LIBERALIZED AGRICULTURAL MARKETS AND THEIR IMPACT ON HUMAN WELFARE IN KOIBARAK LOCATION, MARAKWET DISTRICT KENYA

BY

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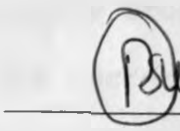
DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.



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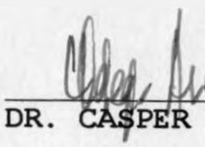

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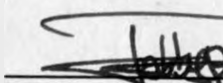

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DR R. M. OCHARO

DEDICATION

This work is dedicated to the entire generation of Ka-Alimaris family and their next of kin who have and will set their feet on the road of education.

To them all, they should use this work as a stepping stone to explore new frontiers of knowledge. My challenge to them is that, the secret of educational excellence is not knowing too much, but knowing just enough to enable one to adequately improve his or her immediate environment.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF DIAGRAMS

LIST OF MAPS

ABSTRACT

The primary objective of the study was to assess the impact of liberalized agricultural markets on human welfare in Koibarak Location, Marakwet District, Kenya. And its secondary objective was to examine other factors that determine the status of human welfare in the region. To achieve the above objectives, it was hypothesized that the change in the net monthly incomes of the farm households due to the liberalization of the agricultural markets significantly affect their food security, education and health status; And that, the human welfare of the households is significantly affected by their family sizes, cultural factors, physical environmental conditions, transportation network, accessibility to public loans and credit facilities, accessibility to agricultural education and extension services, land tenure system and methods of farming used.

The theoretical framework that was used here is that of Rogers,E. and Shoemaker(1971) which states that, every planned programme of change(be it economic, political, industrial or agricultural) produces social and economic reactions that run throughout the social structure. The consequences(social reactions) of the liberalized agricultural markets(planned programme) on the human welfare

of the Koibarak households were therefore the main interest of this study.

The sample size for the research study was 100 respondents whose main occupation is farming. The study was conducted between early March and Mid-April 1995. The 100 interview questionnaires were administered by the researcher with the assistance of two enumerators. The data collected was both primary and secondary. Both descriptive and inferential statistics were used in analyzing the data.

The findings of the study indicate that liberalization of the agricultural markets among other social-cultural, economic and physical environmental factors have negatively affected the welfare status of the respondents' households. Of the other factors considered to influence the welfare status of the households, the following were proven significant:- their family sizes, cultural factors, physical environmental factors, transportation network, land tenure system, accessibility to agricultural education and extension services, and methods of farming used in the region. The respondents' accessibility to public loans and credit facilities in the region was not proven significant in influencing the welfare status of their households.

Based on these findings, a number of relevant recommendations are finally suggested. Given that the agricultural sector is the backbone of Kenya's economy and

other developing countries, the certainty of the liberalized markets to usher in more favorable results in improving the welfare of its people depends on certain conditions. The social dimension (i.e. human welfare status) of the people who are the key participants of the implemented programme should be considered during policy formulations and implementations. Also, farm households should be provided with a strengthened incentive package in terms of improved infrastructure and conducive prices for their inputs and products as these will enable them to compete favourably in the local, national, and even international markets. Lastly but not least, countries expected to implement any externally designed programme should be given an upper hand in assessing the viability of the intended programme to the development of their countries. This will allow for the consideration of the different social-economic, political, demographic, and physical factors prevailing in these countries in the event of implementing any new programme.

CHAPTER ONE

INTRODUCTION

1.0: BACKGROUND TO THE STUDY

Structural Adjustment Programmes(SAPs) and Trade liberalization(the World Bank and IMF's aid conditionalities aimed at the efficient allocation of resources and the achievement of sustainable economic growth among the affected economies) have become the order of the day among many African countries. The need for development and economic growth have driven most of these countries into agreeing to implement these externally imposed SAPs and Trade liberalization policies as a prerequisite of getting financial support (i.e.Aid) from the World Bank and IMF.

It was not until the launching of the 1979/83 Development plan and publication of Sessional Paper No.4 of 1980, when Kenya started embarking on the structural Adjustments of its economy. After this gradual structural change of the economy, we have now reached a near complete liberalization of the Agricultural Markets and Trade in general. Over the proceeding years, Kenya's Agricultural sector has changed remarkably. The government's liberalization of maize marketing on December 28,1993 marked the complete removal of movement controls. The liberalization included the removal of restrictions on maize imports and distribution. Prior to this policy change, NCPB

was the sole official maize marketing channel. Producer prices for maize were set by the Ministry of Agriculture, Livestock Development and Marketing and were announced before the beginning of the main planting period each year. But in a liberalized market, prices will be set by the forces of demand and supply. It is therefore worth noting that, the government's liberalization of maize (Koibarak's staple food and leading income earner) marketing in December 1993, was more or less the climax of the liberalization process in Koibarak because it had tremendous impact on maize production - the mainstay of the majority of the people.

Even though government restrictions on the movement and pricing of maize and maize products in Kenya have been reformed, as **Egerton University (PAM,1994)** puts it, concerns remain as to how a liberalized agricultural market will function, what the impacts of the proposed policy might be, and who would be the winners and losers from those changes? How would damage to potential losers be minimised and the social costs of the transition be kept at minimum? This study therefore begins the work of identifying and analyzing some of these issues. **World Bank (1994)** report attributes the rampant Africa's poverty to result primarily from hindrances, especially government policies that tend to block the operation of competitive forces both in the

domestic and international markets. But lessons from country case studies in Africa reveal that SAPs and Trade liberalization have not played any important role in realizing sustainable economic growth and development in these countries. **Ishrat and R. Farugee(1994)** in their case studies in seven African countries on the effects of SAPS and trade liberalization found out that the policies have underplayed most of the vital aspects of development especially on the social sectors. **The United Nations Economic Commission for Africa (1994)** observed that, the ultimate goal of development in Africa is to ensure the overall well being of the people through a sustained improvement in their living standards. That, whatever the objectives Africa will have to pursue, be they economic, social, cultural or political, the human aspect of development is quite paramount. However, experience shows that the realization of this objective of raising the people's welfare has become indeed elusive given that most of the externally imposed policies adopted by these countries underplays the development of the social sectors.

