expectation of a small token from the motorists. Observations showed that when people run out of food in the area of study, they tend to invest their time and energy in non-farm activities in order to feed their families.

With prolonged periods of food scarcity, people have taken to consuming grain meant for planting. In some instances, consumption is extended to the crop varieties the traditional farmers have selected, bred and adapted to their environment. These farmers also to sell their most treasured livestock such as the milk cows and the draught oxen to purchase food in critical moments and in times of dire need for food. As a result of the prevalent food scarcity, most people not only consume what they had set aside for planting but also sell their oxen, the most valuable agricultural source of power.

The existence of food shortages is not without a social cost. Disruption of the farming community seems to be taking a firm root. Worst affected are school going children and youth especially those attending secondary schools. Field observations revealed quite a number of children drop out of school due to lack of school fees; a factor linked to successive occurrences of food shortages. When the farm produce is barely enough for domestic consumption, there is very little or none left for sale to raise school fees.

In the meantime, there is abject poverty and misery facing the area's population. Malnourished looking children and prematurely aged and emaciated mothers in tattered clothing

are a common sight, a characteristic feature of starved and famished peoples. It is not an overstatement to point out that famine looms in the area of study, a region which a few years ago was self-sufficient in food for domestic consumption. This study deems it necessary therefore to investigate and establish some of the probable causes of this problem whose current magnitude was not recognizable since early 1980s.

This study undertakes to analyse the respondents' background characteristics which have a bearing on food production. Such variables will include age, sex, marital status, educational level, main occupation, religious affiliation and family size. These factors have a bearing on the level of agricultural production activities and consumption rate of individual farmers.

Field observations indicate that the majority of small-scale food producers are women. This is as a result of rural-urban migration by the men in search of wage employment. The majority among these men migrants are the young adult school drop-outs. Upon leaving school, they get married, abandon their women in the rural areas and move to the urban centres in search of wage employment. Their youthfulness and schooling unrealistically raise their expectations on wage employment and this alienates them from rural life and farming activities.

Age and sex are intrinsically intertwined together in relation to food production. The young children are partial

agriculturalists because of school attendance. This has been aggravated by introduction of free primary education which has resulted in the massive rise in primary and secondary school enrolment. After primary school education, most young people and especially the men leave for the urban centres. This largely makes food production a women's domain according to the 1989 World Bank reports. An individual's level of education is also related to food production. The more one acquires formal education, the higher the hopes for a formal job. This creates another influential factor for one to move away from the rural areas in search of paid employment. ✂

Central Bureau of Statistics (1979) figures show that there are more women than men in the age category of 15-64 years old actively engaged in food production. Conversely, men are dominant in the urban economically active population. As these men leave the rural areas to seek employment in towns, more and more women are left behind as the de-facto household heads. This disruption of the rural social structure means that women have taken up most of the food production activities. This is supported by the Fifth Dev. Plan (1989/93) which recognizes women as contributing most of the labour required for cultivation besides performing daily household chores.

Occupation negatively influences one's capability to carry out farming activities. Salaried employment and business undertaking are the two occupations that compete with farming in terms of time to some extent. The size of the

family also matters because the bigger it is, the more it will consume. Unfortunately, some of its members may be too young to actively participate in food production.

Farm inputs are an important factor worth investigating because agricultural success depends on their availability and use. They include farm mechanization and tools, draught power, fertilisers and pesticides, credit and human resources in terms of researchers and extension workers. Field observation revealed the majority of these inputs are lacking in most households. It is important therefore to examine their influence on food production. X

When dealing with a labour intensive activity like farming, one requires a wealth of information on the intricacies of division of labour based on gender. Ideally, women are ascribed to sowing, weeding, harvesting, processing and storage whereas men are required to do only the field preparations. But this is not what practically happens since women have been found to do their tasks as well as the men's duties which affects the crop output in the end.

Some tasks have become interchangeable and others have called in for substitution from a different age or sex category under certain conditions. In the final analysis, these have been noted to have adverse effect on agricultural output. Some of these tasks are women ploughing or guarding crops at night against wild animals in the absence of men. It is therefore important to find out whether failure to

perform ascribed agricultural roles by men has a negative effect on food production and household sufficiency.

Finally, the investigation of land tenure patterns is of great importance especially in semi-arid areas. Farmers feel obliged to cultivate as many small-scale farms as possible in order to maximise their output. But the cultivation of these many farms has been curtailed by land ownership. Family land has been sub-divided and fragmented into small plots with some family members getting sections which are agriculturally poor. This may be a contributory factor to reduced crop output. Again, others are still cultivating communal on family land. This family land does not belong to anybody in particular since the members have got rights over a certain area but with no legal title to it.

Without full private ownership, the farmers hardly feel obliged in terms of long-term conservation as they have not acquired the security of tenure. This gives them a short-term planning horizon which is in itself a drawback towards food sufficiency. Social and economic factors which are discussed in the data analysis prompted the choice of this study.

1.3: Research Objectives.

For a long time, the great majority of the Kenyan farmer's in semi-arid areas have experienced persistent food shortages. Studies and resources aimed at establishing and eradicating the causes of food scarcity in these areas have been directed towards drought, soil and water conservation and the discovery of drought resistant and fast maturing seed varieties according to a World Bank report (1989). Very little attention has been given to the socio-economic factors that have been observed to influence food shortages to some extent.

Therefore, these study seeks to do the following:

- a) To investigate the socio-economic factors that precipitate food shortages and suggest possible solution of minimising them to improve food production in the area.
- b) To establish the relationship between food shortages and the cultural-value system and suggest ways of overcoming them for improved food production.
- c) To draw the attention of the government and other relevant organizations to the magnitude of the food scarcity problem in the area of study.

1.4: Justification.

First and foremost, agriculture is said to be the backbone of Kenya's economy. The 1989-93 Development Plan reports that, 82% of Kenya's population live in the rural areas and the great majority of them make their living from agriculture. Food sufficiency is very essential because the country's political independence will only be supported by its economic self-reliance through sustainable agricultural programmes. In this case, improved economic growth and development in agriculture are basic determinants of social and economic progress in Kenya.

Kenya's key agricultural policy has been to achieve internal self-sufficiency, but this goal is far from being realised. Food scarcity in this country and particularly in the arid and semi-arid areas has been generally attributed to the lack of sufficient rainfall and persistent drought. However, food scarcity in semi-arid areas cannot be blamed on drought alone. This is because drought effects can vary from one household to another since the effects can be termed as a result of interaction between the activities of the farmer and the environment.

Farmers can experience drought and poor yields resulting in food scarcity if they do not sow and weed early or plant the early maturing varieties. This implies that there are other factors that contribute to food shortages besides drought.

A

They are socio-economic in nature and affect food production, often leading to shortages.

The rapidly growing urban population relies on food produced by both the large scale farmers and the small holders. In addition to producing enough food to meet the current domestic requirements, production is also targeted towards meeting strategic reserves sufficient to see the country through at least six months in times of extreme food scarcity, both in urban and rural sectors according to the 1989/93 Dev. Plan.

A high substantial proportion of Kenya's foreign exchange earnings are said to be derived from the sales of both food crops and raw materials from agricultural production. It is the aim of the Kenyan government to expand agriculture at 5.3% per annum to enable the Kenya's economic growth to grow at 5.6% per annum by the year 2000. This ambitious policy cannot be realised without looking at the socio-economic influence on Kenyan agriculture and self-sufficiency in food production for subsistence in marginal areas.

It is also the government's intention to curb the rural-urban migration which strains the meagre urban social amenities amidst the prevailing joblessness. The government anticipates that the highest level of employment will be created by increased productivity in the smallholder agricultural areas. But unless food production and sufficiency is ensured, this objective may not be met. It is therefore worthwhile to look at those factors that hinder

food production and create shortages and try to eliminate them so that small scale farming in the semi- arid areas may pay dividends and become attractive.

The economic aspect also plays its role in farmers selling most of the food produce. This is because they have to depend on it as their source of livelihood in terms of acquiring money to purchase tools, draught animals, hybrid seeds, or even hire casual labourers to assist with farmwork. Since farming in semi-arid areas has not proved to be a reliably rewarding exercise, farmers have to supplement their food production with formal employment, casual labour, seasonal employment, business undertaking and livestock keeping.

African governments are challenged to take food scarcity in their countries more seriously than they have in the past. Achebe and et al (1990:4), observe that: the most tragic aspect of the declining agricultural production in Africa is that the debate is dominated by the international community. "Those who are farthest removed from African realities - who do not feel the pinch or who need not take responsibility- are the pace setters". This is therefore, a justifiable accusation directed at African governments and scholars.

Food crisis in Kenya reduces the incomes of rural majority, their access to food and reduces the availability of foreign exchange which is vital for national development. Regarding the factors that precipitate food scarcities, Timberlake (1985), Donders (1984) and Onimode (1988) have argued out

that even through rainfall may be low and highly unreliable, the climatic aspect should only be treated as a variable and not as a constant. With an understanding of the socio-economic factors that aggravate the scarcity in semi-arid areas, less energy and resources should be focussed on drought or rainfall unreliability as the primary cause of food scarcity.

KARI (1991) notes that semi-arid areas were given low priority in terms of agricultural development during the colonial era. In spite of the arid and semi-arid land reclamation programme, these areas lag behind in food production. Therefore, such areas currently merit the evaluation of their agricultural activity. Understanding the factors that influence food shortages and finding possible solutions to them would significantly raise the people's standards of living and food security. Field observations indicate the production of drought resistant crops such as millet, sorghum, cow peas produced in semi-arid areas are quite low. It would be important to establish why the production of these crops is low and their production unpopular.

Finally, since agriculture is one of the most important sectors of Kenya's economy, it follows that the country's first priority in its agricultural policy is to achieve self-sufficiency in food production and availability. This can be justified in that food shortages in an area have:

a) Direct costs - those the government directly incurs by assisting the famished section of the population primarily

through famine relief. There also occurs a reduction in the loss of foreign exchange which is diverted towards the importation of maize, sugar and rice.

b) Production loss - this is value not added to the national economy through crop production and loss incurred through investment of time, money and labour on activities which fail to yield anticipated results.

c) Social costs - increased nutritional problems and nutritionally related diseases, disruption of families and the psychological effect of suffering from hunger.

The above can be minimised by attempting to achieve and maintain adequate levels of food reserves for subsistence use before generating supplies for export. It is important for this reason that the small farmers are seen as the focus of interest as they account for most of the cultivated area. Besides, they form the majority of the poor and malnourished population. Positive attention to the small farmers in Kenya contributes to the realization of the important national goals of development which are boosting national self-sufficiency in food, improving the incomes of the rural majority, reduction of mass poverty and malnourishment and finally conservation of the environment.

CHAPTER TWO

LITERATURE REVIEW

2.1: Introduction.

Many scholars and researchers have attempted to find out how and why food shortages occur and especially in the developing world. They differ on their emphasis on the major factors that cause food scarcity. The primary factors that have been linked to food shortages by different authors and researchers are climatic, economic, political, social, cultural and environmental. But for the drought stricken areas in Kenya and Africa as a whole, lack of adequate rainfall has been associated with lack of sufficient food and as a result, the occurrence of famine and starvation.

Little attention and prominence has been given to the socio-economic factors precipitating food shortages in Kenya and other African countries. This is because factors such as labour-force, access to and control over land, individual's ability to acquire agricultural inputs, food consumption patterns and traditional beliefs and practices are normally overshadowed by adequate and unreliable rainfall as the major causes of famines.

The general definition of famine is an extreme and general shortage of food causing either distress or starvation among the people of a certain region or country. Aykroyd (1974) states that famine, unlike an earthquake, is rarely a sudden emergency. It is usually a long drawn out calamity in which

food supplies dwindle for months or even years from restriction to scarcity and in the long run to complete dearth. The period when famine is at its peak in terms of suffering and death, may last a year or more even though some famines are known to have lasted for several years.

One of the major devastating consequences of food shortages at a national, regional or local level is the social cost of famine which is rather difficult to quantify. However, even if food scarcity does not result into a major death toll, it creates large scale starvation and performs a serious disruption to social life and a definite threat to health, particularly among children. Therefore, recovery, when food for survivors becomes available again is not immediate. Bodily weaknesses and psychological traumata normally persist for some time because of the increased nutritional problems accompanied by nutritionally related diseases.

Famine throughout history has generally been a social class problem. Where there is widespread food shortages in a country, the poor starve, suffer and even die from the sheer lack of food or from the nutritionally related diseases while the rich secure enough food for survival until food availability is restored again. This is where governments and relief organizations are required to assist the affected populations primarily through famine relief services otherwise there will be deaths, diseases and mental retardation especially in children where this would occur as a result of protein - calorie deficiency as Harrison (1987) points out.

2.2 Environmental and Socio-economic causes of Food shortages

Over the years, drought has been treated as the major cause of food shortages. Mbithi (1975) defines drought as lack of sufficient rainfall (moisture) to sustain plant and animal life systems. In the absence of the adequate rainfall, crops can hardly be sown or harvested and animals die. Man then suffers as a result of the consequences brought by drought. ✓

According to Donders (1984) a prolonged drought hinders not only the production of food but lowers the water level in rivers and dams, thus reducing irrigation possibilities. Therefore, the very first reason for food crisis reports in Africa is normally drought. For instance, it is reported in the UN Emergency Operations in Africa that in Angola, one third of all children were dying prior to their fifth birthday because of drought related causes. On the semi-arid regions of Kitui in Kenya, Donders (1984) states that one or two seasons of drought causes calamity in these regions because they always lack food reserves. Hunger is said to strike immediately and livestock suffers together with man.

Onimode (1988) attributes Africa's food insufficiency and shortages to natural disasters such as drought and desertification. He further on states that due to climatic and environmental reasons, Africa's food crisis affects the staple foods; maize, millet, sorghum, beans, cassava, yams, potatoes and cocoyam. Lack of reliable rainfall in most African countries is therefore seen as the major cause of food scarcity. Timberlake (1984) also cites drought as one

of the factors, besides floods, hurricanes and earth quakes which are to blame for food shortages in Africa. It should be noted with clarity that none of the two authors take into consideration that socio-economic factors might also be a cause for food shortages despite inadequate and unreliable rainfall.

Another writer, Aykroyd (1974) concurs with both Onimode and Timberlake by pointing out that most of the great famines have been precipitated by droughts. However, these writers disregard other causes of food shortages and treat insufficient rainfall as if it is the only factor that causes food shortages. In his argument, he states that insufficient rainfall prevents the cultivation and raising of food crops besides killing of domestic animals and creating adverse conditions for man. This is true but only some extent. However, he overlooks the fact that there are many socio-economic obstacles to food production. The highlight on drought as the main determinant of food scarcity is deceptive because food shortages would not be wholly solved even when there is adequate rainfall unless other intervening variables are also taken into consideration.

Even though Mbithi (1975) attributes food scarcities to persistent drought in Kenya, he also notes that there are other variables that account for famine such as rural-urban migration by men in search of employment. Another factor is that some farmers hire themselves out for casual work on other peoples' farms in spite of the labour demand on their

farms. This creates delayed and reduced farm activities with an end result of poor crop output.

A World Bank report (1990) notes a prevailing attitude which views acquiring a certain level of education as a means out of agricultural labour and an entitlement to formal employment. The report also presents a discussion on the factor of landlessness whereby some members of the Kenyan society cannot produce their own food as a result of owning little or no land at all. The main argument is that there are socio-economic problems that contribute to the shortage of food in spite of inadequate and unreliable rainfall in some regions.

It is explicitly clear that there are other causes of food shortages rather than mere drought because drought is only an environmental factor with an influence on food production and scarcity in a given region. Drought can not account for the scarcity in isolation but has to be looked at in conjunction with other food production related factors which most researchers such as Aykroyd (1974) tend either to overlook or underestimate.