Aina(1995) observes that, the colonial style of economic development implemented in Africa produced structural economic imbalances that were intensified by post-independence policies. These findings revealed that, the SAPs that were supposed to hold them in check were

unfortunately, unable to contain them. In addition, neither did the SAPs restore the balance and solvency of states, nor did they contribute positively to development. As a matter of fact, the report noted that, SAPs generated adverse effects and weakened the states and their internal capacities. Hence, to Aina, a re-orientation of the SAPs toward the creation of favourable conditions for a sustainable development calls for a change of approach.

1.1: PROBLEM STATEMENT

This study seeks to examine the impact of the liberalized agricultural markets on human welfare in Koibarak Location of Marakwet District.

Since independence, the Kenya government's explicit and consistently pursued objective has been the betterment of its people's welfare through alleviation of illiteracy, disease and poverty among its people. To achieve this, the government has implemented various policies at the national level by use of its 5-year development plans. The implementation of the policies has been in different sectors of the economy including agriculture- the backbone of the economy. Agricultural policy formulation is also developed in Sessional Papers that are normally written in response to implementing problems such as drought and international shocks or adjustments. These policies have been well

articulated and as **Mosley (1986)** puts it, "there are those who believe that Kenya has had some of the best agricultural policies in Sub-Saharan Africa". However, experience testifies that, despite of this praise and after many years of independence coupled with its abundant natural resources, Kenya's sustained effort to adopt a variety of development policies and programmes has made little, if any, headway. Such programmes have ranged from the Integrated Agricultural Development Programme (IADP) to the recent District Focus for Rural Development Programme (DFRDP).

For instance, the food supply situation is getting worse and hence, the country has become a significant food importer of basic foodstuffs, notable **cereals (Khalil, 1993:5)**. Famine food relief handouts from the government and many non-governmental organizations, including churches, has become more or less the main source of food in almost all parts of the country. Hunger and starvation has not only resulted from the physical absence of food, but in some areas, it has also come about due to low incomes, especially among the poor. This is a common phenomenon among Marakwet people as observed by the current **Keiyo/Marakwet District Development Plan (1994/96:62)**. The plan notes that, although more arable land has been put under crop production, food production has been on the decrease due to such factors as unfavourable weather conditions, curtailed food production,

poor methods of farming, resulting in rampant food shortages. The situation has further been worsened by the fact that most farmers in the district are subsistence farmers with little income that cannot allow them to buy enough food or improve their living standards.

In Kenya, the majority of the people live in the rural areas, are small holders, and self-employed, and derive their incomes from producing and marketing food and cash crops. For any development to be achieved in the country, its development programmes or strategies should be designed in such a way that it improves the economic and social life of these specific groups of people- the rural poor and this is through agricultural development. However, from the foregone state of affairs, it is worthwhile to note that the problem of deteriorating human welfare in Kenya is affecting many regions especially the rural areas like Koibarak in Marakwet district. Based on this background, the imposition of market liberalization on the agricultural sector that is the people's backbone in terms of food provision, employment opportunities, and hence income generation, is quite uncertain whether it is appropriate and timely. The crucial question is: Will the liberalized agricultural markets in rural Kenya (and, especially within the Marakwet district), help improve the people's human welfare, or perpetuate its deterioration?

1.2: OBJECTIVES OF THE STUDY

This study seeks inter alia:-

1. To assess the impact of the liberalized agricultural markets on the households' human welfare and in particular on:-

   (i) Their income distributions,

   (ii) Their food security status,

   (iii) their education status,

   (iv) their health status,

2. To understand and address other social-cultural, economic, demographic and physical environmental barriers to the improvement of human welfare status of the households in the region.

1.3: STUDY JUSTIFICATIONS

This study focuses on Marakwet district where it has been observed that population growth rate has been steadily rising since the 1980's and was estimated to have reached 241,951 in 1993, and is projected to be growing at 3.53% per annum and will reach 250,493 in 1994 and 268,484 by the end of the plan period. Hence, with such an increase in population, the development plan addresses itself to such areas as the provision of social/welfare facilities such as shelter, education and health, the need to ensure that enough employment opportunities are created, and that food

security within the district is assured **(Keiyo/Marakwet District Development Plan, 1994-96:9)**. This crucial need is thus the main theme of this study.

The open market policy, especially within the agricultural sector is an attempt to bring about development and change from the right place - rural areas. Rural areas are not only the right places of laying down the development foundation in as much as the majority of the country's population do live there, but also because they are endowed with the immediate natural resources needed to set off the development phase as compared to the urban areas which are on the receiving end. It is also an attempt to bring about an improvement on the economic and social life of a specific group of people - the rural poor. The study is thus hoped to open avenues on how to improve the well being of the rural inhabitants who are mostly the poor.

This study aims at adding to the understanding of the impact of SAPs on the social development of our country and developing countries as a whole, and to our understanding of the many factors involved in the country's realisation of human welfare development.

There is limited research on SAPs effect on agriculture despite the fact that most of the sectoral adjustment loans implemented to date are partly or wholly agricultural **(FAO, 1987:5)**. The study therefore attempts to survey the effect

of structural adjustment programmes on the agricultural sector so as to provide ways and means on how farmers from all levels can accommodate the programme to their own advantage.

1.4: SCOPE AND LIMITATION OF THE STUDY

There are multiple indices for evaluating the impact of the liberalized agricultural markets on welfare status. Those which have been used in this study include food security (or food availability and affordability), health, and education status of the respondents. It is worth noting that all the respondents interviewed were basically farmers although some engage themselves in other income generating activities.

To evaluate the impact of the liberalized agricultural markets on food security, the following variables were measured:- input (or factor) prices in relation to output(product) prices of the respondents' agricultural sector, retail prices of other food necessities purchased by the respondents households in the shops such as maize (posho and grain), beans, wheat flour, sugar, milk(0.5) tetrapack, rice, and the like, self sufficiency in food, and food imports or famine food relief from the government or non-governmental organizations(e.g.church) before and after the liberalization of the agricultural markets. However, it is

important to point out that maize is the main food crop and income generator in the region. The production levels of the other food crops are below subsistence level. There are also cash crops like Pyrethrum and Coffee that are grown by few individuals and on very limited scale and hence, do not contribute much towards the respondents' income levels. Hence, the net monthly incomes of the respondents from the agricultural sector are derived mainly from maize grain sales.

To determine the food security status of the respondents' households, their staple food self-sufficiency and affordability were examined. Thus, the study does not examine the per capita food nutritional status of the households.