According to Timberlake (1984), Africa's recent droughts have aspects of natural fluctuation and that human interference through overcultivation, deforestation and overgrazing prolong and intensify dry spells. This statement indicates that man's socio-economic behaviour contributes to that drought most observers and writers blame as the main of food scarcity in semi-arid areas. Donders (1984) attributes ✓

the food problems to other causes. He discusses such causes as economic weaknesses, political upheavals, corruption in governments, the need to grow cash crops at the expense of food crops, lack of farm inputs. People's change of eating habits from their customary staple foods such as maize, millet, cassava and sorghum to rice and wheat products because of their convenience and taste has been noted to be a contributory factor on food shortages.

Harrison (1987) cautions against attributing food problems in semi-arid areas to drought. He argues that there is very little the Africans can do to reduce the occurrence of drought when it is as a result of either some long-term shift in the global climate. This is normally due to variations in the earth's orbit or the warming of the "greenhouses" effect of raised carbon dioxide in the atmosphere which results in the burning of the fossil and fuels. The effects of "greenhouses" warming cause insufficient precipitation leading to inadequate soil moisture in relation to the requirements plant life. If drought cannot be controlled, then the only possible approach is to adapt to its effects. This would reduce the farmer's vulnerability to its effects on food production and scarcity.

Socio-cultural practices such as overcultivation, overstocking and deforestation have been cited as acts that lead to low agricultural productivity by indirectly influencing rainfall reduction. Harrison (1987), Dumont (1983) and World Bank (1989) agree on land degradation by

livestock and deforestation. They point out that livestock eats up grass and shrubs thus exposing the soil to the erosion by wind and water, rendering the land infertile. Deforestation is also another problem that affects farmlands. Achebe (1990), states that there is scientific evidence to the effect that deforestation lowers the level of soil moisture and suppresses rainfall formation. This leads to insufficient rainfall, poor yields and hence food scarcity.

Lapple (1977) dismisses the vulgarism of weather including drought as the sole cause of food scarcity. He states that famine is a social fact, not a natural one; the result of human arrangements but not an act of God. He also dismisses droughts and floods, the commonest reasons for famines as the only source of food problems. He attributes the food scarcity problem to the failure of social systems such as the farming communities, governments and international organizations to meet the challenges of nature some of which are human induced.

Harrison (1987) comes up with a recommendation for the African people to solve some of the food production problems they create. He suggests some form of small-scale irrigation measures be taken to increase water infiltration and improve the waterholding capacity of the soil. He also encourages inter-cropping, growing fodder and fruit trees whose deeper roots can tap lower levels of water besides using fertilisers. Different researchers such as Clayton (1983) or Boserup (1975) and agricultural experts such as Heyer (1976)

address the problem of food shortages in most semi-arid regions differently. They vary in their opinions as to the causes and are divided in their perception of the problem. Writers such as Aykroyd (1974), Lapple (1977) and Clayton (1983) emphasise on drought as the root cause of food shortages without analysing the intervening variables.

On the other hand, writers such as Harrison (1987), Dumont (1983) and Onimode (1983) have viewed the issue of food scarcity from a social and economic dimension which had been overlooked and underestimated. They have examined the food scarcity problem and especially in semi-arid areas where it is a major problem beyond the scope of the climatic conditions and the availability of sufficient rainfall. Even where drought resistant hybrid seed varieties have been developed, the crop output has not improved much due to social and economic problems.

In other instances when experts succeed in introducing hybrid seeds to farmers such as the drought resistant Katumani maize in Machakos only a few farmers can afford or are aware of its availability. Incidentally, after a year or so, these hybrid varieties cross-fertilise with the local crop and gradually lose their drought resistance and high yielding capacity. Besides, some farmers are hesitant to use hybrid varieties because of conservatism and do not want to change from their traditional varieties. These are therefore some of the causes of food scarcity in the semi-arid zones.

2.3 Labour-force in relationship to food production and scarcity.

Food production in semi-arid areas is normally a labour intensive activity. Agricultural labour-force can be termed as the act of engaging in agricultural activities for both subsistence and economic purposes. In small-scale farming, agricultural labour takes a socio-cultural characteristic. Household members are the primary suppliers of the manpower required in food production even though in some cases, hired labourers may supplement the family efforts. Thus agricultural labour-force takes into consideration the socio-economic conditions that determine the division of agricultural labour in a household on the basis of factors such as sex, age and social status.

There is a clear disproportion between labour-force and the number of consumers in a household because not all family members engage in productive agricultural activities. The division and distribution of agricultural labour among the small scale farmers is somehow determined by social, cultural and economic factors. As stated earlier, farming in semi-arid regions is a labour intensive and time consuming activity. Most of the farm activities have to be done within a specific time because delayed ploughing, sowing and weeding can create low yields and thus food scarcity in a household.

According to Harrison (1987) and Fieldhouse (1986), insufficient work-force among the farming communities and

especially in semi-arid areas is a common feature. They attribute scarce labour-force to a cross-section of social and economic factors . Unfortunately, the issue of agricultural labour-force has not been explored in much detail to determine its influence on food production. Clayton (1983) states that massive school enrolment in some countries like Senegal negatively affects food production. This is because child labour in agricultural activities is absent and some instances, cultivation of crops such as millet and sorghum which require intensive bird-scaring are abandoned. Similarly, Ndegwa et al (1987) says that, where primary education is compulsory for all children, account is not taken of the negative effects of the withdrawal of children's labour on food productions activities.

Insufficient labour-force among the small-scale farming is influenced by various factors. For instance, Harrison (1987) reports that a survey carried out among the Zambian farming community indicated that, 40 % of the small-scale farmers experienced inadequate agricultural labour-force as a result of emigration, family separation or illness. Households which experienced inadequate labour-force were found to suffer from food shortages. Insufficient labour-force is not limited to the Zambian farming community but it is also common in other African countries.

Just as there is little documented information on agricultural labour-force, so is there on the division of labour based on gender in relation to farming in semi-arid areas. Those writers such as Onimode (1985), Achebe (1990)

Question" (1987) is quoted saying, "African comrades say very nice thingsthey are for women's equality, they aren't anti-feminism they want us to produce both the corn and the children." This is an ironical way of saying how African men avoid household duties and farm work and justify themselves by saying that it is a woman's job and responsibility not only to produce children but also food for the family. *

The traditionally low position accorded to women in Africa aggravates food production problems. At the height of the farming season rural Africa women have to combine digging, hoeing, planting, weeding and harvesting with household tasks. Very little is done to correct this bias and more male participation is thus required to supplement women's food production activities. Water fetching, wood/fuel collection and looking after the children are household activities that require shared performance by both men and women. Transport of the harvested crop from the farms also falls on the women. As Dumont (1983) observes, most women in Africa are the major means of transport for the harvested crop to the villages.

Women who are left alone with the children by their men normally have difficulties in feeding their families. Dumont (1983) says that at times these women even hire themselves out to their richer neighbours for some food, hence abandoning their own farm work. This issue of peasants taking up casual farm work in their neighbourhoods is quite common in the semi-arid areas. However, it has not received

much attention and analysis from researchers. Hiring out oneself to work on others' farms for food or money negatively affects some people's food production output. Such people are also said to be weakened by malnutrition and diseases which reduce their food production capacity.

When examining the gender division of labour in the context of food production, it is of importance to take into consideration the significance of time use, household's labour-force participation in other activities and the economic returns. This is because, as Harrison (1987) notes women walk long distances in the dry season to fetch water while their men engage themselves in social activities and especially drinking parties. He says that such hard working women are likely to be discouraged in carrying out food production activities by their lazy husbands. The drinking of illicit brew has become one of the social ills in rural areas which negatively affects the production of food and its sufficiency.

Owing to traditional values and norms, women cannot introduce significant innovations in farm investments without prior consultation with their husbands. This is according to research findings by Mbithi and Bahemuka (1981). Incidentally, the husbands who are expected to make key decisions are normally absent with little or no knowledge on farming technicalities. This creates a problem in that decisions that might be advantageous to food production are either taken too late or never at all because

the traditional decision maker is away. This becomes an influential factor to household's seasonal crop output.

Performance of household chores is another influential determinant of a family crop output. Household duties have been noted to disrupt women's full participation in agricultural activities. Harrison (1987;60), noted that-:

"Women, helped by their children do all the work on the farm. In areas where fire wood is scarce, or where sources of water are distant in the dry season, women's burdens are intolerable. They spend an average of an hour a day collecting fire wood, an hour and a half pounding or grinding foods and anything from half an hour up to six hours fetching water. Something has to give and as water and wood are inescapable daily needs, planting, weeding and harvesting are delayed and yields suffer."

Rural women are early risers so that they can go about their various household activities. They walk for miles to fetch water and firewood. Besides these activities, they are known to be prone to the problems of malnutrition and various types of illnesses that attack them and their children which lowers their agricultural productivity as it interferes with vital farm activities. Unfortunately, these are the farm tasks normally ascribed to women while men allocate themselves the duties of land clearing, fencing against

domestic and wild animals and at times ploughing, tasks which are periodical and less demanding.

Onimode (1985) emphasises on the women's dominant role in small-scale farming. He points out that their active participation in food production is sharply contrasted by men's passiveness. In most cases, male participation in agriculture is easily noticeable because men are conspicuously absent. Dumont (1983) justifies the absence of the African men in agricultural activities by saying that their non-participation is traceable back to the pre-independence days. He argues that colonialism disrupted and destroyed the setting and structure of the African traditional societies, their economies and mode of production. Men were compelled to work in the mines and in the plantations while their wives and children were left to fend for themselves. In the British colonies, poll taxes which had to be paid in cash also forced men to work for European employers.

The migration of African men to the mines and plantations for paid labour was the beginning of the institutionalization of male passive participation in food production, a feature which is still in existence up to the present time. Many decades have elapsed but many African men have been unable to overcome this negative attitude towards farming activities traceable to the colonial era.

One is bound to concur with Harrison (1987) who remarks that changes in men's attitudes towards food production are

needed to correct the imbalanced agricultural labour-force rooted in gender differences which in turn contributes to food scarcity. In reference to inadequate agricultural labour-force, Harrison (1987:59) notes that, "If planting or weeding are delayed, yields suffer quite drastically. If harvesting is delayed in areas with two rain seasons, the old crop may still be lying in the fields when the first new rains arrive, it will be put away damp and damage by moulds in storage will be more serious."

Men may no longer provide forced labour in the mines and plantations on a forced basis as it was during the colonial times. However, they still migrate to urban areas in search of paid work either seasonally or permanently. Mbithi (1975:183) points out that, "short-term migration in search of wage employment was found to be common in the marginal areas of Meru, Embu and Kitui." Those men who may not seek for work in urban areas work on casual basis for people in more advantaged areas and may receive payment in kind; food or domestic animals. In the case of food, they later take it home to their families and especially during the onset of rains and during the times of severe food shortages.

Therefore, the out-migration of males from their home areas is a contributory factor to reduced food production. Their migration to work has a socio-economic element as it has been directly linked to the traditionally ascribed role of a man as the provider and bread-winner of the household. African men tend to view this breadwinning not in terms of agricultural food production but acquiring a paid job, a

characteristic of the contemporary industrial society. A man's position in life is viewed in terms of what he makes out of the current economic world whereby he is expected to move from a humble to high ranking status either through formal employment or business undertaking. This explains the food deficit in various households since men have little or no time for agricultural undertaking and leave it to women to feed the families.

Fieldhouse (1986) states that those men who do not migrate to urban areas or other places for paid work still play a passive role towards the production of food crops. He notes that many men give priority to cash crops whose proceeds they keep while their wives struggle with the demands of subsistent crops. Dumont (1983:138) lends weight to the above statement by saying that, "the colonial administrators put stress on developing cash crops which became a male prerogative while women were relegated to subsistence farming." He further argues that while the women work to feed the family, the men work for money and keep it for themselves and despite the women's massive share in the farm work-load, men remain firmly in charge of the produce. When there is surplus food, the men may accumulate capital in the form of extra livestock or even marry another wife thus exposing the family members to food scarcity in times of prolonged droughts.

The combination of livestock keeping and arable farming is another determinant of poor food production activities and especially in the semi-arid zones. This aspect of livestock

keeping alongside arable farming alienates men from food production activities. Even though the cattle provide drought power for ploughing and transport, protein from dairy produce and meat and manure, the integration of the two activities acts as a hindrance to the intensification of agricultural food production. Livestock keeping activity deprives agriculture the required male labour-force. Families that own livestock have to divert part of their time to herding. World Bank (1990) notes that herding is a predominantly male activity which excludes most men from active food production.

According to the 1967 Arusha Declaration on food production, Tanzanian government called for agricultural "hard work with intelligence" and warned against laziness especially in rural men. Dumont (1983) feels that hardworking women are demoralised by their lazy husbands who contribute very little towards subsistence farming. He states that women in Wedza area, Zimbabwe complained to an agricultural researcher that, their men use money on beer prostitutes and yet give them no power to spend money on agricultural inputs or investments. This is a draw back on food production because if the women have no authority to spend money on farm improvement, then the yields are lowered.

Soil conservation is an important aspect in food production in semi-arid areas. In reference to Machakos district, Harrison (1987:21) remarks that, "Women are the backbone of soil conservation," an indication that men hardly conserve the farmlands. Agricultural experts argue that farmers in

semi-arid zones should not expect good yields without conserving the soil which is prone to wind and water erosion. However, unless women are assisted by men in this conservation exercises where erosion becomes more pronounced every year, a lot of good farming land is rendered infertile. The end result would be a further drop of the crop even when there are sufficient rains to guarantee a good harvest.

Educational system is an influential factor in food production and sufficiency in sub-Saharan Africa. Ndegwa (1987) wonders whether the system of education in this region of Africa is by accident or by design and whether it relates to the agricultural labour production needs. He says that since the education system in sub-Saharan Africa does not relate to food production requirements, some parents subject their children to agricultural absenteeism in the agricultural peak periods.

Tanzania and Lesotho have realised the significance of school going children's participation in food production. These two countries have thus linked their educational system to agricultural production in some respects unlike Kenya where school holidays do not allow for alteration to adjust to local variations in labour demand. Lesotho has adopted the shepherd schooling systems to cater for the country's significant livestock economy. Children are allowed to go to school on alternate days so as to look after the livestock. Tanzania on the other hand has a

November -January holiday which moderately corresponds to the agricultural peak labour demand.

Therefore, there is an urgent need to review the pattern of agricultural labour allocation of subsistence farming within households based on gender, age, sex and other socio-economic factors. These would be the household members' economic activities (work for wages, trade in a family enterprise, crop production for sale or consumption). The analysis of agricultural labour allocation would also involve the daily household chores which are child care, food processing and preparation, wood and water collecting and animal husbandry. These factors significantly influence agricultural labour supply in many subsistence farming households and their interferences with food production activities determine the crop output in a household.

2.4 Dependence on food as a source of income.

The World Bank (1989) states that the priority in agriculture practised in the semi-arid areas should be on food for subsistence rather than as a source of income. But over the years, there has been a marked increase in food sales at the expense of the household's consumption. This is because many families have no other source of income and therefore can only depend on the sale of their farm produce.

Odetola (1985:126) points out that, "African traditional farming has been based on subsistence economy. Today, however, because of diversified economic activities, food production is only meant for consumption within the household but the surplus is sold in the market to other consumers." However, what Odetola calls a surplus is no "surplus". What he considers as surplus farm produce is what is not in immediate use according to UN/FAO (1984) report. But the subsistence farmers are then said to sell their farm produce meant for future domestic consumption even at the risk of depleting their food stores and going hungry.

Different writers attribute subsistent farming food sales to different reasons. Dumont (1983) and Onimode (1985) say that a host of financial requirements compel small holders to sell part of their farm produce because of their domestic needs. The traditional African economy was based on self-sufficiency. There was normally little left for commercial consideration after the primary group had consumed what it required and stored away any surplus for the future use.

With the onset of the cash economy, the trend has changed and commercial consideration for what is produced becomes a priority over the vital consumption by the household.

Most African small-scale farmers have little or no cash for their daily requirements. According to Todaro (1986), they are left to rely on the incomes from their major economic activity which is either small-scale farming or livestock keeping. Ndumbu (1985) says that the sale of food takes precedence over livestock because of the still persisting strong traditional attachment to animals. It also becomes more convenient for food to be sold because normally, the men are away and the women cannot take it upon themselves to sell livestock without permission from their menfolk as Dixon-Mueller (1985) points out.

Most of the food selling, though at the risk of exposing the family to starvation, is justifiable. In most cases, food is sold to cater for family requirements and obligations such as payment of school fees. Ndegwa et al (1987:154) states that there is a direct cost of education to rural based cultivators in terms of cash for school fees, building funds and uniforms. He states that the money, "is obtained by sale of produce, reducing the production available for own consumption". He goes on to elaborate that the small-holders' children in education is a clear indication of their parents' perception of the potential benefits of education which are worth the cost of their children's involvement in agriculture.

Dumont (1983:237) adds weight to Ndegwa's observation by saying that, "child labour which is both very common in Africa and very necessary, seems to perform a very useful function.... but also furthers the children's education." The indication is that besides these farmers producing food for their sustenance, there is also another objective of catering for the children's education. Food selling for educational purposes is a post-independence development in many African countries according to Clayton (1983). Prior to that, there was hardly any food sold for the purpose of raising school fees.

There are other socio-economic requirements that necessitate the selling of food crops meant for household's consumption. Onimode (1985) cites some of them as the payment of taxes, dowry as well as the purchase of imported manufactured goods such as textiles and bicycles. He says that such payments of purchased commodities are largely obtained from the sale of surplus food and cash crops. The insistence of surplusness however, gives an erroneous impression that the subsistence farming sector in semi-arid areas produces extra food convertible into "cash crop".

Due to uncertain climate, and especially in semi-arid areas, there is always a looming risk of crop failure. In this case, farmers ought to be prepared against this eminent food scarcity risks as best as they can. When they are lucky enough to enjoy a bumper harvest, Ndegwa (1987) cautions against falling into false sense of security and selling almost all their food crops instead of storing it

for the future in case rains fail. Onimode (1983) points out that the African famines of 1983-85 were not a sudden isolated disaster. There had been visible indications prior to their outcome. Therefore the governments and the farmers should not have diverted the stored grain to the market as it is normally done at the slightest sign of a potentially good harvest.

The sale of food crops would not be so deplorable if only the farmers obtained fair prices for them. But the International Journal of Health Services (1985) points out how the small-scale farmers are victims of poor marketing facilities. They are reportedly vulnerable to monopolistic food marketing practices that exploit them. They are too poor to press for increased prices for their farm produce. Therefore famines strike when they have accumulated little capital from their food sales and hardly in a position to purchase back what they had previously sold out. Farmers who had initially consumed their seed grain and sold the rest are faced with immense problems and experience difficulties in starting all over again.

The introduction of the so called "civilized foods" such as wheat and rice have influenced food scarcity in the rural areas to some degree. This is because farmers would sell their indigenous food crops such as maize beans, cassava or potatoes to purchase uncustomary foods alien to their eating habits. This is because they find wheat and rice products tasty and convenient to prepare as Donders (1984) reports. In spite of disposing their customary staple foods

at cheaper prices, they buy wheat and rice products at more exorbitant prices and hence end up the losers.

Giving food to starving people can be linked to the change of the traditional eating habits and food sales. Relief foods cannot be said to be without negative and harmful effects on agricultural production and food consumption patterns. People receiving food aid may become charity institutionalised such that they either slacken their food production efforts or dispose almost what they have harvested with a belief that should a famine strike, the government and the international world will intervene because they have a moral obligation to feed them. This is a negative attitude towards the strive for food sufficiency and that is why at times the government restricts the sale of farm produce from one area to another in a bid to control food sales.

Likewise most of the food aid varieties are normally alien to most rural people; rice, wheat, corn oil, powdered milk and the U.S. nutritional biscuits influence the traditional eating habits. Once the recipients are introduced to these foods, they grow to like them because of their tastes and convenience and hence later sell their home grown foods in order to purchase what they consider as modern. To curb this, some policy makers have suggested Food-for Work programmes. This means food aid be only given to those who are willing to work on communal projects so as to discourage dependence unless this is inevitable. Relief foods should be discontinued as soon as local yields are back to normal.

The Machakos district's low potential zones are rather suitable to the growth of the drought resistant cash crops and especially cotton and sunflower. Cotton has been the leading of the two crops. However, according to the 1989-93 Machakos Dev. Plan (1989:63), there was a drastic drop in hectareage under cotton during the period under review. This was largely attributed to the lack of prompt payments, abrupt change of the buying, paying dates and seed distribution and finally the deductions of old cotton loans which were said to have been poorly administered. As a result of these disincentives the majority of the farmers abandoned the cultivation of their main cash crops thus reverting to dependence and sale of their food crops. Since the decline of the cotton growing in the area, food selling has become more rampant even though nobody seems to have drawn much parallel between food selling and scarcity.

2.5 Agricultural land and its ownership.

Land is one of the most treasured assets not only in Kenya but in Africa as a whole. In most African societies, land ownership is regarded as a sacred phenomenon. Mbiti (1969) stresses the importance and significance of land ownership in African communities and relates it to the union with ones ancestors. His observation is confirmed by many Africans insistence on being buried in the ancestral land or on their own farms instead of public cemeteries.

In most African communities, land is inherited and passed on from parents to children. If a family does not own land, its members become squatters or people of no fixed abode and are agriculturally unproductive. If they are, they do not enjoy the security of tenure and have a limited agricultural ambition. The U.N/F.A.O (1984) report states that the increasing number of landless agricultural workers and farmers who have inadequate access to production is a major concern to the developing countries. Such countries have been noted to be characterized by an increasing inequality in land distribution.

George (1977) concurs with the above U.N/F.A.O report for she feels that food deficient areas should increase their production by allowing more access to land. For people to eat they must grow their own food, purchase it or a combination of both. Farmers will not be able to produce any food unless they own land and those who have money will not be able to purchase any food unless the producers have access to agricultural land.

Many regions in Kenya are characterized by a transitional phase between communal and individual land ownership. In some places and households, it is a no man's land in which the farmers have permanent rights over a certain piece of land but minus a legal title to it. This is because such lands have not yet been officially demarcated and title deeds issued to their respective owners. Therefore, without a full private ownership, the farmers do not feel very obliged to think in terms of long-term conservations. This could be due to the fact that they have not yet acquired the security of tenure and hence under such conditions, the conventional approach to improve and conserve farmlands hardly works.

Appeals for preservation of land for future generations would only probably be taken seriously when most smallholders begin to enjoy full ownership and control over their land, trees and even water points. However, this is a fact that does not seem to have drawn the attention of the policy makers. People will not feel morally obliged to care for and maintain that which may not turn out to be rightfully theirs no matter what amount of persuasion or coercion they are subjected to.

In the hilly and semi-arid zones of Machakos, sheet erosion has taken toll of the farming land. It has stripped the top soil from many slopes and has left behind hard gravel dotted with sparse tufts grass. The washing away of the top layer and rich organic soil reduces the fertility and cuts plant

yields. Therefore, when crops cannot send their roots deep into the soil, they become vulnerable to dry spells. Soil erosion whose conservation efforts are related to land ownership has been cited as one of the food scarcity causes in semi-arid areas.

In the traditional African societies , families did not own land. Land is said to have always been there even though its occupants owned its produce as well as the produce of any trees that they planted. Individuals were given more or less permanent rights over certain areas which could be inherited by children or rented out. In Kenya, these permanent rights have been converted into full private ownership which will probably encourage the owners to care for the land and put it into agricultural use. For instance in Kibauni location where this study was carried out, the government is currently surveying and demarcating family owned land into household plots and issuing title deeds; an exercise which is long overdue but which is expected to influence soil conservation activities and improved crop output.

Land fragmentation has notably been cited as a problem against striving for food sufficiency. As landholdings are divided and sub-divided among family members, they dwindle in size. In some areas, the fragmentation of farmlands into small farm units renders the use of farm mechanization and especially big tractors. Besides, the more a household has adult male population, the more the family land is sub-divided into fragments of farm units. This is currently happening in some of the areas under this study. Such small

farm units are rather uneconomical to invest in long term improvements.

Soil erosion is noted to have become the subject of serious concern in the colonial British East Africa as early as 1930s. But instead of educating and encouraging the farmers to conserve their land, colonial authorities imposed conservation by force. People who owned land on steep slopes were compelled to dig terraces and plant trees on the slopes. Defaulters were either fined, whipped or jailed. In the end, this coercion did more damage than good because the farmers came to view conservation as a form of colonial oppression and collaboration. Soon after independence many farmers gave up land conservation activities. They let their terraces and drains go into ruins or even destroyed them. Their food production output also declined. Even up to now some smallholders have not yet overcome the soil conservation negative attitudes instilled by the colonialists and therefore give little attention to soil conservation methods.

2.6 Animal Power and its Relationship to Food Production.

Draught or animal power is a vital source of agricultural labour-force and especially in the arid and semi-arid regions where farm units are fragmented and the use of mechanization is not very viable. The use of draught animals can make a lot of difference in agricultural output. The dates when the farmers plough and plant are crucial. Should the farmer be a few days late in planting, the yields will be definitely lower and poorer. If there are no oxen or donkeys to plough/sow or plough-weed, the weeds will get a head start on the crops and damage them.

In East Africa, arable farming and livestock have been gradually integrated to the benefit of both ventures. Besides the provision of meat and milk, the larger animals, mainly donkeys and oxen, serve as a source of power in ploughing and transport. According to Harrison (1987), it has been established that a family can cultivate two to three times more land with a pair of oxen than with hoes. He observes that one of the biggest obstacles to progress in African food production is the severe labour shortage, including draught power. For instance, in Zimbabwe, only a third of the households own draught animals. Those who do not possess then experience late ploughing, planting and weeding and hence a decline in crop output. Again, those who do not own draught animals are likely to be unable to purchase or hire agricultural machinery.

One of the major obstacles to owning draught power for agricultural purposes is drought. A combination of widespread drought and animal diseases decimates a lot of animals especially cows, therefore leaving the farmer with nothing to rely on. Mbithi and Bahemuka (1981) notes that between 1970/1971, 29% of the farmers in lower Machakos were forced to sell both their milk and draught oxen because of drought. This meant a serious loss not only in milk for domestic consumption but also loss of draught power for several seasons because there was going to be a slower rate of herd replenishment once grazing was restored and the calving rate returned to normal. Therefore, once the farmers realise the onset of drought, they sell off their livestock to avoid death by drought effects and related diseases. This becomes a great set-back to agricultural food production.

Animal mechanization is the immediate technology between the hoe and the uses of tractor are argued to be greater than those required in animal drawn ploughs. Several reasons favour the use of animals; one, the cost of buying and maintaining the animal is minimal when compared to tractors. Secondly ox-drawn plough can easily be manufactured locally. This calls for the popularization of ox-cultivation and especially in the semi-arid regions where farming is integrated with livestock keeping. But this can only be successful if the ox-drawn ploughs are availed to the farmers at the local markets and in affordable prices or to be sold through a hire purchase system because sometimes, they are either unavailable or unaffordable. Since they are locally assembled, they should be able to reach almost every

farmer who requires them. In this case, the hand-operated hoe could be replaced by use of draught power in various farm operations; thus substituting tractors with animal power.

Another common observation by Mueller (1985) and Ndumbu (1985) is that the invention of new farming techniques may displace a certain group from some form of agricultural work. For instance, with the adopting of plough-weeding, that is the use of draught animals to uproot weeds in between the crop rows is not popular with most women. It is a task that requires precision and concentration because the ox-drawn plough hard to handle, might uproot more crops than the weeds. Women are disadvantaged because they find it too strenuous and instead prefer to weed with the hoe which is too labourious and time consuming.

Therefore, if a more refined ox-drawn plough could be designed, perhaps women could be able to use it more comfortably and be relieved some of the heavy farm work especially the weeding which is very crucial but takes a lot of time. Peasant agriculture in Africa is limited by low technology. The semi-arid tropics of Africa are said to be in want of appropriate agricultural research more acutely than any other region in the world. Onimode (1985) notes that the lack of this research into new ways and methods of food production such as the development of a suitable ox-drawn plough, researching in to appropriate ways of training draught animals and adapting them to new farming methods hampers agricultural production in Africa to some extent.

2.7 Socio-cultural Value Systems.

According to Mbiti (1969:216), Africa is undergoing a form of rapid social change . He calls it a revolution of man in totality in a sense that, "No people or any country can remain unaffected by this new rhythm of any form of human history." The very first form of western and de-Africanization started with the European explorers who came to Africa in the 19th century. They were followed by the white missionaries who came to convert people to Christianity; a form of religion that was embraced with an adoption of European life styles, dress, science and technology and customs. Unfortunately, some of these adoptions are believed to have spearheaded the destruction of the indigenous social structure, modes of production and generally the socio-economic fabric of the society.

As a result of this change, food production and consumption were affected just like the other spheres of life. Clayton (1983) says that African agricultural methods have been frowned at by the Western world. The so called western bias has had a tendency to over-value Western agricultural technologies and approaches; and at the same time look down on the African ones. African peasants' ways of shift cultivation, mixed cropping in the fields and the annual burning of cleared bush and rangelands require research regarding their usefulness instead of being regarded as alien, primitive and untidy; a conception of the western world. Harrison (1987) says that the African educated elite

have maintained similar attitudes and opinions to traditional farming since independence and this has not been helpful at all towards food production.

Taking into consideration that western agriculture was clearly more productive in comparison to African methods, it seemed both logical and justifiable that the western technologies and farming approaches be imposed on the small-scale farmer, even in the semi-arid regions. Some of these were mono-cropping, full-scale mechanization and chemical fertilisers. But the majority of the small scale farmers resisted and have continued to resist these innovations which are not conducive to their climate, land, form of labour and production patterns.

The Western bias influenced programme designers and policy makers against the special characters of the socio-economic realities of the peasants lives, the soils and climates and the value of the traditional ways of dealing with them. This is why the small-scale farmers do not want to adopt new farming methods which they are not certain about while their traditional farming methods are not being improved. Therefore these farmers are not sure whether they should take a risk and adopt the uncertain prospects of crop failure for the reward of promised higher output if modern farming methods are substituted for their traditional ones.

As Harrison (1987:100) argues, a new research agenda has to emerge in Africa, "... where farmers are allowed to try out the technology for themselves, to see how it performs in

their social and economic circumstances- the amount of cash, labour draught power they have; their attitude towards risk taking; their crop priorities; their patterns of inter-cropping; their requirements of food, fuel or fodder." This is something that has been lacking in the development of semi-arid agriculture and needs to be explored taking into consideration the farmers' social and economic intervening variables in food production.

Social customs and mores loom large in rural life. These have been noted to have significant impact on food production and consumption. One aspect of these valued customs is the issue of getting many children. According to Timberlake (1985:301), "Numerous children are traditionally seen as a proof of man's virility and woman's fertility." On the other hand, Mbiti (1969:143) remarks that, "where peasant farming is the means of livelihood, the many children in a polygamous family are an economic asset, even if they must also eat." The indication here is that whereas many children are valued as a source of labour in a traditional agricultural setting, they also consume a big proportion of what is produced, exposing a household to food scarcity. Therefore, the adherence of this traditional value of having many children may be at the expense of food production.