The health status of the respondents' households has been analyzed in terms of disease prevalence (i.e., morbidity), Staple food self sufficiency, health affordability, sewerage system and disposal of litter, existence of own toilet and water source among the respondents' households both before and after the liberalization process. The study does not therefore look into the households' food nutritional status, the physical and the mental status of household members.

The households' primary, secondary and post-secondary enrolment and retention rates, the households' accessibility

to and quality of education facilities and services measured the impact of the policy on the households' educational status.

Change on the respondents' income distributions due to the implementation of the policy is measured by:- the respondents' net monthly agricultural income changes in the post-liberalization period in relation to the pre-liberalization period, and the trend of this income distribution across the population.

This study also discusses other constant factors affecting human welfare status among households in Koibarak Location such as their social-cultural, economic and demographic factors and the physical environmental conditions in the region. The information collected from the households through the respondents included the households' family sizes, accessibility to agricultural loans and credit facilities, accessibility to agricultural education and extension services, cultural factors, existing physical environmental conditions and the methods of farming they use.

CHAPTER TWO

LITERATURE REVIEW

2.1: SAPs: AFRICA AND OTHER DEVELOPING COUNTRIES

Many countries faced with harsh economic circumstances borrow from international financial institutions principally the World Bank (WB) and the International Monetary Fund. The conditionalities attached to the loans entail what have been termed as Structural Adjustments Programmes (SAPs). The World Bank's definition of SAPs refers to macro-economic policy packages that seek to achieve both a long-term macro-economic stabilisation and a structural transformation of the economy by addressing the fundamental causes of the country's economic crisis **(Ali, 1993:33)**. Stabilisation measures are short-run in nature, focusing in bringing the level of aggregate demand in line with level of the output and external finance. In most cases, a reduction in the fiscal deficit and currency devaluation is required to restore the internal and external balances. Structural adjustment measures are long-term in nature focusing on creating a more appropriate incentive framework and on strengthening institutional set-ups. The measures involved include the deregulation of the domestic goods' markets (such as liberalized agricultural markets), employment, savings and investment (ibid.).

According to a **World Bank (1984, 1989a)** report, "Africa's poverty results primarily from hindrances, especially government policies, that, in both domestic and international markets, block the optimal operation of competitive forces". However, the IMF doctrinaire conviction is that, Africa's economic crisis can be redressed by unleashing the market forces to independently allocate resources without any hindrances through state intervention. Market liberalization refers to the democratisation operations either locally, nationally, and even internationally. It refers to a free (or open) and competitive market situation whereby there is no any state intervention in its operations. It is guided by the principles of:-(i) the willing seller and the willing buyer - price mechanisms, (ii) the free movement of goods and services from a region of high supply to a region of deficit (or shortage), and, (iii) free factor mobility to those areas or sectors it can fetch maximum profits.

According to **Khalil (op.cit:11)**, Structural Adjustment Programmes have tended to be viewed as economic exercises; hence the basis of the strategy is "trickle down" economics which implies that the social and political realities have tended to be ignored and the consequences for different groups of people have not been thought through. That is, the human condition in the process of economic recovery and

development is thus hardly given due attention. It is the consensus of many rational analysts that, the most vulnerable victims of the decline in the social sector due to the SAPs' effect are the lower social classes in society

As observed by Southern Africa Political Economic Monthly- **SAPEM (1991:13)**, the deregulation of prices and removal of food subsidies in Mozambique as a result of SAPs has meant diminished access to food. It observed that, with the higher prices, many urban workers and rural dwellers could no longer purchase the quota available per family. The Consumer Co-operative Network that has been part of the rationing distribution system finds itself in a cash flow crisis, without enough money to purchase the quantities of goods from the wholesalers to which their members are entitled through the ration's system. In 1988, the prices of rice, maize and sugar increased by between 300 and 500% and the wage increase of 50% clearly could not cushion the effects of the hikes in food prices **(ibid.)**.

Thus, it is the contention of many analysts that, in a situation where the state provides a subsidy to vital economic sectors and social services and commodity prices are controlled, the social cost of development, particularly to the lower strata of society, are relatively lower than in a completely privatised and laissez-fair economic system. As **SAPEM (ibid.)** notes, if the state cannot guarantee social

welfare due to the IMF austerity package, then the welfare costs rest largely on the people. Most of these people are unemployed and in the context whereby social security is not an established practice as in Africa, adjustment costs translate into mass poverty and marginalization of the lower social classes from the means of production.

The monetarist approach to Africa's economic crisis underplays the centrality of the human factor in economic development by assuming that fiscal, trade and price balances play a role in increasing production and investment **(Khalil,1993:15)**. However, **SAPEM (op.cit.)** observe that the implementation of SAPs tends to widen the gap between the poor and the rich. For instance, in agriculture, rich farmers benefit while the poor ones are squeezed by the rising input prices; and in urban areas, the merchants benefit as they can rapidly shift the burden to the consumers. On the whole, long-term investment declines, leading to declining output. For example, certain policies such as currency devaluation and high interest rates have negatives impacts on production.

According to **Ali (op.cit.34)**, the aim of SAps is generally to get "prices right" by removing all types of distortions in the domestic price structure. The market liberalization process was especially aimed at: stabilising a given economy by adjusting demand to available resources;

to promote economic growth through changes in resources; to promote economic growth through changes in relative prices; and to reduce internal and external deficits, achieving efficient allocation of resources and reducing the role of the state in the economy (i.e., state's involvement in production, marketing, distribution and exchange). However, **SAPEM (op.cit.18)** observe that, for the urban and rural poor, real wages and incomes tend to decline due to rising inflation. That, the introduction of user charges-school fees, hospital fee further reduces the income of the poor. And the removal of subsidies on basic commodities will only help to further institutionalise poverty and extend the scourge of malnutrition particularly in the high-density urban suburbs. In order to minimise the suffering, households adopt multiple modes of earning a living, and that this leads to a growth of the underground informal sector of the petty trade and production, augmented by large numbers of redeployed or retrenched workers. And that the worsening living standards are evidenced by rising malnutrition especially among children, which leads to high infant mortality. Budget cuts are reflected in the declining quality of services such as overcrowding in schools and hospitals.