Finally, fatalism is an influential factor in food production. This is a socio-cultural belief that all events are acts of God, predetermined and beyond one's control or influence. The aspect of fatalism has a defeatist attitude and a form of resignation by man to alter his destiny. It is

no wonder that Harrison (1987) says it has become fashionable by government and farmers alike to blame food scarcity on climate which they say is changing ultimately.

Dinham and Hines (1983) think that such an attitude is a mere defense mechanism; an excuse for political, social and economic inaction. For instance, when some farmers, out of their own sheer negligence fail in a farm activity, they attribute it to the will of gods and would even go to witch doctors to justify and confirm their feelings.

Therefore, the fact that food shortages occur frequently in Africa and especially in the semi-arid areas is a result of a multiplicity of factors; each of which perhaps contributes a small percentage of the aggregate deficit in food. However, these factors are all significant in the contribution of the suffering that results to hunger, a common rural phenomenon in the arid and semi-arid areas.

2.8 Conclusion.

It is quite evident that food scarcity and hunger are not only a wide spread phenomenon in marginal areas but prevalent in other drought stricken African regions.

Scarcity of food in Kenya's semi-arid areas cannot be eliminated unless the government in collaboration with local and international organizations address themselves to food production related problems. Some of these are soil and water conservation, irrigation, afforestation, research, technology know-how, labour-force and the socio-economic aspects of the smallholders' lives.

One of the African countries' major problem is that too many people go around the continent with solutions to problems they barely understand. Many of these solutions are not well suited to the prevailing agricultural constraints. Even though the industrialised nations have been blamed, writers such as George (1977), Ndegwa (1987), Timberlake (1984) and Achebe et al (1990) think that some of the African policy makers are not knowledgeable of the African problems and especially agricultural and livestock production priorities. They argue that Africa's social economic and political development are dominated by the international community and further note that those who are farthest removed from the African realities, those who do not feel the pinch and need not take responsibility are the pace setters to finding solutions to African food insufficiency.

Peasant agriculture in Africa is reportedly limited by low technology according to Harrison (1987). He notes that food

production and sufficiency is influenced by the level of technology in a household. In households where labour technology is at low levels, family labour remains important and the yields are comparatively lower in comparison to households where draught power or mechanised labour is applied. Again, the issue of low agricultural technology extends to low breeding of drought resistant crops, development of inter-cropping patterns, manufacturing of chemical and organic fertilisers, irrigation methods and pesticide control related to low socio-economic conditions prevailing in Third World countries such as Kenya.

Agricultural research in Kenya indicates that food production training for women is often limited. Domestic roles of women receive priority over their food production activities despite the fact that women have been established to be the key household food producers. This makes them agriculturally dependent on their husbands who may not be active farmers but have control over the tools and knowledge which could improve the output.

The government's agricultural policy is to increase food production and ensure food sufficiency in all parts of the country as per the Sessional Paper No.4 (1981). This is expected to be accomplished through opening up newlands, intensifying the utilization of lands already under cultivation and extension of agriculture to marginal areas. Besides, the government intends to collaborate with private sector(s) in agricultural research and especially in

establishing the socio-economic causes of declined agricultural food and cash crop production.

Finally, it is evidently clear from the literature review that food scarcity in semi-arid areas is as a result of multiplicity of factors. Each of these factors plays a certain role to influence the total food deficiency in an area. Such factors are all significant in the contribution of inadequate food production that leads to human suffering. In a community, the socio-economic cost of food scarcity is manifested in starvation and malnutrition, hunger-borne related diseases or even death. In some instances, vices such as prostitution, alcoholism and drug abuse, single parenthood and family stress are to some degree, associated with food scarcities in a community.

CHAPTER THREE:

METHODOLOGY:

3.1: AREA OF STUDY.

The Kamba people of Machakos district are the subject of this study. Prior to the split of the area into Machakos and Makueni, the district, which is in Eastern province had an area approximately measuring 14,250 sq.km. Machakos borders Kajiado to the West, Makueni and Taita-Taveta to the South-East, Kitui to the East, Embu to the North-East, Murang'a to the North and Nairobi and Kiambu to the North-West.

Before its sub-division in 1992, Machakos was made up of 9 administrative divisions, 41 locations and 233 sub-locations. The area in which this study was carried out is in Mwala division, Kibauni location. This division has 7 locations and 17 sub-locations. It falls in the semi-arid ecological zones. The study was specifically conducted at Kilala sub-location within Kibauni location.

The 1979 census recorded 1,022,522 people in the district. Settlement is basically influenced by the climate. Areas of high agricultural potential support the majority of the district's residents. The population decreases towards the lower potential drier lands.

The major economic activity of the people of Mwala division is small-scale farming mainly for subsistence purposes and to some extent as a means of generating the household

income. The other economic activity in area that supplements food production among the Mwala farming community is livestock keeping, an economic occupation which is fully integrated into the farming activity.

Cows, goats, sheep and donkeys are commonly reared in almost every household. These animals provide meat and milk, draught power in the case of oxen and donkeys, farm fertiliser in form of manure and sold to meet a family's economic requirements. Normally livestock is sold to raise money for payment of school fees or the purchase of food in times of scarcity. Livestock also plays a significant role in meeting social obligations such as payment of bride price, slaughter at social functions and presents at weddings.

Due to low rainfall in the area, most farmers in Mwala carry out subsistence farming. However, this region is characterised by big tracts of open grasslands which have the potentiality of producing drought resistant crops especially the Katumani hybrid maize, pigeon and cow peas, or even cotton, castor oil and sunflower as cash crops.

In the event of famines, the community adopts non-farm activities, which are out of the ordinary. This is geared towards raising money to sustain and feed their families. Such activities include migration outside the home areas in search of casual labour, selling of crushed stones and building sand, basket and rope making, charcoal burning and firewood selling and brewing of local beer.

3.2 SITE DESCRIPTION.

Machakos district falls in the semi-arid agro-climatic zones; an area characterized by extreme variability of rainfall depending on the altitude. On average, annual rainfall ranges from slightly over 1000 mm in some of the highlands like Mbooni, Kilome, Kathiani and Kangundo to slightly below 500 mm in the low lying south-east parts of the district like Mwala, Yatta, Makueni and Kibwezi. This region experiences two seasons per year which fall between March to April and November to December.

Typically, good seasons are interspersed with extremely dry periods. The average amount of rainfall in a season, its timing and duration has a strong bearing on the area's crop production. This variation in the outset of rainy seasons renders food production activities expensive and unreliable; thus creating difficulties in ensuring adequate crop production. Since most of Machakos falls in the semi-arid ecological zones, the majority of the farming community operate in what the Machakos 1989-93 Dev. Plan terms as, "fragile environment prone to soil erosion and erratic rainfall."

Cereal crops are grown in almost all the district's semi-arid zones. Maize, which is the most important food crop in region occupies the largest cultivated area. Sorghum and millet, even though they form an important component of the diet for most of the area's population, they are not widely grown but occupy only a small percentage of the farming area

inspite of their suitability to the climate. There is a declined demand of the two due to their high labour requirement and unpopular taste. Beans, pigeon and cow peas are widely grown in the area and form an important source of protein.

Population and Settlement Patterns.

The Machakos district's population is estimated to have reached 1,447,352 in mid 1987. The 42% increase is equivalent to an average growth rate of 3.9 per year. The district's population size has been projected according to the divisional administrative units. Mwala division, measuring 1,332 sq. km. had a population of 125,517 people and this is projected to have reached 199,210 by the end of 1990. The 1989-93 Machakos Development Plan notes that the high agricultural potential zones in the district have a higher population growth rates when compared to the semi-arid areas.

The population growth rate in the drier areas is expected to raise owing to the pressure on land in the higher agricultural rich areas. The district's agricultural office has noted migration out of the high potential areas to the low agricultural potential areas characterised by big open grasslands. This is attributed to the increasing population pressure in the wetter zones, forcing people to shift to the semi-arid areas which are suitable for growing drought resistant crops for domestic consumption and generation of income for their households.

3.3 Discussion of Hypotheses.

(a) The selling of farm produce in households influences food scarcity.

This hypothesis is aimed at finding out whether food selling in a household influences food shortages. The objective behind this hypothesis is to find out how the two variables i.e food selling (cause) and food scarcity (effect) are associated.

(b) Farmer's land tenure system is an influential factor in household's food production and sufficiency.

The aim of this hypothesis is to look for association between a family's type of land ownership and its food sufficiency. Variables such as where farming is done and whether communal land-ownership poses problems to food production are analysed.

(c) Household's division of labour between food production and other chores affects food sufficiency.

The objective of this hypothesis is to establish if the performance of non-agricultural activities in a farming family unit interrupts food production and influences scarcity.

(d) There is a relationship between households' food sufficiency and the farmers' age.

Here, the hypothesis attempts to find out if there is any linkage between the age of the farmer and his food production output.

Definition of Concepts and Operationalization of Variables:

1. Dependent Variables (Effects):

a) Food sufficiency: This will refer to a household's ability to agriculturally produce adequate food for its requirements. Food sufficiency will refer to a household being capable of meeting all its basic food needs through subsistence farming from one season to another and without resorting to buying, borrowing or begging or depending on food aids.

b) Food scarcity or shortages: This is the opposite of food sufficiency. It simply means the inability of a small-scale farming household to produce sufficient food for its members and hence resorting to dependency on food aids, buying, borrowing or begging of food.

2. Independent Variables (Causes):

a). Food Selling: This is the farmer's sale of farm produce even when there is no extra food reserved for the family. Since the small-scale farmers' major activity is farming, food selling to meet the household's socio-economic commitments. The sale of household's farm produce reduces the amount available for its consumption.

(b) Land-tenure system:

Land tenure in this case comprises of private (individual family) and communal (extended family system) land-ownership. This variable refers to any rights to land-ownership, including possession of land as a result of a farmer's relationship with others be they parents, brothers, or any next of kin. This variable also refers to whether the farmer has a legal title deed for the family's land or enjoys it's use land with permission from relatives to produce food.

(c) Division of labour:

This is the division of the family labour-force between food production and other non-agricultural activities and commitments. The non-agricultural activities are domestic chores, rural-urban migration for paid work, school attendance, herding, trading and even idleness.

(d) Household chores:

These are the every day routine activities that are performed in a household for the well-being of the family members. Such activities include fetching water, collecting firewood, cooking, livestock-keeping, looking after children and the sick and running small-scale family businesses.

(e) Farmer's Age:

This variable refers to the actual age of the respondent at the time of the interview. The age variable was categorised in a span of ten years and it ranged from 21 years to 61 years and above.

3.4: Sampling, Data Collection and Analysis.

Sampling and sample size:

A sample size of 147 respondents was used for this study. The Kilala sub-location where this study was specifically carried out has four self-help groups for administrative purposes and convenience. Each of the four groups is headed by a village group leader who keeps a name list of all the households in his group. The groups are required to alternate in their contribution of labour towards communal projects such as construction of schools, dispensary, drawing water for the local cattle dip and contributing in cash or in kind towards any other projects that may arise.

Random sampling was used in the selection of the respondents for this study. The area under this study had about 800 households when this research was done and a sample size of 147 respondents was randomly drawn from that population. All the household heads were listed from the four villages and each was given a number from which the sample frame was drawn. Only one person was then interviewed from each of the selected households. The respondent had either to be a husband, wife or any responsible adult household head. Therefore, every household had an equal chance of being selected.

Methods of Data Collection:

(a) Interviews:

Data was gathered by using interview schedules as the main research instruments. The questionnaire had two types of questions. There were closed questions mainly on factual information which included age, sex, marital status and educational level. There were also open-ended questions designed to elicit as much information from the respondents as possible and also to give the respondents an opportunity for free discussion and opinion giving.

(b) Case studies:

Informal talks were carried out. This involved lengthy discussions on the socio-economic factors that influence food scarcity in the area with a cross section of five people. Field notes were taken during these talks and have been used in this work.

(c) Secondary data:

Supplementary data for this study was obtained from

- a) Katumani Dryland Research Station.....Machakos.
- b) Kenya Agricultural Research Institute (KARI)...Nairobi.
- c) District Agricultural Office.....Machakos.
- d) Central Bureau of Statistics (CBS)....Nairobi.

Data Analysis:

The analysis of data for this study presented in both chapters 4 and 5 was carried out in two ways:

(a) Descriptive Statistical analysis.

This is a common method used in measures of central tendency and dispersion. It is a statistical form of analysis where

the researcher summarises patterns in the responses of people in a sample by frequency distribution.

Chapter 4, which is on descriptive analysis deals with the presentation of data using frequency and percentage tables. Since descriptive analysis deals with univariates, the univariate method of analysis was employed. Each variable or a group as distributed so that different respondents were put in different categories of the variable. This was summarised as follows:

- a) List of the variables' category.
- b) Number in each category.
- c) Converted numbers to percentages.

(b) Inferential Statistical analysis:

Chapter 5 deals with the presentation of the study findings through the interpretation of the data by bivariate method; an analysis of two variables simultaneously. This method establishes whether these variables are related (associated). Cross-tabulations, a bivariate inferential method was employed in testing of the study's hypotheses. Basically, the objective of the hypothesis test through inferential method was to :

- a) Find out if there exists a relationship between the independent (cause) and the dependent (effect) variables.
- b) Ascertain the nature of the relationship; whether it is causal or non-causal.
- c) Establish how general the relationship is and if it holds for most types of people or only for a certain group.

Chapter 5 exclusively concerned itself with the testing of the hypotheses and inferential statistics were extensively used to arrive at this end. The study adopted 0.50 as its acceptance of any chi-square (χ^2) test of significance. Anything below this level was regarded as insignificant. The chapter finally dealt with the implications of the farming community's food production and the causes of scarcity. This is from the collected data, field notes and the researcher's casual observations.

The implications of food scarcity were either social or economic in nature. Frequency tables with respective percentages and the mean (\bar{X}) were the the most commonly used measures of central tendency in this chapter. Therefore, the inferential's basic function was to find out if patterns described in the sample have a likelihood of being in applicable in the population for which the sample was drawn.

3.5 Field Experiences.

The interviewing exercise was completed within a period of six weeks in spite of some problems. The major problems experienced by the researcher and his assistants were :

This exercise was undertaken in the months of February/March when the farmers were busy harvesting their crops and clearing their farms in readiness for the April rains. It was therefore difficult to find them at home.

Household tasks such as looking after the livestock, fetching water, collecting firewood or even going to the markets meant some prospective interviewees being away from the homes at the time the researchers would have wanted to interview them. Therefore, one had to make another call-back to the convenience of the respondents.

Many peasants wanted to know what help or significance this research was going to be their farming activity. It was quite difficult to explain that this was an academic exercise.

There were instances where members of the respondents' households were curious to know what the interviews were all about. Some of them insisted on being present at the expense of free flow of information and confidentiality. Disruptions by young children or the performance of domestic tasks also interfered with the interviews at times.

Some women proved rather uncooperative for fear of granting an interview without the approval of their husbands. They

were afraid they might be quarrelled and beaten for divulging some information without the consent of their husbands. It was only after they were briefed on the purpose of the interview that some of them relaxed and granted audience to the researchers. However, others remained adamant and preferred their husbands to be interviewed instead.

A total of (48.8%) the respondents were illiterates. Some were ignorant of their ages, type of land-ownership, or the seasons they have experienced food scarcity. However, ages could be established from the identity cards and land-ownership on who was the holder of the title deed.

Finally, the place where this research was done is hilly, with vast natural forests and poor communication. It was actually tedious walking from one ridge to another in the hot weather.

CHAPTER FOUR.

DESCRIPTIVE DATA ANALYSIS.

4.1 Introduction:

The data under discussion and analysis was collected from the study area's four self help groups divided into villages namely, Ikotheni 72 (49.0%), Kithunthi 24 (16.3%), Kilevu 29 (19.7%) and lastly Nthangathini 22 (15.0%). The number of respondents interviewed were 147 (small-scale) subsistent farmers. The discussion under this chapter will therefore be based on the respondents (farmers) drawn from the Kilala sub-location's four villages.

4.2. Background characteristics.

Background characteristics give insight into the type of people under discussion in this study. For the purpose of this -study, these characteristics include the respondents' sex, age, marital status, religion, occupation, educational level and specific details on the division of household chores on gender basis.

Table 1: Distribution of respondents by age.

<u>Age</u> (years)	No. of Respondents	Percentage
21 - 30	24	16.3
31 - 40	35	23.9
41 - 50	65	44.2
51 and above	23	15.6
Total	147	100.0%

The age of the respondents ranged between 21 years and 60 years. The majority of the respondents happened to be within

the age bracket of 41-50 years and these were 65(44.2%). This category of people could be said to be those who have passed the stages of young adulthood. This age bracket could be said to embrace those people, owing to the virtue of their advanced age have settled down to some consistent form of economic activity either because they are slightly too old for urban migration or too young to retire from the farming activity.

It was noted that the least number of respondents fell between 21-30 years 24(16.3%) and 51-60 years 23(15.6%) years of age respectively. The impression created here is that there is a possibility that most of the young adults and the most elderly may not be very much involved in food production activities on account of age. The young adults are either in school or have moved to urban areas to look for gainful employment. Field observations showed that some of the young people are also not very keen on farming since the majority are unmarried with no families to cater for.

Likewise, there were fewer elderly people of between 51-60 who were actively involved in food production when compared to the 31-40 and 41-50 age groups. The assumption would be that they have retired from active farming activities and are probably contented with being grandparents and especially when they are past the age of having school going children or even children who directly depend on them.

The only other age group that was closer in terms of age to the 41-50 year olds was that of 31-40 years. The respondents

in this category who were 35(23.9%) and can be termed as close to that of the young adults but who are already settling down into active rural life and with young families to cater for. It can therefore be inferred that food production involves various age categories.

The distribution of respondents by sex.

There were 58 (39.5%) men compared with 89 (60.5%) women. It is not clear why there turned out to be an imbalanced proportion of men to women since the respondents' marital status question revealed that only a total of 18 (12.2%) were widowed while 4 (2.7%) were single women. However, most men were reportedly said to be involved in doing business or formally employed in urban areas. This could be a sufficient reason to explain men's absence from their households as they leave their wives and children in the rural areas and migrate to urban areas in search of employment.

This is consistent with Harrison's (1987) findings which state that women are the major food producers. He estimates women do 70% hoeing and weeding, 60% harvesting and 80% transporting crops and storing them and then 90% of food processing. This may therefore explain as to why the majority of the respondents turned out to be women. Another factor that could explain for the women's high number in the sample is their involvement in domestic work which confines them to the homestead.

Table 2: Distribution of respondents by occupation.

Occupation	No. of Respondents	percentage
Farming	115	78.2
Teaching	16	10.9
Business undertaking	16	10.9
Total	147	100.0%

The above table indicates that a total of 115 (78.2%) of the respondents stated that farming was their main occupation. This is not unusual since the major economic activity in this area is small-scale farming supplemented by livestock rearing. The area in which this study was carried out falls within the semi-arid ecological zone of Machakos district and hence the people in this region carry out subsistence farming due to the low rainfall.

The other two activities that had equal number of respondents were teaching and business undertaking. A total of 16 (10.9%) respondents said they were doing some form of business. However, even these two categories of respondents admitted that in spite of their involvement in other careers they still depended on farming indirectly because either a spouse or a worker was carrying out the food production on their behalf. In this case, one can conclude that farming is more or less practised by everybody.

Table 3: Distribution of the respondents' marital status.

Marital status.	No. of respondents	Percentage
Married	125	85.0
Widowed	18	12.2
Divorced/separated	4	2.8
Total	147	100.0%

The marital status of the respondents varied quite widely. There were more married people than widowed, divorced or separated. According to the findings, 125 (85.0%) were married people against 22 (15.0%) widowed, divorced or separated. ~~According to the findings, 125 (85.0%) were married people against 22 (15.5%) widowed, divorced and separated~~ In most African communities agricultural responsibilities are attached to one's sex. The aspect of marital status may have some influence on food production, its availability or scarcity. Therefore agricultural job allocation is distinguished by sex and tasks ascribed on account of ones age and sex.

There is a common observation among researchers that some of the agricultural duties that used to be performed by men are falling on women in the absence of their male counterparts. Men are noticeably being alienated from food production as a result of rural-urban migration, business undertaking and other socio-economic related factors. The absence of a man in the household may therefore have a negative influence on food production and scarcity in the family. The same would also apply to a woman's non-participation in farming as result of sickness, death or other commitments. Therefore, marital status may have some influence on food production and sufficiency and especially in cases where agricultural division of labour is based on gender differences.

Table 4: Distribution of respondents' educational level.

Education	No. of respondents	Percentage
None	71	48.8
Std 1-4	11	7.5
Std 5-8	47	32.0
Form 1-2	4	2.7
Form 3-4	14	9.5
Total	147	100.0%

Almost a half 71 (48.3%) of the respondents turned out to be those who have received no formal education. These were observed to be mostly the elderly people who never attended school and admitted illiteracy. Consequently, a total of 76 (51.7%) had received some formal education though varying and ranging from Standard 1-4 through Form 3-4.

It is not known how much educational level would influence food production and scarcity. However, there is bound to be some influence especially on agricultural conservatism and the flexibility to adopt to new farming methods, the use of modern technology, visits to agricultural offices and even the ability to read farming instructions and put them into practice. Also beliefs on food production can be linked to the level of education. This may influence food scarcity to some extent especially where people attribute their food sufficiency to traditional beliefs and practices.

4.3 Women's role in food production

It was observed that women in this study were the main contributors to food production. Below is a frequency table outlining who in a household contributes most in food production for domestic consumption.

Table 5: A frequency table on household's key food producer.

Producer	No. of Respondents	Percentage
Wife	88	59.9
Husband	35	23.8
Both	24	16.3
Total	147	100.0%

The research findings revealed that 88 (59.9%) are women who are the main food producers whereas only 35 (23.8%) were men. However, a total of 24 (16.3%) of the food producers were both husbands and wives, who equally participated in food production unlike in households where the main producers were either men or women.

Even though the women were found out to be the major food producers when compared to their male counterparts, it was noted that their agricultural participation was interfered with by their involvement in other social and household responsibilities. Some of these activities included fetching water and firewood and looking after small children. They also perform other daily household tasks mainly cooking, cleaning, going to the market and in some instances looking after the livestock. This lends weight to the findings by Ndegwa et al (1987:136) where he states that, "In most African countries, 70-90% of women live and work in rural areas. They perform 90% of "subsistence production" in addition to much petty trading and a number of handicrafts." In addition, women bear nearly all the responsibility of raising children. In this case, only a few number of men were noted to be the main food producers in their families.

Table 6: A frequency table on who looks after children.

Child-care taker	No. of respondents	Percentage
Mother	102	69.4
Worker (Other)	18	12.3
Children	12	8.2
No children	15	10.2
Total	147	100.0%

Majority of the small children are cared for by their mothers as indicated in the above table. For instance 102 (69.4%) of the respondents indicated that it is mothers who had the responsibility of nursing and caring for the young children. But 18 (12.3%) households could afford house girls or relatives within the extended family system to stay with their children. This gave the mothers some time to concentrate on subsistence food production. Other families got some assistance from either pre-school age children or school drop-outs who could baby sit for them.

The respondents felt that in the course of their food production, with little or no assistance from their husbands, children or hired workers, it leaves them with less time to do farm work activities. This kind of commitment was observed to be a cause of less food production activities. As Harrison (1987) remarks, women have to combine farming and household duties together and as a result, food production suffers.

One of the observations made showed that there is a traditional ascription of roles on gender lines. This gives women, who are noted to be the major food producers more

household chores than men and leaves them with little time for agricultural activities. Below is a frequency table indicating the respondents' feelings on whether women's performance of household chores interferes with the food production, influencing its scarcity in any way.

Table 7: Household's chores influence on food production.

Do chores disrupt food production (Y/N)	No. of respondents	Percentage
Yes	109	74.1
No	38	25.9
Total	147	100.0%

As table 7 shows, the majority of the respondents reported that the activities of fetching water, collecting woodfuel and looking after young children interferes a lot with food production. The performance of these tasks were said to disrupt food production activities lowering the yields to some extent and contributing to food scarcity. A total of 109 (74.1%) of the respondents admitted that the performance of household duties tremendously affected their farming activities as they were time consuming and therefore delayed sowing, weeding and harvesting.

There was a strong feeling that if the responsibilities of women were reduced or even removed, they would be in a position to do more agricultural work and thus improve their yields. The time devoted to child care, water fetching and wood gathering would be directed towards food production activities. This is because the above roles that most women have to perform besides farm work were said to cause:

a) Delayed farm-work activities 50 (34.0%).

- b) Less work done on farming activities 66 (44.9%)
- c) Reduced crop-output 8 (5.5%)
- d) No effect on food production 23 (15.6%)

The respondents stated out that there would be less delays in sowing, weeding, harvesting, soil conservation efforts and spreading of manure on the farms if household duties did not take first priority while the food production activities were secondary to the household time allocation and utilization.

4.4 Men's role in household food production.

Table 8: Distribution of men's roles in food production.

Task	No. of respondents	Percentage
Clear the bush and Plough the shamba	34	24.0
Weed, harvest and make decisions	27	19.0
Spread manure, cut terraces, fence and guard against wild pigs	81	57.0
Total	142	100.0%

The above outlined tasks are the exact activities that the respondents said men perform in respect to food production. However, on being asked what else they wished men could do besides these roles, both the male and female respondents stated that men should do the following:

- a) Avail tools and draught power for farm work 38(25.9%)
- b) Reduce the farm's size and have a smaller area 10 (6.8%)
- c) Increase farming acreage to produce more 32 (21.8%)
- d) Farm fencing, terracing, and pest control 67 (45.6%).

However, most men are not able to meet these expectations due to variety of socio-economic factors. These include looking after livestock, doing casual labour, rural-urban migration and sheer idleness coupled with taking illicit brew. These aspects were noted to have adverse effects on household food production because the absence of male participation in farming was said to result into:

- a) Lack of decision making and supervision 40 (29.0%)
- b) Low crop output due to non-farm maintenance 51 (37.0%).
- c) Delayed farm-work activities 47 (34.0%)

It was earlier noted that 60% of the food producers were women, 23.8% men and only 16.3% both men and women. Findings of this study also indicate that only 7% of men fetch water for domestic use while 6% take part in household duties. Women are therefore probably left with insufficient time to devote to food production.

Absence of male labour is a likely contributory factor in food scarcity. The absence of male labour in agriculture is said to have become a common phenomenon in most African traditional societies. This is linked to the pre-independence colonial days when men were forced to work in the mines, settlers' farms and industries to create labour for colonial employers and raise money for taxes. Hence man's absence in food production has become institutionalised in that most men are either away working in urban areas or engaged in non-food producing activities.

The table below outlines the reasons for men's non-participation in household food production.

Table 9: Reasons for a man's non-participation in food

production.

Activity	No. of respondents	Percentage
Idleness, casual labour, illicit brew taking	17	11.6
Livestock keeping	42	28.6
Urban migration or career jobs	37	25.1
Business undertaking and trading	51	34.7
Total	147	100.0%

Even when men remain within their rural farming environments, most of them play a passive role as far as food production is concerned. When men's labour is diverted from food production to the above activities reported in the table, crop yields decline and food scarcity is likely to result. This is because availability of labour may have an effect on the yields due to the time of planting, weeding and harvesting. If these agricultural activities are delayed, crop yields might decline drastically. Food production cannot be completed without collective efforts and hence the absence of men's participation, child labour or hired labour is likely to influence food scarcity.

As shown in table 8, there are food production roles set aside for a man. Most of these involve clearing the bushes to make a farm, ploughing and weeding, spreading manure and cutting terraces to control soil erosion and even fencing against domestic and wild animals. However, inadequate land preparation, minimal weeding and erosion checks may contribute to poor crop returns.

Children are an agricultural source of labour-force. Child labour is necessary in food production, especially if children's participation in agriculture is kept within limits. Absence of children's participation has been noted to be an influential factor in food scarcity and has even been known to change crop patterns as discussed by Clayton (1983). This leads to the abandonment of some crops especially millet and sorghum which though drought resistant, require intensive bird scaring, a responsibility normally suited to children. As a result of the prevailing social change, children have ceased to be supplementers of the family agricultural production efforts due to the reasons outlined below.

Table 10: Reasons for children's non-participation in food production.

Activity	No. of respondents	Percentage
Going to school	124	86.7
Livestock keeping	9	6.3
Urban migration	6	4.2
Delinquency and household duties	4	2.8
Total	143	100.0%

Children are a valuable agricultural asset in an African setting and especially where near subsistence farming is practised. However, the outlined reasons have resulted in most children's non-participation in food production, eventually denying agriculture one of its vital sources of labour. School attendance is the leading factor that creates the decline of children's participation in agricultural

activities. The massive rise in both primary and secondary schools' enrolment has taken away a prime source of family labour on the farms as reflected by 124 (86.7%) of the respondents who pointed out that they lacked child labour owing to school attendance.

Another factor, although not as influential as that of school attendance is livestock keeping. It was found out that those parents who had non-school going children committed them to the rearing of livestock 9(6.3%) and therefore received no assistance from them with farm work because livestock keeping is a full-time work. Urban migration by under 18 year olds occurred in 6 (4.2%) respondents whereas there were noted 4 (2.8%) cases of juvenile delinquents who only performed household duties once in a while. These reasons were cited as the ones which resulted in children's non-participation or minimal contribution in food production.

a) Weeding, harvesting and post-harvest clearing of the farms, 62 (43.3%).

b) Keeping away birds and monkeys from crop destruction, 32 (22.4%).

c) Transporting crops home after harvest and spreading manure, 49 (34.3%).

Failure by children to carry out the above stated agricultural activities was felt to have a negative effect on food production and therefore, influenced low production in most households. This is because the children no longer lived up to their parents' expectations and could no longer

carry out the duties they had traditionally been ascribed. In this case, Table 11 outlines the consequences of children's partial or non participation in food production.

Table 11: The effects of children's absence of labour-force in food production activities.

Activity	No of Respondents	Percentage
Creation of labour shortage	36	25.2 — 14, 5%
Reduced agricultural area	25	17.5
Delayed work and less yields	38	26.5
Destruction of crops by birds and animals	24	16.8
Change of crop patterns	20	14.0
Total	143 × 100	100.0%

Respondents stated that the lack of children's help with farm work creates the hindrances to the production of food. The biggest problem is the occurrence of less yields as a result of delayed work 39 (25.2%). What the respondents implied is that ploughing, weeding, sowing and harvesting are bound to be delayed by lack of sufficient labour-force and hence negatively affect the season's crop output thus influencing scarcity.

Creation of labour shortage is another negative effect that results from the lack of child labour. Respondents felt that they had to work extra hard to make up for where their children were not helping but they still could not cover the work required to be done. For them and especially women, to accomplish most of the farm's work, they had to wake up as early as six in the morning to carry out their various household tasks before going to the farms where they

remained till evening hoeing, digging, planting and harvesting.

A total of 25 (17.5%) had to reduce their agricultural acreage at the expense of less production simply because they stated that they could not manage without children's help. Consequently, 24 (16.8%) complained that their crops were destroyed by birds, monkeys and wild pigs which are quite prevalent in the area. This is because they had no one to scare them off and this led to a lot of crop damage by these animals and negatively affecting the yields.