Furthermore, the report observes that education and health services are provided at low cost recovery due to

reduced state subsidies and hiked financial charges. Net incomes decline substantially as a result of spiralling inflation, freezing of wage investments, increased income numbers of employees, particularly in the public sector, are retrenched so as to reduce public expenditure as one of the SAP austerity measures. This retrenchment process runs in the face of the IMF's statutory mandate to promote and maintain a high rate of employment and real income, and to contribute to the productive potential of all its members. And that the general outcome of the Fund's disregards for social-political variables in its economic recovery programmes has increased social inequality and political unrest.

The most vulnerable victims of the decline in the social sector, particularly unemployment due to the SAPs' effect, are the lower social classes in society who include women in general and peasant women in particular; the unemployed youth; poor peasants; bureaucrats, salaried staff in the private sector and ordinary soldiers and members of the security forces. The adjustment programmes have led to social and political instability in such countries as Zambia, Nigeria, Ghana and Tunisia; and in others, ruling parties or governments have become unpopular.

Hence, from the above observations, African countries implementing SAPs have experienced a decline in the social

sector in so far as provision of goods and services is concerned. In other words, the human condition is underplayed in the process of economic recovery and development in the sense that, it is hardly given due attention. In practice, **SAPEM (ibid.)**, in trying to show the strength of these SAPs error, observe that, "this prescribed 'medicine' has been bitter to swallow, and in some instances, has actually worsened the condition of the 'patient'". That, it certainly has not resulted in a spectacular recovery of the "structurally adjusting" countries, and that this has inevitably raised the question whether there might not be something fatally flawed in the prescribed package of reforms.

However, studies have shown that, increased agricultural productivity in Africa and third-world countries in general, can only be achieved through a good network of the extension services to farmers, a good transportation system, improved marketing and distributive facilities of the crops produced, provision of loan and credit facilities, satisfactory producer prices and a good reception to new agricultural innovations **(La-Anyane, 1984)**. From this observation, the success of any agricultural policy will be determined by the presence of the above-mentioned supplementary factors, of which **La-Anyane(ibid.)**

notes to be lacking in Africa and the developing countries as a whole.

Furthermore, the SAPs' advocates argue that, the social costs are temporary and somewhat unavoidable **(Khalil, op.cit: 15, SAPEM, op.cit:19, 38)**. But nevertheless, immiseration of the work force through SAPs may not be an ephemeral process and neither it is unavoidable. SAPs induced impoverishment among the lower social classes can last even beyond the life span of the programme. As **SAPEM (ibid.)** observe, "to the extent that SAPs services the interests of the upper social classes in Africa, it sets in motion increased marginalisation and alienation of the lower social classes which could be perpetuated long after the programme through established economic structures". Also, to argue that SAPs' social costs are unavoidable is rather mendacious. Social costs can only be avoidable if SAPs were to reflect a balanced mix of social-political and economic variables of Africa's economic crisis.

Thus, from the above observations, the dominant human welfare development problems of Africa have been explained by different analysts in different perspectives. On the one side are those, mostly representing African states and developing countries as a whole and their supporters who place the blame on imperialism and the international capitalist system, or more specifically, on the policies of

the IMF and World Bank. The other argument espoused most particularly by the World Bank and IMF is that, high population and low productivity, and poor infrastructural facilities compounded by the policies of the African governments themselves are primarily to blame. But one important example of the agreement among all official decision-makers from IMF bankers to radical African leaders, is the need to modernise agriculture through technologies, inputs and equipment derived, if not imported, from the advanced western (or socialist) countries. In other words, it is only through the complementation of the necessary infrastructural facilities to the farmers (or citizens) and only an internally evolved and debated economic recovery programme that can engender social guarantees for, and protection of, the poor and vulnerable groups in society. This is what has been vigorously advocated and canvassed by UNICEF and is the linchpin of what has come to be known as "Adjustment with human face".

This theme of adjustment as observed by **SAPEM (ibid.)**, has recently been corroborated by the United Nations through the 1988 Khartoum Declaration. In the African context, the UN Economic Commission for Africa, in popularising the thesis of "adjustment with a human face" in its recent publication entitled *"An Alternative Framework for Adjustment with Transformation"*, it notes;

"The social dimension of adjustment with transformation is a prominent focus of the alternative framework which is based on employment generation for the majority of the population, equitable income distribution especially to households and vulnerable groups and the satisfaction of the essential needs of the people. The critical focus of the framework for adjustment with transformation is that of more human-centred development process in which productive forces are given a prominent role and resources are used so as to bring about the transformation of the Africa economy from a primary exchange economy to a productive economy ***(SAPEM, 1991:19-20)".***

Thus, the importance of the Alternative Framework for Adjustment with Transformation as suggested by ECA lies in the fact that it stresses the centrality of the human factor in Africa's economic recovery programmes. It is clearly in line with the 1980 "Lagos Plan of Action" adopted by the African Heads of States which noted, among other things, that, "since Africa's greatest asset is its human resources, full mobilisation and effective utilisation of the labour force (men, women and youth, both trained and untrained) for national development and social progress should be a major instrument of development"**(ibid.)**. Both of the above strategies have stressed the following priorities for Africa's economic recovery and development:- the rehabilitation and increased resilience of food and agriculture sector and strengthening of related sectors; and they also put more emphasis on increased employment, labour productivity and concerted efforts to arrest labour migration, particularly brain-drain from the continent. It also emphasises the need for complementary factors such as the provision of good transportation, good extension services, credit and loan facilities, receptive population to new ideas and the like, all of which would help in enhancing the productiveness of any new agricultural policy.

KENYA

As **Khalil (1993:1)** observes, "SAPs have been conceived for a long time as a ghost animal deliberately unleashed by the World Bank to punish socialist countries like Tanzania and Zambia. It was a distant animal as far as many Kenyans were concerned, but the animal and its rumblings crossed into our borders with full impact in recent months. And that, the effects, to say the least, have been devastating".

Structural adjustment of the Kenyan economy, as a public response to the country's macro-economic crisis began with the launching of the 1979/83 Development Plan and Publication of Sessional Paper No.4 of 1980. Prior to that, the response took the form of financing the deficits through borrowing and implementation of demand restraint and export promotion. The demand restraint measure is based on imports squeeze including foreign exchange rationing, price controls and wage squeeze; while the export promotion measures include such incentives as provision of production credit, infrastructure and tax relaxation. To safeguard the small income earners and the poor, and some vital sectors of the economy such as agriculture, education, and health sectors the state pursued the following: it controlled the consumer and producer prices of certain goods and services such as food, school fees, medical fees and the like by deciding on maximum fees to be charged; it also provided subsidies to

the producers of these goods, and services to compensate on the low-charged prices through such activities as provision of credit facilities, establishing marketing boards to ensure commodity price stability even during excess supply period, import restrictions to protect local industries, provision of roads and storage facilities and the like. In the areas of health and education, the government provided free primary education and free medical care in government hospitals, all geared towards the accessibility of all members of the country (i.e. the poor and the rich). From all these government efforts, it is evident that initial response to the crisis did not entail any adjustments being made to the existing development model and hence to the structural characteristics of the economy.