Finally, a total of 20 (14.0%) said that they had changed their crop patterns and abandoned the cultivation of labour intensive crops due to lack of child labour. Some farmers said they had stopped growing sorghum and millet as these crops require guarding against birds, an activity most suited to children. But with the massive enrolment of children in schools and urban migration, some people have given up on those crops that require much attention. Incidentally, these are the crops that do well in semi-arid areas and would alleviate hunger if cultivated.

A total of 53 (36.1%) of the respondents said their children assist them with fetching water, while 47 (32.0%) take care of the young children. The inference here is that, when these children are available, they normally assist with these duties. So their absence deprives their mothers the time they would have saved on household activities to work on the farms and probably improve on the crop output.

Table 12: The causal effect of child labour on food production.

Effect	No. of Respondents	Percentage
Negative	121	84.6
None	22	15.4
Total	143	100.0%

In reference to Table 12, 121 (84.6%) respondents were of the feeling that their food productivity is negatively affected by lack of assistance from their children. However, 22 (15.6%) felt there was no difference due to the fact that their children were too young to participate in food production while some other parents were noted to have adult children who had their own farms. Therefore, child labour in food production activities is very necessary and when it is not forthcoming, it has been found to have a negative influence food production.

4.4. Household selling of food crops.

Food scarcity in a household could be influenced by dependence on the harvest as a source of income. This involves the selling of food crops to meet family expenses, a socio-economic consequence that influences the occurrence of food shortages. A total 115 (78.2%) of the respondents had no other occupation apart from farming as indicated in Table 2. Their dependence on farm produce as their financial sources besides being a means of subsistence is thus justified. It was observed that even those who had other

activities as their major sources of income, still depended on farming to some extent. This is because a spouse or a worker was involved in food production on their behalf.

Women who formed the bigger proportion of the sample admitted selling part of their harvest for financial reasons. Onimode (1985) terms this as the "food dualism" among small-scale farmers. He points out that in most cases, what smallholders produce is geared towards subsistence and then the monetized enclave or food selling to cater for the family's financial needs and especially where there are no cash crops raised. Even though food selling is more common among women than men, the latter can either authorise its disposal in the market or directly sell it. Food is either sold for the welfare of the family for personal and unjustifiable reasons.

Table 13 is a differentiation between those households who normally sell their farm produce from those who do not. Those involved in food selling argued that since farming was their major activity, they had no alternative but to sell part of what they harvest; even when there was no extra food reserves for the family. Some women stated that their husbands had abandoned them for the urban life and therefore had to financially depend on food sales. In this context, small-scale farming in semi-arid areas can be termed as a near-subsistence activity because not all the food that is produced is used to feed the family.

Table 13: A frequency table on household sale of food.

Food sale	No.of Respondents	Percentage
Yes	110	74.8
No	37	25.2
Total	147	100.0%

Almost three-quarters of the respondents engaged in food selling for economic reasons. They however, admitted that their selling of food was a last resort since food disposal depletes stock in the stores and exposes the households to food scarcity at times of drought. They also indicated that even when one has surplus food, it is not wise to sell as the weather is quite unpredictable and a season's good harvest can be followed by a prolonged drought and famine. The following reasons were given for selling food.

- a) Raise school fees 51(46.4%)
- b) Purchase livestock 27(24.5%)
- c) Maintain the farm 8 (7.3%)
- d) Meet family needs 24(21.8%)

Out of 147 respondents, 110 engaged in food selling while a total of 37 did not. What is stated above are the reasons advanced by the respondents to justify their sale of food which was done even at the risk of their households going hungry in the near future. Some respondents admitted even having sold food until they exhausted what they had reserved to plant the following season. Women, the major producers of food rationalised that since they were widowed or their husbands engaged in other activities, they were economically depended on farm produce. Others said they had a right of

selling food just as their husbands had a right of selling the livestock. Men justified food sales to purchase of livestock, maintenance the farm and purchase of farm inputs.

Food selling was found to include all the food crops that were produced by the respondents. Maize, the main staple food was the most sold crop. Out of 110 farmers who engaged in food selling, 51 (46.4%) said they only sold maize. Beans, which is also commonly grown in this area was found to be sold by 27 (24.5%) while a total of 24 (21.8%) farmers stated that they sold all their major food crops that they grew (maize, beans and peas). Only a small proportion of 8 (7.3%) sold peas.

The most prevalent reason given for selling food was to raise school fees especially for those parents who had secondary school-going children. A total of 51 (46.4%) sold food for this purpose. However, these people said they sold food more often than they sold livestock to raise school fees. Again, most farmers seemed to favour livestock to their farm produce. Livestock keeping which is a cultural and economic activity is so valued that 27 (24.5%) farmers sold their produce to purchase animals. The need to meet family requirements was also stated as another reason that warrants food selling. Some of the requirements for which food was sold were: to buy clothes, meet medical expenses, consumables and other miscellaneous domestic expenses.

4.5. Food production and Land-ownership.

George (1977) links food scarcity to landlessness. Her belief is that giving people food in the rural areas of the developing countries means primarily giving them access to farming land. One of the reasons given for insufficient food production in some households were poor yields due to inadequate farmlands and poor soils. This has both social and economic implications in that either the farmers are unable to conserve their farmlands and maximise production due to social related reasons or they have no money to purchase farming land in cases where land is not enough.

In contrast, there are those who felt they had enough food for their families and said they owed this to the cultivation of many farms or had sufficient labour-force to conserve the eroded farms. The following reasons were given by the respondents as to how they avoided food scarcity and ensured food sufficiency.

a) Early planting and growing enough for the family

23 (23.2%).

b) Dry seasons' loosening of the soil and planting

25 (25.3%).

c) Cultivation of different food crops on different shambas

51 (51.5%).

The implication here is that one way to ensure food sufficiency is to cultivate as many plots as possible especially in semi-arid areas and for instance where this study was done. However, the cultivation of these many gardens has to be related to land ownership. One has to own

land to be able to carry out food production on many gardens to ensure household food sufficiency.

Table 14: A frequency table on farming land-ownership.

Land ownership	No. of Respondents	Percentage
Personal land	92	62.6
Communal land	28	19.0
Both	27	18.4
Total	147	100.0%

Even though everybody admitted owning some kind of land, this ranged from personal to communal land ownership or both. Communal land ownership means land held by an extended family or a clan. Whereas 92 (62.6%) have individual household land, 57 (37.4%) own land either at an extended family or clan level. It is on such land where they carry out their food production activities. However, the people who did their farming on communal land encountered the following limitations as a result of being restricted to farming on jointly owned land which they felt had a negative effect on their agricultural productivity.

- a) Inability to cultivate as much as one wants 30 (54.6%).
- b) Too little land among many people 18 (32.7%).
- c) Lack of proper land planning and management 7 (12.7%).

Besides these problems the farmers also had their own reservations about communally owned land. They said they could not exploit communal land fully for higher yields for they felt insecure because of the reasons tabulated below.

Table 15: Farmer's causes of insecurity on communal land.

Insecurity causes	No. of Respondents	Percentage
My piece of land has yet to be identified	18	32.7
I can't cultivate anywhere of my choice	12	21.9
I might develop an area that may be allocated to someone else	15	27.3
The land is too small for development and also badly managed	10	18.1
Total	55	100.0%

Therefore, due to these reasons the respondents who owned communal land could not fully utilise it for food production. Individuals who had personal land for agricultural purposes complained of owning fragmented pieces of land that had recently (1988-89) been surveyed. Households sub-divided their farms among the wives and sons with each party being allocated a small plot.

4.6. Food production and animal power.

This study found out that there is some association between food production and animal power which is an agricultural form of labour-force. Like land ownership, draught power has some socio-economic implications on food production and sufficiency. Findings of this study showed that 145 (98.6%) of the farmers use animal power as an alternative means of agricultural mechanization and only 2 (1.4%) did not employ animal power in their food production activities.

Oxen and donkeys are the only draught animals used in agricultural production. It was noted that 116 (78.9%) use oxen, 7 (4.8%) donkeys and use both 24 (16.3%) for food

production purposes. Besides, some respondents said that they used donkeys to scare off wild pigs from crop destruction at night. Since donkeys are more drought resistant than oxen, they are gaining popularity in their use as an agricultural source of power as 31 (21.1%) farmers were already using them instead of oxen which easily die in times of drought.

Table 16: The source of animal power.

Source	No.of Respondents	Percentage
Self-owned	77	52.4
Borrowed	49	33.3
Hired	21	14.3
Total	147	100.0%

Even though the use of animal power was noted to be quite common with the smallholders as a means of raising their crop output, it was discovered that not all farmers have access to draught animals. A total of 49 (33.3%) relied on borrowing these animals from friends and relatives while 21 (14.3%) hired them for a fee to perform the agricultural activities that cannot be efficiently done without their utilization. Only 77 (52.4%) farmers had a sense of security in using their own draught power and therefore managed to avoid delayed performance of agricultural activities which influence reduced crop output.

The respondents admitted that the use of animal power in food production is of extreme importance and its absence or inadequency has adverse effects on crop output. It was found out that 136 (92.5%) of the population sample felt that their food production declines with non-employment of animal power while 11 (7.5%) felt that this did not have any marked effect on their agricultural produce and therefore made no difference to their output.

The negative effects that the farmers experience when they do not use animal power are :

- a) Less area farmed due to none use of animals 64 (44.4%).
- b) Occurs farm-work delay 50 (34.7%).

c) Less weed control which damages crops 13 (9.0%).

d) No dry-season farming 17 (11.8%).

Those people who either borrow or hire animal power have to experience the stated effects. This is because such farmers are too poor to own their personal animals or the animals die of diseases and drought effects.

When farmers were asked whether their crop output was negatively affected by non-use of animal power and if they experienced a drastic drop in their normal yields, 136 (92.5%) said yes while 11 (7.5%) responded no. The indication here is that animal power is a vital asset in food production and any drop in the crop may be associated with its non-use. In the absence of animal power, the majority 127 (86.4%) indicated that their main alternative is human labour.

Human labour may not be an efficient way of producing food in a semi-arid areas especially where farming is affected by unreliable rainfall. The other alternative to animal and human labour is the use of tractors. However, only 10 (6.8%) resorted to the use of tractors while 10 (6.8%) said they complemented the use of tractors with human labour for increased yields. The impression created here is that a tractor is not a very popular medium of agricultural form of mechanization and source of labour in semi-arid areas.

Findings of this study indicate that only a meagre 6 (4.1%) of the sample relied on tractors as their major source of agricultural power whereas 135 (91.8%) relied on hand-operated implements. Therefore the minimum usage of a

tractor in food production means that not all farmers who require the use of this facility get access to it and especially when it is required most. Generally farmers admitted that they were restricted from using it due to financial handicaps. If they had access to one, they said this would ensure an early land preparation. Late planting in semi-arid areas is associated with low yields and crop failure.

There are factors which dictate that not all farmers will get to use the tractor as much as they would like to. Either they cannot meet the expenses of this facility or it is not available when they can afford it. Therefore they lack the advantages that go with the use of a tractor such as seedbed preparation, weeding, harvesting and the transportation of the harvest. In some areas, there occurs a reduction in the size of the farm due to lack of mechanization.

Table 17: Reasons for minimal use of tractors.

Reasons	No. of Respondents	Percentage
Not available	14	9.5
Too expensive	68	46.3
Not required	47	32.0
Unaware of their availability and usefulness	18	12.2
Total	147	100.0%

The above table shows the reasons why some farmers are unable to use tractors in their agricultural activities. The major reason is the cost aspect because 68 (46.3%) farmers said that the use of a tractor requires a lot of money to

purchase or hire. In such cases, it becomes unaffordable to those who are interested in using it. One of the reasons why the farmers are not in a position to use tractors is due to their expensiveness or lack of credit to purchase them; either as individuals or as groups. Again for those who might have wanted to hire them, they are hardly available according to the responses of 14 (9.5%) farmers.

A total of 47 (32.0%) farmers felt that using tractors is not a priority in their food production activities. Therefore they did not require them. The underlying reason behind this perhaps comes from the local people's traditional way of farming. The affected farmers are accustomed to the use of hoe, the plough and the panga. Introduction of new modes of food production is met with indifferences because the farmers have become attached to their traditional farming implements. They probably view the tractor as an advanced mode of agricultural means of production restricted to very large farms. The rationale in this is because a tractor may be economically unviable. In such circumstances, the requirement of tractor use may not arise in situations where the ploughs and hoes suffice; some of which are inherited and their owners have strong sentimental attachments for them.

Traditional mixed cropping may make the use of tractors impractical because different crops require different operations in ploughing before planting. It becomes difficult to use a tractor when maize, beans, sweet potatoes, and the crawling pumpkins are grown together on

the same plot. Besides, some crops such as the pigeon peas take two seasons to be ready for harvest. Mixed cropping therefore brings extra difficulties in mechanising agriculture and perhaps justifies the "not required response". Since mechanization is hardly used, it does not play a significant role of enhancing food production in some semi-arid areas.

4.7. Traditional Beliefs on Food Production .

According to the findings of this study, there exists socio-cultural beliefs on food production and consumption in semi-arid areas. Among the 147 respondents, 102 (69.4%) were aware of taboos and beliefs related to food production and consumption while 45 (30.6%) were unaware of any cultural beliefs and did not practice them. The following cultural beliefs and taboos were practised.

- a) Only very hard working people should break the soil prior to planting 16 (15.7%).
- b) Food should be sacrificed to gods upon harvest and before consumption 36 (35.3%).
- c) Farms should be traditionally cleansed to wipe evils cast on them 38 (37.3%).
- d) Sacrifice by community elders a necessity to ensure sufficient rainfall 12 (11.7%).

The respondents' assumption is that failure to carry out the above traditional rituals results in poor and inadequate rainfall. Some of these are, invasion of crops by pests and animals, unwarranted crop wastes such as selling food for no

apparent reasons or farms becoming unproductive due to jealousy neighbours casting evil eyes on them.

Another common traditional taboo affecting food production the strong respect for the age-old shrines which evoke sense of fear and respect among the people. According to the findings of this study, it was established that 55 (37.4%) of the sample had shrines on their farming land while 92 (62.6%) had none. Even though those with shrines said such areas were ideal for farming, they dared not cultivate them for fear of offending the gods. They had the choice of transferring them elsewhere but lacked an alternative ideal place. The farmers refused to interfere with the shrines for fear of misfortunes and the wrath of their clans.

This study also tried to find out from the respondents what beliefs they attributed to food shortages. One of them is fatalism. People seem to resign to fate and feel that no matter how much efforts they put towards their food production, God's will would be done; hence an acceptance of their agricultural destiny rather fantastically.

Sacrificing of both livestock and farm produce is a traditional practice highly held by traditional elders. A total of 41 (27.9%) both Christians and traditionalists felt that traditional sacrificing has been neglected and this is why there are recurrent droughts, pest invasion, crop failure; resulting in poor yields and finally to starvation. Incidentally, at the time of doing this research, the traditional elders were going through the villages

soliciting for money from well-wishers to purchase animals to sacrifice for the rains. Witchcraft was pointed out by a few as another probable cause of food scarcity as indicated by 4(9.5%) respondents. They were of the opinion that other people were casting evil spells on their farms and therefore causing poor harvests.

CHAPTER FIVE:

SOCIO_ECONOMIC FACTORS RELATED TO FOOD PRODUCTION.

5.1 INTRODUCTION

This chapter deals exclusively with the interpretation of the research findings in much depth and greater analysis. The interpretation of data in this chapter will involve inferential data analysis, a form of data interpretation which applies the analysis of two variables simultaneously in order to find out if they are related (associated). This study endeavoured to establish the factors that are associated with food shortages. The data gathered in this exercise were used to test the study's hypotheses in respect to food shortages in the area where this study was done.

5.2: DATA ANALYSIS AND HYPOTHESES TESTING.

Hypothesis One.

There is a negative relationship between food sufficiency and food selling in households.

Table 1: Household selling of food crops.

Food sufficiency

		Yes	No	Total
Food	Yes	52 (35.4 %)	58 (39.5 %)	110 (74.8 %)
Selling	No.	6 (4.1 %)	31 (21.1 %)	37 (25.2 %)
Total		58 (39.5 %)	89 (60.5 %)	147 (100.0%)

2

$X = 9.916$

DF= 1

$0.01 > P > 0.001$

The X^2 indicates that there is a relationship between the selling of food crops upon harvest by the household head(s) and food sufficiency in the household for daily domestic consumption. The findings of this study revealed that out of 110 (74.8%) farmers, 58 (39.5%) attributed their food scarcity to selling as compared to 52 (35.4%) who did not sell their food and at the same time did not suffer any food scarcity in their households. On the other hand, out of 37 farmers who did not engage in any food selling upon harvest, 6 (4.1%) did not experience any food insufficiency but 31 (21.1%) farmers did. In spite of not having any extra surplus, they sold the little they had and therefore exposed their family members to starvation.

This study therefore established some negative relationship between food selling and household food scarcity. There is a conclusive evidence to the effect that food selling is an influential factor that causes food scarcity in most of the households. The two variables are associated to a significance level of $0.01 > p > 0.001$. A total of 89 farmers experienced food scarcity. Out of this number, 58 (65.2%) engaged in food selling activities probably because they wrongly felt they had enough reserves as opposed to 31 (34.8%) who, in spite of not having produced enough food for their domestic consumption requirements, sold the little they had harvested and therefore experienced scarcity.

These findings undoubtedly confirm the hypothesis that there is a negative association between food selling and maintaining food adequacy in a family. The implication here is that food selling activity is an influential factor to food scarcity in a household and that food is sold by both those who produce adequate for their needs as well as those who do not harvest enough for their domestic consumption.

According to Onimode (1987:52) food production raises dualism which involves "monetized enclave" of primary production and a subsistence barter sub-system of less developed economies. He attributes food selling to household financial obligations: the payment of school fees, dowry, purchase of imported and locally manufactured goods such as textiles, salt and sugar and these are largely obtained from the sale of surplus food and cash crops.

From the findings of this study, it could be inferred that 31 farmers who did not engage in food selling probably did not harvest enough to consume besides selling and would have most likely sold had they harvested "surplus". Surplus here would give an erroneous impression that food was sold because there was extra. On the contrary, even without actual or potential surplus, household financial needs necessitate food selling. The same could be said of the 58 (39.5%) farmers, who in spite of not having enough, still sold the little they had, even at the risk of going hungry.

The household financial needs and requirements for rural based cultivators have a direct cost in terms of cash for various needs such as the payment of school fees, purchase of livestock, maintenance of the farm or catering for family daily needs. This cash is obtained by sale of food crops, surplus or potential surplus thus reducing what remains for household consumption. Therefore, even though the statistical relation between food selling and sufficiency appears weak, there is an actual association and food scarcity was stated to be linked to this phenomenon of dependence on farm produce by the majority of the rural households whose major economic activity is farming as a source of their financial resources.

Hypothesis Two.

There is a positive relationship between the type of land ownership where food is produced and food sufficiency in a household.

One of the factors that may influence food scarcity among small-scale farmers in semi-arid areas is the type of land ownership. The hypothesis below will attempt to find out if they are related to farmers' land ownership.

Table 2: The influence of land ownership on food sufficiency.

Land-ownership	Individual	Communal	Both	Total
Yes	34(23.1%)	9(6.1%)	15(10.2%)	58(39.4%)
No	58(39.4%)	19(12.9%)	12(8.2%)	89(60.6%)
Total	92(62.6%)	28(19.0%)	27(18.2%)	147(100.0%)

2

X = 3.79708

DF = 2

0.10 > P > 0.20

Out of the 92 people who owned individual land, 34 (37.0%) were sufficient in food for their household consumption whereas 58 (63.0%) were not. In the category of communal land ownership, 9 (32.1%) were also self sufficient in food as compared to 19 (67.9%) who admitted that they had experienced food shortages. Finally, 15 (55.6%) of those who produced their own food on both individual and communal land enjoyed food sufficiency and did not experience any scarcity as opposed to 12 (44.4%) who did not have enough to cater for their households' food requirements.

Even though the Chi-square (χ^2) in Table 2 indicates some strong relationship between food sufficiency and land ownership there was a higher percentage of farmers who grew and produced food on their private farms, whereas 58 (63.0%) suffered food insufficiency. Field notes and observations revealed that land in this particular area was surveyed two years ago and sub-divided among the families' eldest male members or their widows. Some of these people have just acquired title deeds. The adjudicated land is in the process of being sub-divided further among the male members of the family heads resulting into unviable fragments.

The transition from communal to private land has disrupted food production. Parents were noticed to have retained the already existing farms which they had fenced and planted fruit trees. They shared the uncultivated and untended land to the children to make new farms. Surprisingly, food production on individual owned farm is not quite high. It will probably take a long time investment before such newly created farms can produce adequate food for consumption. As a result of this, there has been an interruption in the cultivation procedure leading the individual-owned cultivated land is not to producing as much as expected.

A total of 9 (32.1%) of the communal land cultivators were found not to suffer from food scarcity when compared to 19 (67.9%) of their counterparts who produced food on jointly owned land and did not meet their food requirements. This was because individual farmers could not cultivate as much as they wanted as a result of little land among many family

members or the farmlands having been badly managed and productive.

Out of the 27 farmers who carried out food production on both personal and communal land, 15 (55.6%) were self sufficient in their domestic food requirements but 12 (44.4%) were not. The indication here is that joint land ownership is an influential factor towards a household's food sufficiency. Lack of total rights on land might have been the cause of insufficient food production among the 12 (44.4%) farmers who are similar in number to those who solely relied on communal land and yet did not suffice their households with adequate food.

Alternatively such farmers might be in the transitory stage of moving out of the former extended family owned land to their newly acquired plots where they were yet to establish themselves agriculturally. Lack of availability of agricultural land in relation to the high population limits most holdings to a size too small for progressive and productive food crop production which can cater for the households' domestic consumption.

Therefore, this lack of sufficient land could probably explain why farmers who are even producing their own food on private land are unable to feed themselves and their families. Some of the plots are too small to warrant enough food production for large families. Again due to land survey and fragmentation, some places that had been abandoned as a result of poor soils and reserved for livestock rearing have

come under cultivation. Such places need a lot of rehabilitation before they can be transformed into food producing areas. High population growth rate coupled with poverty has forced the inhabitants of these areas to start reclaiming almost uncultivable land. One would therefore be expecting too much from farmers in such circumstances to be self sufficient in their food production.

Communal land ownership was said to be a source of social friction among family members. This type of ownership reduces the farmers incentive to carry out long term investments and therefore works against land conservation. Greater security of land tenure would probably encourage investment and conservation. Those who produce their food from communally owned land are somehow justified in not being able to produce enough to cater for their needs. Findings of this study show that improper planning and management of communally owned land was cited as one draw back to food sufficiency.

Land scarcity among the farmers was found out to be common in the area of this research and it was noted to be getting worse as the area's population expands and fragmentation of land continues. Certain families will continue to have cultivation rights over certain large areas while others will suffer a loss of these rights as a result of their big families and will be excluded from such rights. Those few individuals who have money have started to purchase pieces of land elsewhere to extend their farmlands. Households with large male population are subject to further

fragmentation of their agricultural land. This means that their food production will drop more as a result of owning smaller plots and therefore the vicious circle of food scarcity will continue irrespective of how hard they work. Mostly land is acquired by inheritance. However, this land suffers serious fragmentation due to sub-divisions. If a parent owned only a small acreage, each child in turn will get an even smaller portion.

Hypothesis Three

There is a positive relationship between the level of the male head of the household's contribution in food production and food sufficiency.

Small-scale subsistence farming in semi-arid areas is a labour intensive activity where household members are the primary source of labour. However, the division and distribution of agricultural labour is determined by social, cultural and economic factors. Observations indicate that women are the key food producers when it comes to subsistence farming. Therefore in most cases women are by custom the cultivators of food crops grown for home consumption while their husbands who should be actively engaged in agricultural food production assume the responsibility of seeing to the care of cash crops or livestock if they do not migrate to urban areas to look for wage employment.

Table 3: The level of a man's contribution to food production and its sufficiency.

Level of man's contribution

	Low	Medium	High	Total
Yes	10 (7.0 %)	5 (3.5 %)	40 (28.2 %)	55 (38.7 %)
No	24 (16.9 %)	22 (15.5 %)	41 (28.9 %)	87 (61.3 %)
Total	34 (23.9 %)	27 (19.0 %)	81 (57.0 %)	142 (100.0 %)

n = 142 : Missing observations = 5

2

X = 9.76541

DF= 2

0.02 > P > 0.01

The above table shows that there is a relationship between the male head of a household and his participation in food production and its sufficiency. The relationship between the two variables had a Chi-square (χ^2) of 9.76541 and significant at $0.02 > P > 0.01$. This happens to be a strong relationship between the cross-tabulated variables.

The "low" and the "medium-level" head of the household's food production seem to have more influence when compared to the "high-level" food production by the male-household heads. The figures on Table 3 indicate that out of 34 households where a man's agricultural food production was said to be low 10 (29.4%) were self-sufficient while 24 (70.6%) were not. This implies that the more a household experienced a "low level" male-household head's participation in food production, the more likelihood there was of experiencing food scarcity.

Low production also seems to apply to the medium level of male household head's participation to food production activities. Most of the households who experienced food scarcity in this category were of men who partly assisted in the agricultural exercises. Out of the 27 households, 5 (18.5%) did not suffer any food shortages whereas 22 (81.5%) experienced scarcity. Therefore the implication here is that more households are likely to suffer food shortages as a result of men partly contributing towards the households' food production.

There does not seem to be much difference in food sufficiency and scarcity in those households where male-household heads participated highly. The figures indicate that out of 89 families, 40 (49.4%) enjoyed food sufficiency as there was a high level of contribution by the household head towards it's production as opposed to 41 (50.6%) households where there was no sufficient food despite a high participation in food production exercise. Casual field observations indicated that, where a man was rated to be highly involved in food production, he was either widowed or had a sickly wife. This could therefore be the reason why the difference between those who were sufficient in food and those who were not was very negligible since (0.7%) farmers are very insignificant. Irrespective of how high the man participates in food production, there might arise other factors such as food selling or feeding a large family which might influence insufficiency of food in the household.

The majority of the small scale farmers experience labour limitations which in turn influence the food output level. Therefore, this aspect creates a relationship between a man's level of contribution to the family's food production and sufficiency as indicated by the findings of this study. Diversion of labour out of the rural sector has significant effects on the crop output as well as the ability to produce food surplus for consumption during poor harvests and for sale. Male household heads are the ones who normally move from the rural areas creating scarcity of agricultural labour-force. Their participation is therefore low when compared to that of women. This low level or partial male

participation may have contributed to insufficient food for the household consumption thus necessitating looking for alternatives to cater for the family food requirements.

But even when the household male-head is physically present, he may not actually contribute fully towards food production because he is the one who decides on how much labour-force should be devoted to various household's activities such as livestock keeping, petty trading, casual labour or even the cultivation of cash crops. Therefore, the woman, who may be a key figure in the food production activities has limited choice concerning the allocation of labour and even the use of the agricultural land and farm inputs.

Hypothesis Four:

The major household food producers have a negative influence on food production as a result of performing household chores.

Table 4: The influence of household activities on the family's food production.

Major household food producer

	Wife	Husband	Both	Total
Yes	66 (44.9 %)	30 (20.0 %)	13 (8.8 %)	109 (74.1 %)
No	22 (15.0 %)	5 (3.4 %)	11 (7.5 %)	38 (25.9 %)
Total	88 (59.9 %)	35 (23.4 %)	24 (16.3 %)	147 (100.0 %)

n = 147

2

X = 7.47510

DF= 2

0.05 > P > 0.02

According to the findings in Table 4, 88 (59.9%) of the farmers turned out to be women who were the major food producers in their households. Out of these, 66 (75.0%) admitted household chores interfered with their food production activities at some stage of production and thus were unable to produce as much as they would have in the absence of doing these household tasks. They therefore attributed the food scarcity to their inability not to fully participate in agricultural activities because they had to perform other non-agricultural related activities alongside their farming requirements.

On the contrary, 22 (25.0%) reported that their performance of their everyday domestic chores had no marked effect on the food production and would not attribute any of their

food inadequacies to this factor. However, field notes indicated that some of these women were living within the extended family systems. This is where household tasks were spread among other members of the family. They enjoyed some reprieve of performing some activities such as drawing water, collecting woodfuel, baby sitting, cooking, looking after livestock or even going to the markets to grind maize and do shopping. Others relied on hired help such as housegirls or farm labourers. But there were others who did not have as many responsibilities as their neighbours because they had no small children, livestock or had rain-water tanks which saved them the daily ordeal of fetching water from distant places.

It turned out that 35 men were the chief food producers within their families. Out of this number, 30 (85.7%) admitted that the performance of household chores greatly interfered with their routines of food production. Such men were either widowed or separated from their wives or had sickly spouses who could not perform heavy farm work. Others had wives whose were involved in petty trading; buying and selling cereals, fruits and vegetables. Therefore, some of these men have to undertake household duties that are normally done by their wives. These daily tasks have to be performed together with livestock rearing.

The concerned men said such activities either delayed farm work or took most of their time and the energy that could have been spent on food production. As a result, they experienced reduced food production. But 5 (14.3%) of the

men who exclusively produced household food stated that such activities did not inconvenience them much because they were able to arrange their time and plan it well. Again, such men were noted not to have many people dependent on them and thus could manage with a jerrican of water and a few logs of wood for some time.

Finally, a total of 24 respondents said they performed their agricultural tasks more or less on equal basis with their partners. There is only a difference of 2 (1.4%) between those whose food production activities were interfered with by the performance of household chores and those who were not. A total of 13 (54.2%) farmers (both men and women) stated that their food production was disrupted as a result of one of them taking time off to attend to some other non-agricultural activity. However, 11 (45.8%) said that their food production was not interfered with by carrying out of these household duties.

According to Table 4, figures indicate that 66 (44.9%) of the major household food producers turned out to be women compared to 22 (15.0%) men. This lends credibility to the World Bank report (1989:103) which states that women are perhaps the most important rural people. "They are responsible for an estimated 70% of the staple food production." The report continues to state that women's agricultural workload grows while their traditional work burden in childcare, water drawing, fuelwood gathering and food processing and cooking grows too. Ndegwa (1987:137) adds weight to this by remarking that in most African

countries, it is women, with some assistance from their children who draw water for household purposes. Unfortunately, most supply water points are far from the homes and a lot of time is taken in this exercise.

Shortage of fuelwood is increasingly becoming acute in most African rural areas. Wood gathering, an African feminine affair, affects rural women and their agricultural production adversely since the bulk of the work falls on them. These household chores have been said to be time consuming and arduous to the performer. It means that land preparation, planting, weeding and harvesting are often delayed and hence results in declined crop yields.

Hypothesis Five:

There is a positive relationship between food sufficiency in a household and the age of the farmer.

Table 5: The relationship between household's food sufficiency and the farmer's age.

Farmer's age

Age (Years)	21-30	31-40	41-50	51-60	above 61	Total
Yes	10 (6.8 %)	8 (5.4%)	19 (12.9%)	13 (8.8%)	8 (5.4%)	58 (35.5%)
No	14 (9.5%)	27 (18.4%)	31 (21.1%)	10 (6.8%)	7 (4.8%)	89 (60.5%)
Total	24 (16.3%)	35 (23.8%)	50 (34.0%)	23 (15.6%)	15 (10.2%)	147 (100.0%)

n = 147

2

X = 8.14368

DF = 4

There is no statistical and conclusive evidence that the farmers' age and their households' food sufficiency are related. Therefore, this study fails to reject the null hypothesis. Findings of this study reveal that 24 farmers fell within the range of 21-30 years of age. Out of these, 10 (41.7%) were self-sufficient in food whereas 14 (58.3%) were not. In the second category, there were 35 farmers and out of these, 8 (22.9%) admitted that they experienced no food insufficiency problems as compared to the 27 (77.1%) who did not have enough food for their domestic consumption.