Hence, the launching of the 1979/83 Development Plan and Publication of Sessional Paper No.4 of 1980 marked the beginning of the structural adjustments of the Kenyan Economy. Here, a gradual structural change of the economy was recommended implying reform of the development model to make it pro-market, pro-private sector, and pro-liberalized open economy. In Kenya, the process of implementing the saps' policies has been both cautious and gradual, explaining the absence of the political troubles their introduction has sparked off elsewhere **(Khalil, op.cit.)**. At present, the adjustment is almost complete with the recent

being nearly full liberalization of the agricultural sector (i.e., in terms of movement of grains such as maize) and the decontrolled foreign exchange sector.

LIBERALIZATION OF AGRICULTURAL MARKETS

Reforms of agricultural pricing and marketing systems are underway across the African continent. Almost all countries have taken steps to ensure those producer prices for Africa's major agricultural export track world prices more closely. According to world studies published in the late 1980s, the main problems facing Kenyan agriculture lay at the marketing level; And that prices and payment systems were distorted by policy, and marketing infrastructure necessary for private sector participation was underdeveloped (**Egerton University PAM, 1995:41**). Thus, in a few cases, most African countries have abolished marketing boards; more frequently, they have allowed the private sector to compete with the marketing boards, or they have adopted pricing formulas with a clear link to market prices. Widespread price controls are therefore a thing of the past. By liberalizing agricultural markets so that private agents can compete with parastatals and thus link producer prices to world market prices may be useful transitional mechanisms in the near future. Thus, hopefully, it is expected to help farmers reap the full benefit of the exchange rate

deprecations, which might otherwise merely shore up the financial profitability of parastatals.

However, there has been good progress in liberalizing the marketing of the major staple food crops that were subject to extensive government control before the reforms. Many of the marketing reforms legitimised the existing situation, thus reducing barriers to private sector entry. The active private sector is expected to produce a more integrated market. Liberalization is supposed to create lower prices in surplus areas and higher prices in deficit areas and thus, reduce differences between the two regions. Another effect of liberalization is on price movements overtime and storage of produce. However, studies have shown that in maize surplus areas such as Trans-Nzoia, Uasingishu, Keiyo/Marakwet, Nakuru and Nandi, the expected price increases with the liberalization process was never realized but instead, the cost of production was rising in all regions because of the increase in prices of intermediate inputs like fertilisers and other agro-chemicals. Cost of land preparation also increased because the costs of diesel, tractors and spare parts also increased **(Egerton University PAM, 1994)**. This negative impact could have been even worse in Koibarak Location road infrastructure is in poor state for the smooth operation of the private sector.

SAPs IMPACTS ON KENYA

As **Khalil (ibid.)** observed, "the first half of 1993 witnessed semblance of a sustained and intellectual exchanges, and Kenyans for the first time have been exposed to a regular diet of reform economies. And that more intermediate to the sensibilities of many Kenyans, has been the adverse impact the strategy has brought on the livelihoods of middle and lower income families in our country". The elements in the typical prescription defined by the World Bank and the IMF includes devaluation, price decontrols, privatisation and deregulation of job security and minimum wages, and open liberalized markets for tradeables. In addition, the state is required to eliminate budget deficits, trim public service employment and cut back on such crucial social services as education and health.

ECONOMIC IMPACTS

Output Structure and Growth

There was deceleration in overall and sectoral growth rates of the economy. By 1980, the overall real growth rate of the economy, the industrial and agricultural sectors declined to 2.4% and 3.7% respectively. Due to rapid growth in population recovery on real per capita, GNP has been minimal, averaging less than 1% over the period having recorded an average overall growth rate of about 5% p.a.

Table 2.1: Nominal and Real (1982 Price) GDP Growth Rates in Kenya 1980-97

Period	Real GDP (%)	Nominal GDP (%)	Real GDP per capita (%)
1980	2.4	12.2	-1.6
1981	5.3	16.2	-1.3
1982	3.4	12.2	-2.9
1983	3.9	12.3	-0.5
1984	0.9	5.3	0.0
1985	4.8	13.5	0.9
1986	5.5	16.2	1.5
1987	4.8	11.1	0.9
1988*	5.2	16.0	1.3
1991	2.2	15.5	-1.3
1995	1.9	15.4	-0.4
1997	5.9	14.7	-0.3

*-Provisional

Source: Republic of Kenya - Economic Survey, 1980-97.

Furthermore, the 1992/93 Economic surveys observe that, there was poor performance of the agricultural sector in 1992 and 1993 mainly due to poor weather conditions and high agricultural farm input costs that made it particularly difficult for farmers to purchase adequate fertilizers and chemicals for planting, top-dressing and spraying. That, the high input prices resulted from complete liberalization of agricultural inputs led to a decline on the total hectarage planted to a number of food-crops and some temporary industrial crops by small holders, and this has affected the country's food reserves and forced the country to import foodstuffs to supplement local production. These Economic Surveys continue to note that, in 1993, the value of total recorded-marketed production rose by 63.5 % compared to 1992. This sharp rise in value despite the decline in

production is mainly attributable to high commodity prices resulting both from massive devaluation of the Kenya shilling against major world currencies, affecting exported agricultural commodities, and internal decontrol of prices of commodities, especially of cereals, during 1993. In other words, the complete liberalization of marketing of various agricultural commodities has allowed farmers to negotiate prices above the set floor prices. The surveys note also that, the situation worsened for farmers who strived to sustain farming enterprises while faced with increased costs of production as well as increased cost of living as reflected by the increase in the index of purchased consumer goods. Also, livestock and livestock products sector recorded a growth rate of 12.8% in terms of value of marketed production during 1993 compared to a decline of 0.2% in 1992. This is partly due to price decontrols of some of the livestock products, producer price adjustment of livestock products especially milk and deregulation of meat prices and the desire by farmers to sell animals due to drought. Thus, liberalization of milk pricing and marketing has promoted an enhanced diversion of raw milk from Kenya Co-operative Creameries (KCC) to other market outlets.