Most of the respondents fell within the third category of 41-50 years of age and they were 50. Among these, 19 (38.0%) were self-sufficient in food while 31 (62.0%) experienced food scarcity. The last category of 51 years and above had

38 respondents out of which 21 (55.2%) had no food insufficiency problems but the remaining 17 (44.8%) experienced food shortages.

The impression created by Table 5 is that the age factor was only influential in the 31-50 years' age group category. The disparity between those who were self-sufficient and those who were not was quite high; 27 respondents against 58. This difference could be attributed to the household family networks. Whereas the first category comprised of relatively young people, mostly newly married and living in small nuclear family systems, it was different with their counterparts. The 31-50 years age group did not live in a small nuclear family system but they had an estimated family size of roughly 8.3. Therefore, theirs were relatively larger families to feed and more financially to cater.

The 51 years old and above group does not show much difference when compared to the rest. Out of 38 respondents, 21 (55.2%) had enough food for themselves as opposed to 17 (44.8%) who were not. Two reasons could be inferred from this; firstly, these were rather elderly people with few or no dependants and their little farm produce they harvested was enough for their domestic consumption. The same were noted to be more keen on farming and consistent with the farming patterns when compared to the younger farmers. They were noted to have fewer distractions from their farming activities.

Consequently, those who did not have sufficient food had extended family systems which depended on them. Most of them were grandparents with daughters who had born children out of wedlock and had either married and left them behind or had not married at all. Besides, their age and associated ailments were noticeably a draw back to their food production activities while some of the children they were caring for could not assist them since they were in school.

The last category of 61 years and above has a likelihood of experiencing some surplus food. They are also the least likely to periodically move to urban areas. They were noted to be keen on carrying out farming activities and the responsibilities associated with them such as fencing against domestic and wild animals, cutting terraces and spreading manure in the dry season. This is contrary to Mbithi's (1975:183) observations that, "short term migration in search of a wage employment was found to be common in the marginal areas of Meru, Embu and Kitui. Many of this migrant workers received payment in kind and carried food back at intervals to their families." Mostly, this is done by the young and the middle aged who leave their home areas in the dry season to go and work for a short time.

The age factor has therefore a far reaching socio-economic implication in terms of food production activities. The elderly people rarely divert their labour-force out of the farming activity which is bound to have profound negative effect on the crop output. Besides, they were noticed to have concentrated on less labour intensive food crops and

hardly engaged themselves in the cultivation of the area's cash crops such as cotton and sunflower. People in this age group therefore had a better chance of being more self sufficient in food crops except those who appeared to be tied up with large "extended" families.

CHAPTER SIX

SUMMARY AND CONCLUSIONS

6.1 Summary

In this chapter, the main findings of the study are summarised and conclusions drawn from the field observations, data findings and analysis. Appropriate recommendations and areas of further research are also spelt out for the benefit of policy makers, planners and researchers.

Out of the 147 respondents, 89 (60.5%) experienced food shortages for four consecutive seasons in comparison to 58 (39.5%) who claimed sufficiency in food. This implies the fact that the majority of farmers from the area of this study experience inadequate food for subsistence consumption.

Socio-economic Background of the Respondents.

It was found out that, the farmers who suffered food scarcity had low socio-economic backgrounds when compared to those who did not. The research findings revealed that such farmers relied on food production ~~as their~~ as their main occupation and lacked other sources of income. Out of 147 respondents, 115 (78.2%) practised farming as their main occupation whereas 16 (10.9%) were teachers and 16 (10.9%) were business people. It was noted that those who suffered food shortages also experienced inadequate labour-force, draught power, farm inputs and carried out their farming activities on communally owned land.

An analysis of those households which had sufficient food reveals that their socio-economic standards were better when compared those who experienced food scarcity. The self sufficient farmers enjoyed more labour-force, produced their food on individually owned land, owned draught power and some had other careers to boost their food requirements.

Therefore, from the comparison of the two categories, it can be concluded that food production and its adequacy in semi-arid areas is depended on the individual farmer's level of socio-economic status. These facts collaborate the findings of Heyer (1976), Harrison (1987) and the Machakos Dev. Plan (1989-93). Their observations indicate that food scarcity in semi-arid areas is as a result of farmers' socio-economic background. However, these factors should not be discussed in isolation but in conjunction with the effects of the weather on food production and sufficiency.

6.2 Recommendations

It is rather difficult to offer suggestions on the minimisation and erradicaction of food shortages in situations where the underlying reasons are low socio-economic standards. However, the study has identified several factors that, if addressed, can minimise the food scarcity problem in semi-arid areas.

There is need to deploy agricultural extension officers to semi-arid areas. These officers should embark on extensive campaigns to educate farmers on how to improve their food production. The farmers should be educated on the necessity

of equal participation of both men and women in food production, soil and water conservation, cultivation of cash crops, more selling of livestock instead of food crops and the discarding of traditional taboos and beliefs which interfere with food production and consumption.

Dependency on food crops as an income source is an issue that has to be addressed. The World Bank (1989) states that the priority of agriculture in semi-arid areas should be on food for subsistence rather than a source of income. However, findings indicate that over the years, there is a marked increase on food sales at the expense of household's consumption. Creation of other sources of income will improve the household's socio-economic status and reduce food sales. Cultivation of castor oil, cotton, sunflower and sisal as cash crops and the performance of rural based non farm activities to raise money instead of food selling. Such activities would be selling of crashed stones, building sand, rope and basket making.

Land ownership is a significant factor in food production and sufficiency. The area under study is characterised by a transitional phase between communal and individual land ownership. There is an urgent need for government to issue title deeds to farmers living on communally owned land. This will ensure security of tenure, an incentive towards long term conservation. Greater security on land encourages investment and conservation.

There is a need to change men's attitude towards food activity in subsistence farming with a view to correcting the imbalanced agricultural labour-force rooted in gender differences. This would ease the farming burdens that fall on women noted to be the major food producers among the small-scale farmers according to Harrison (1987). Men should also be sensitised to grant women the freedom to introduce any significant innovations in farm investments without having to consult their husbands.

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where

FOOD SCARCITY IN SEMI-ARID AREAS: KIBAUNI LOCATION.

Q U E S T I O N N A I R E

Hello !

My name is C.M. Waema from the Sociology Departement of the University of Nairobi. I am visiting farmers in this area and asking them questions about various agricultural and socio-economic issues regarding food production. The information gathered will help in identifying workable solutions to the food crisis. Your responses will be treated in strict confidence.

Thank you in advance for your anticipated co-operation. Good-day.

1. BACKGROUND INFORMATION

1. Village
2. Sex 1.Male 2.Female
3. Age.....
4. Marital status
1.Single 2.Married 3.Widowed 4.Divorced 5.Separated
5. Religion
1.Catholic 2.Protestant 3.Traditionalist 4.Other
6. Occupation (specify the main one).....
7. Educational level attained (specify in years completed)
1.None 2.Std I-IV 3.Std V-VIII 4.Form I-II
5.Form III-IV 6.Form V and above
8. What type of family system do you live in ?.....
1. Nuclear 2. Extended
9. What is your relationship with these persons ?
1.Spouse 2.Child 3.Grandchildren 4.In-law 5.Other.....
10. Do you have enough food for them from one season to another?
1.Yes 2.No
11. If yes, how do you ensure this constant sufficiency ?
-
12. If not, how do you explain this insufficiency ?

13. What amount of food do you consider is enough for them ?.....
.....

2. FOOD PRODUCTION AND WOMEN'S HOUSEHOLD CHORES

1. Who in this household contributes most towards food production?
1. The wife 2.The husband
2. Who does the following duties?
 - 1.Fetching water
 - 2.Fetching firewood
 - 3.Looking after the children
 - 4.Doing any other household tasks
3. Do these chores interfere with food production? 1.Yes 2.No
4. If they do, what are their effects?
 - 1.Delayed farm work
 - 2.Less farm work done
 - 3.Reduced crop output
 - 4.Other.....
5. Do you think if a woman's household burden is reduced, food production would improve? 1.Yes 2.No
6. If yes, how would this happen?
 - 1.The woman would do more farm work
 - 2.There would be less delays in sowing, weeding and harvesting
 - 3.Other.....
7. What role does a man play in food production?
 - 1.Clear the bush to make a farm
 - 2.Plough the shamba only
 - 3.Plough, sow, weed and harvest
 - 4.Look after the livestock
 - 5.Other (specify).....

8. What do you think a man should do to boost food production?

Explain.....

.....

They are not available to help on the fields

3. LABOUR FORCE

1. Do you experience agricultural labour shortage? 1.Yes 2.No

2. In what form is the labour scarce? *carry out on the farm?*

1.Women's 2.Men's 3.Children's 4.Other.....

3. Where is the women's labour lost to? *they destruction*

1.Doing household duties

2.Looking after animals

3.Trading *to make use with this affect food production?*

4.Other.....

4. Where is the men's labour force diverted to? *they destruction*

1.Idleness

2.Looking after animals

3.Urban migration *to live in the*

4.Trading *you have to individually 3. Domestically 4. have*

5.Other.....

5. Where is the children's labour lost to? *the*

1.School going *they themselves to doing farming activities*

2.Urban migration *to live in the*

3.Juvenile delinquency *of individuals you have*

4.Household duties *re developing common, land productivity?*

5.Other.....

6. How does the absence of women's labour force affect food production? Explain.....

7. How does the men's absence in food production activities influence food shortage? Explain.....

8. How does the absence of children's labourforce in food production influence food scarcity?
 - 1.They are not available to relief mothers from household tasks
 - 2.They are not available to help on the shamba
 - 3.They cannot relief their father's livestock keeping
 - 4.Other.....
9. What specific duties can children carry out on the farm?
 - 1.Weed and harvest
 - 2.Scare away birds and monkeys from crop destruction
 - 3.Transport food crops home
 - 4.Other.....
10. Does failure to do away with this affect food production?
 - 1.Yes 2.No
11. If yes, explain.....

4. LAND OWNERSHIP

1. Do you own any land? 1.Yes 2.No
2. If yes, do you hold it 1.Individually 2.Comunally 3.Both
3. On what type of land do you practise your farming ?
 - 1.Individual 2.Communal 3.Both 4.Other.....
4. Do you encounter any inconviniences in doing farming activities on communal land? 1.Yes 2.No
5. If yes, explain what kind of inconviniences you experience
6. Would you feel secure developing communal land agriculturally ?
 - 1.Yes 2.No
7. If no, explain why.....
8. Do you think your food production efforts are discouraged by communal land ownership ? 1.Yes 2.No
9. If yes, explain why.....

10. Where would you concentrate your efforts in food production?

1. Individual land 2. Communal land 3. Equally both

11. For any case explain why.....

5. ANIMAL POWER AND FARM INPUTS

1. Do you use animal power in your food production exercises ?

1. Yes 2. No

2. What is the source of your agricultural animal power ?

1. Donkeys 2. Oxen 3. Both 4. Other

3. What is the source of your agricultural-animal power ?

1. Self 2. Borrowed 3. Hired 4. Other.....

4. Is your food production negatively affected by non-use of animal power ? 1. Yes 2. No

5. If yes, explain how.....

6. In case you don't use animal power in your agricultural activities, what are your alternatives ?

1. Human labour 2. Tractor 3. Other.....

7. What types of tools and mechanization do you use ?

1. Tractors & harvesters 2. Pangas & jembes 3. Others.....

8. What are the sources of your tools and farm machines ?

1. Own 2. Borrowed 3. Hired 4. Other.....

9. Is your food production raised by the use of farm machines?

1. Yes 2. No

10. If yes, explain.....

11. If you don't use mechanization in your food production why is this?

1. Not available 2. Too expensive 3. Not required

4. Not aware of any 5. Other.....

6. FOOD SCARCITY

1. For the last two years, have ever run out of food before the following harvest? 1.Yes 2.No
2. If you have run out food within the last two years, in how many seasons ? 1.One 2.Two 3.Three 4.The four seasons
3. In what particular foods did the shortage affect you most ?
 1.Maize 2.Beans 3.Peas 4.All 5.Other
4. When you run out food what do you do?
 1.Buy 2.Borrow 3.Beg 4.Barter 5.Other
5. What do you think are the causes of food shortages in this area?
 1.Natural events (name them)
 2.Poor storage
 3.Grain damage
 4.Others.....
6. Give reasons for any of the above.....
 Why is it so?.....
8. If yes, what do you sell? 1.Maize 2.Beans 3.Peas
 4.Other.....
9. For what purpose is the harvest sold?
 1.To raise school fees
 2.To buy livestock
 3.To maintain the farm
 4.To cater for family needs
 5.Other (specify).....
10. Does food sale affect your sufficiency ?
 1.Yes 2.No
11. If yes, what are they?
 1.Weddings 2.Funerals 3.Dowries 4.All 5.Others.....
12. For the last one year, have used food on any of the above?

1.Yes 2.No

13. If yes, what occasion and what amount?.....
.....

7. GRAIN STORAGE AND FOOD PRESERVATION METHODS

1. Do you have any food to store? 1.Yes 2.No

2. If yes, where do you normally store it?

1.Ikumbi 2.Modern store 3.Main house 4.Other.....

3. What type of containers do you store the food in?

1.Grass-bins 2.Gunny bags 3.Gourds 4.Other.....

4. Do you experience any pests problems? 1.Yes 2.No

5. In what form of storage is your food prone to pests?

1.Grass-bins 2.Gunny bags 3.Gourds 4.Other.....

6. If yes, what kind of pests?

1.Stalk borer 2.Weevils 3.Rats 4.White ants 5.Other.....

7. What steps do you take to rid your crops of these pests?

1.Nothing 2.Use pesticides 3.Other.....

8. What do you do when food is left over a meal?

1.Preserve it for the next meal

2.Give it away to the neighbours

3.Throw it away

9. Do you think preservation of food is economical?

1.Yes 2.No

10. Do you think non-preservation of cooked food influences food shortage in your household? 1.Yes 2.No

11. If yes, explain.....

8. RESEARCH AND AGRICULTURAL EXTENSION

1. Have ever been visited by an agricultural officer ? 1.Yes 2.No
2. Have you visited either an agricultural station or a demonstration centre ? Why ?.....
3. Have you heard of any farming method(s) that you didn't know of two years ago? 1.Yes 2.No
4. Have adopted any of the methods you heard? 1.Yes 2.No
5. For any case, answer why.....
8. If you adopted a new method, has it improved your food production?
1.Yes 2.No

9. TRADITIONAL TABOOS AND BELIEFS

1. Do you know any traditional taboos and beliefs related to food?
1.Yes 2.No
2. If yes, what are they? List them.....
.....
3. Do you have any shrines on your land? 1.Yes 2.No
4. Are they cultivated? If not, explain why.....
5. What are your feelings about letting your shrines lie idle?
1.They should be cultivated
2.They should be left as they are
3.Christians should not fear cultivating them
4.Animists should be encouraged to cultivate them
6. Are you aware of any foods whose consumption is not popular?
1.Yes 2.No
7. If yes, what are these foods?.....
8. What is done to unpopular food?
1.Sold 2.Exchanged for labour 3.Given to the po
4.Other.....

9. What cultural beliefs do you know of on food scarcity and famine?

1. Act of God

2. Lack of sacrifice to the spirits

3. Practice of witchcraft

4. Other.....