Wage Employment

The minimal changes in the structure of output have in turn led to marginal changes in the structure of especially wage employment in the country. The public sector alone accounted for about 50% of total wage employment throughout the period. However, growth in public employment declined from about 64% during 1964-73 period to 43% during the 1974-80. In the 1980's, growth wage employment in both sectors has been stagnating.

Table 2.2: Size and Structure of Wage Employment, 1979-97

Year	Total(%)	Private(%)	Public (%)
1979	100.0	56.3	43.7
1980	100.0	53.1	43.7
1981	100.0	51.8	47.2
1982	100.0	51.2	48.8
1983	100.0	51.7	48.3
1984	100.0	51.6	48.4
1985	100.0	51.1	48.9
1986	100.0	50.1	49.9
1987	100.0	50.1	49.9
1988*	100.0	49.6	50.4
1991	100.0	48.9	51.1
1995	100.0	55.7	44.3
1997	100.0	57.5	42.5

***- Provisional**

Source: Republic of Kenya, Economic Survey, 1979-97.

At the sectoral level, wage employment in agricultural sector in 1982 declined by 5.2% while all the other sectors recorded varying growth rates over the 1980s. However, the public sector reform programme has led to reduction of the public sector through trimming of the civil service and continued privatisation of non-strategic public enterprises. The reforms' efforts are reflected in the declining share of

public sectors' employment in the modern sector. The share has declined steadily from 51.1% in 1991 to 46.5% in 1993 and further to 42.5 in 1997. Further, the number of persons employed in the sector declined from 700.9 thousand in1996 to 7000.6 thousand in 1997 except only in teaching and medical departments which indicated an expansion.

Table 2.3: Growth in Wage Employment in Selected Sectors 1979-1997(%)

Year	Agric.	Manuf.	Constr.	Trade and Tourism	Govt. Services
1980	10.0	1.3	-15.2	2.6	13.9
1981	1.7	3.4	13.2	2.9	2.4
1982	-5.2	0.3	-1.4	3.1	7.4
1983	3.1	1.3	0.3	6.7	5.3
1984	2.0	2.8	-22.4	5.3	3.0
1985	2.2	3.6	1.4	5.5	7.8
1986	3.1	3.6	11.8	5.0	3.0
1987	3.3	2.9	4.4	5.1	3.8
1988	5.3	0.4	8.8	1.0	5.0
1991	0.8	0.6	1.7	2.9	3.3
1995	4.6	3.7	3.8	6.2	0.4
1997	0.9	1.6	1.6	3.5	0.2

Source: Republic of Kenya, Economic Surveys, 1980-1997

Inflation

The inflation rate that averaged a low 3% per annum during the period 1964-73 and rose double digits (averaging 11.3%) in 1980s. In 1986, this inflation rate declined to 5.7% due to the credit squeeze introduced then. With the relaxation of the credit squeeze policy, the inflation rate has again risen to about 10% and is thought to have even risen further in the past two years (i.e. 1992 and 1993) due to the widened scope of the economy's structural adjustment.

Table 2.4: Trends on Out-patient Morbidity in Kenya,1981-87*

Source of morbidity	1981	1982	1983	1984	1985	1986	1987
Acute respiratory infection	16.7	19.9	5.8	19.4	21.4	0.7	21.01
Diarrhoeal infections	6.7	5.9	20.1	6.7	5.8	5.4	4.7
Measles	10.8	0.9	1.1	0.7	0.7	0.6	0.6
Malaria	22.0	20.0	23.6	25.4	24.3	24.0	23.4
Intestinal worms	5.0	4.2	5.5	5.5	5.4	4.9	4.7
Malnutrition	0.5	0.6	0.5	0.5	0.6	0.5	0.4
Skin diseases including ulcers	6.0	5.9	6.5	6.2	6.5	6.7	7.5

NB. Figures in the table represent percentage share in total outpatient morbidity.

Source: Republic of Kenya, Annual Health Statistical Reports,1981-87.

Nutritional Status

In the study, data for assessing changes in the nutritional status of Kenyans was only available for stunting, food security, per capita nutrients' availability and affordability. From the CBS Survey data, the proportions for all Kenyan children who were stunted rose from 24% in 1977 to 27% in 1979, and to 28% in 1982, a trend likely to have continued in the latter part of the 1980s and 1990s. Though improving slightly in the non-drought areas, the Kenya food security situation was poor with self-sufficiency in cereals and sugar being far from being reached throughout the period.

The situation as per capita availability of food nutrients(i.e.calories and proteins), on the other hand, remained fair throughout the 1980s being estimated marginally above FAO/WHO recommended averages. Household

affordability of food appear to have declined throughout the 1980s and may be even 1990s, given trends in per capita incomes and food prices(inflationary in nature) at the time. While the economy recorded significant recovery as measured by the overall GDP growth rates, per capita incomes only improved marginally, implying low household income, and hence, low purchasing power. Improvement in farm households' purchasing power implied by the rising index of producer prices was possibly neutralised by the food price inflations of the period. The impact of food price inflation on the purchasing power of wage earners (with fixed nominal wages) could be expected to be considerable.

Table 2.5: Percentage of Children (1-4) yr. Old Stunted Height for Age in 1977, 1979 and 1982 by Province

Province	1977		1979		1982	
	%Stunted	Mean (CMS)	%Stunted	Mean (CMS)	%Stunted	Mean (CMS)
Central	26	93.6	21	94.5	24	94.0
Coast	(14)*	96.3	40	92.9	39	92.2
Eastern	34	92.8	24	94.6	27	93.4
Nyanza	21	94.7	34	93.6	33	93.3
Rift Valley	25	94.0	24	94.2	22	94.9
Western	16	95.0	24	94.0	30	92.9
National	24	94.1	27	94.5	28	93.7

*** Data unreliable due to small sample size**

Source: Republic of Kenya, Third Rural Child Nutritional Survey, 1982. Nairobi 1983.

Table 2.6: Daily Per Capita Nutrient Availability, 1965-1984

Period	Calories	Protein
1965-1970	2,412	62.9
1971-1975	2,453	65.6
1976-1980	2,395	64.6
1981-1984	2,428	64.8
Average 1965-1981	2,428	64.8
FAO/WHO recommended average	2,362	46.0

Source: Kenya Government, Statistical Abstract, 1965-1984

Table 2.7: Food Imports in Kenya, 1978-1986

Year	Maize	Wheat	Rice	Sugar-cane
1978	18	211,527	241	12,504
1979	48,462	323,879	1,239	1,751
1980	49,289	77,394	4,573	1,756
1981	139,326	89,056	11,880	2,216
1982	81,946	n.a.	44,768	2,402
1983	149,906	405,445	507	1,503
1984	143,793	125,454	562	39,121
1985	115,281	700	61,745	126,209
1986	n.a.	n.a.	n.a.	n.a.
1987	217,857	39,129	39,129	49,100
1988	n.a.	n.a.	n.a.	n.a.
1991	n.a.	48,697	29,363	46,700
1995	n.a.	364,100	n.a.	17,200
1997	1,100	n.a.	n.a.	n.a.

n.a - Not available
(Figures inside the table represent imports)
Source: Kenya Government, Statistical Abstract, 1978-86

Table 2.8: Annual Information Rate of Official Retail Prices of Selected Food Commodities 1982-1991(%)*.

Food Commodity	1983	1984	1985	1986	1987	1991
Maize (posho)	19.8	20.9	47.8	13.1	0.0	5.14
Maize (grain)	2.2	17.2	26.5	4.7	0.0	6.50
Milk (1/2 lt)	9.2	15.0	12.2	9.1	0.2	3.90
Beans (mixed)	-5.6	13.4	62.1	-6.9	15.5	11.99
Wheat flour	7.1	13.8	14.2	10.2	8.4	18.04
Sugar	9.6	9.5	4.3	2.5	9.7	9.40
Consumer Price Index*	n.a.	10.2	10.7	5.7	10.7	10.30

*** Based on Data for City of Nairobi only**
Source: Kenya Government Statistical Abstract, 1982-1991.

Resource Mobilization and Capital Formation

The investment balance(resource gap) continued to rise in the 1980s. The share of gross capital formation in GDP declined from 35.3% in 1980 to 19.2% while the domestic and foreign savings' rates declined by 6.2% and 10.8% respectively, implying also a worsening resource gap. The

efficiency of investment estimated at 7.9% declined in 1981 to 6.4% and recovered significantly in 1984 and 1985.

Table 2.9: Inflation Trends in Kenya, 1964-1997 (1982=100).

Year	GDP Deflator	Consumer Price Index	Inflation Rate(%)
1980	82.6	72.6	13.8
1981	91.2	81.8	11.8
1982	100.0	100.0	20.4
1983	110.0	114.6	11.9
1984	122.8	125.0	10.2
1985	138.8	138.9	10.7
1986	144.3	144.3	5.7
1987	152.0	151.8	7.1
1988	156.0	164.4	10.7
1991	171.2	172.0	13.7
1995	203.0	211.8	9.0
1997	208.3	213.9	11.2

(Based on data from Nairobi only).
Source: IMF, International Financial Statistics Year Books, 1964-97.

External Trade

The degree of openness of the economy(as a percentage merchandise total exports and imports in GDP) was estimated at over 40% throughout the 1980s. It however declined continuously during the 1980-83 period from 56% to 40.6%, but increased to 46.8% in 1984 due to increase in food imports caused by the widespread drought. The degree of openness increased very fast thereafter possibly due to the trade liberalization and export promotion policies being implemented. Coffee and tea continued to dominate the structure of Kenya's exports in the 1980s. The share of coffee that was estimated at more than 20% throughout the

1980s rose to a peak value of 40.6% due to the "coffee boom" of 1985/86 while that of tea remained above 11.9% throughout the period reaching a peak of 25.1% 1984. The growth in the real value of exports of these showed a similar pattern.

The structure of imports has continued to be dominated by intermediate inputs and machinery and equipment to support import substitution industries. Their combined share remained over 80% throughout the 1980s. The share of food imports that increased during the drought periods has generally declined during the period.

Balance of Payments

The country's current account deficit position generally improved during the 1980-96 period, having declined from K# 329 million in 1980 to K# 36 million in 1986. It deteriorated sharply in 1987 reaching K# 409 million and recorded only a minor improvement in 1988 to K# 403.2 million. The situation was attributed to the differential growth rates of imports and exports following implementation of trade liberalization and export promotion policies.

IMPACT ON HUMAN WELFARE

Health Status

From the available data, trends in CDR, IMR and U5MR and life expectancy at birth reveal that, they stagnated during the adjustment period, implying declining chances of survivability of Kenya children.

Table 2.10: Trends in Mortality Indicators in Kenya,1984-87.

Year	CDR	IMR	U5MR	Life Expectancy at Birth
1948	25	184	260	35
1962	20	120	200	44
1969	17	119	163	49
1979	14	104	138	54
1987	13	86	115	60 and over

Source: Hill, 1987.

Declining share of morbidity due to immunizable diseases could have neutralised the deceleration trend. From the morbidity data, it was further revealed that malaria continued to be the major source of morbidity in Kenya throughout the 1980s, only declining marginally in some years. As Odegi-Awuondo, Namai and Mutsotso(1994:23) observe, "Lack of adequate food therefore, results in malnutrition and the prevalence of diseases especially among children. And that, in rural Kenya today, kwashiorkor and marasmus are common due to hunger. Besides, absence of proper and adequate food intake makes the body generally weak and susceptible to infection."

Educational Status

The situation of basic education status in the country as measured by changes in adult literacy rates, pre-primary and primary enrolment and retention ratios, accessibility to and quality of educational facilities and services only marginally worsened during the 1980s. This could be explained by the government's cuts on educational expenditures and the introduction of cost-sharing through the user fees both in pre-and primary schools,(National Development Plan, 1984-88).

Water and Sanitation

Though data on accessibility of Kenyans to clean water and sanitary means of disposal of litter is lacking, with austerity measures in place, chances of expansion of the present levels of coverage appear low(Ayako, 1990:31). Furthermore, existing water schemes, especially those in rural areas, operate below capacity due to inadequate budgetary outlays for operations and maintenance. All these imply the rural-urban imbalances in the development of water supply and sanitation facilities, and sewer worsened in the 1980s.

2.2: THEORETICAL FRAMEWORK

The theoretical framework that was utilised in this study is that of Rogers and Shoemaker. According **to Rogers and Shoemaker(1971:319)**,"Every programme of planned change produces social and economic reactions that run throughout the social structure". Thus, any new programme be it political policy, economic policy, industrial policy, agricultural policy or any form of social change whatsoever, goes through two phases-diffusion/adoption and finally consequences. The result of adoption of any new ideas or programme is what they call consequences of the new policy\programme and this is what the study was interested in.

In this study, liberalized agricultural markets' policy has undergone the first two stages of invention, diffusion and hence the third stage of yielding results(or fruits) -- the consequences(or impacts). Since the interest was mainly on consequences, the study attempted to measure(or assess) these consequences, and establish whether the market liberalization policy/strategy has met its intended goals or guarantees desired development.

Diag 1: Invention-------->Diffusion------>Consequences

2.3: CONCEPTUAL MODEL

In the views of Rogers and Shoemaker, the consequences (or results) of an innovation or new programme can be analyzed in three parts: the first part is what they call antecedents of innovation(i.e.,diffusion/adoption) which is the independent variable(s) that work through the indicants of the innovation/new programme(or the dependent variables) to influence the third part that is the consequences of innovativeness or of implementing the new programme. The consequences of a new programme can be functional or dysfunctional, positive or negative. In order to understand the success of adoption of a new programme and its appropriateness, we need to examine its consequences, the functional and dysfunctional results.

The Input-Output model below shows the household as both an economic production and social unit. It derives its inputs into the production process from natural resources(land, water, climate), human resources of the household, external resources(the community, hired labour, local and central government and the private sector) and technology(seed, fertiliser, irrigation, tractors etc.). It derives its strength from being a social unit bound into a cohesive whole by its blood-ties and relationships. So, the well being of the households' members is largely determined by the above mentioned social-economic factors.

The introduction of a new policy\programme into this social unit will definitely have an impact on the existing social-economic variables, which in turn can induce changes in the structure of the household. However, the introduction of liberalized agricultural markets(a new policy) in Koibarak Location(a dominantly agricultural region) is expected to trigger off some changes on the existing social-economic and physical characteristics of the region and ultimately a change in the well being of the people.

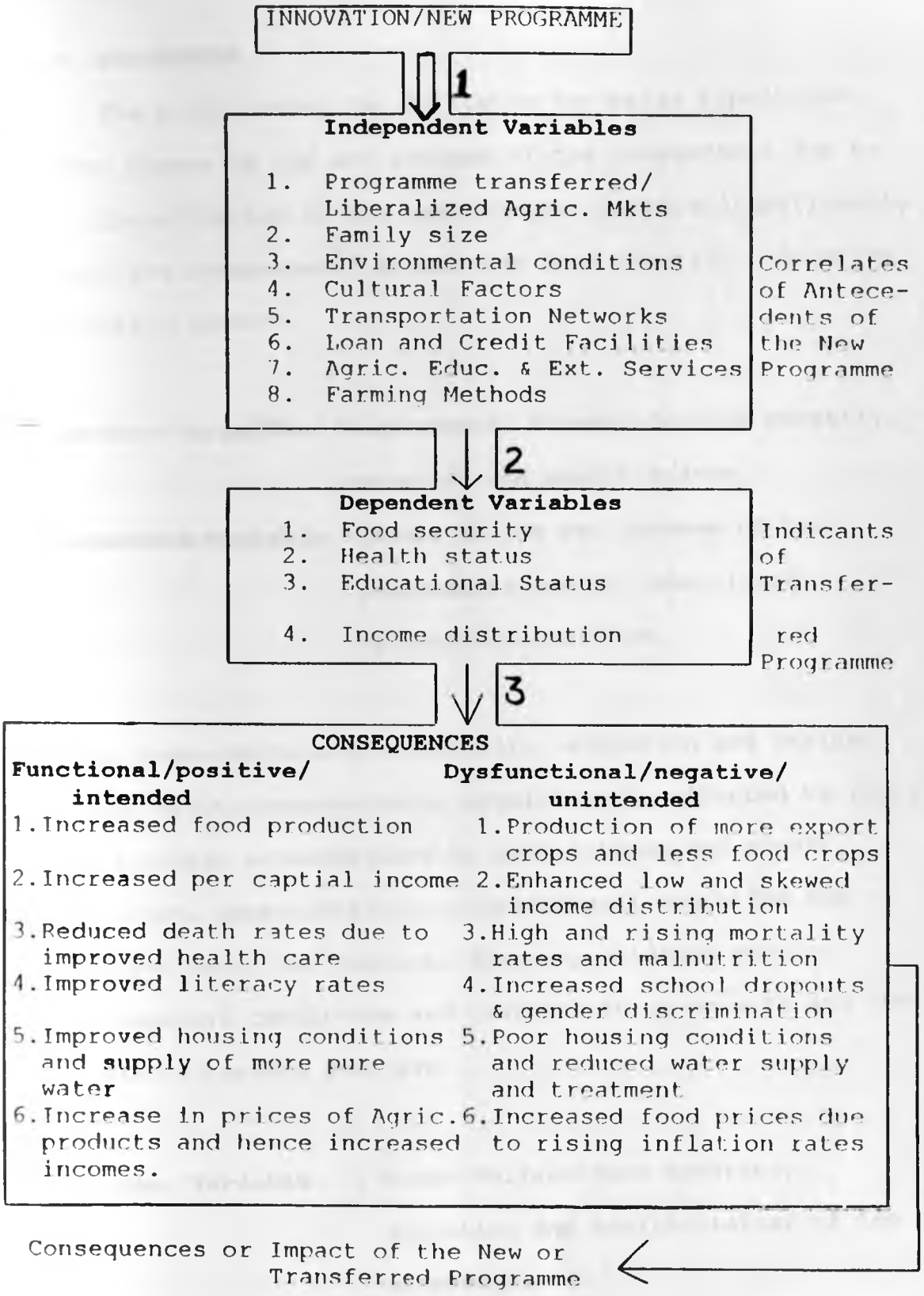
From Diagram 2 below, arrow 1 shows the introduction of the new policy of liberalizing agricultural markets to Koibarak Location. The introduction of this policy will automatically affect the peoples well being either through its effects on the existing social-economic factors or in collaboration with these social-economic factors and other physical environmental conditions in the region. For instance, free market economy may bring with it changes in transport costs, labour costs, agricultural input costs and so on which in one way or another will bring changes in agricultural production and income levels. In the same perspective, the natures of the constant or existing social-economic and physical environmental factors have a direct influence on the above mentioned costs and consequently have an effect on the agricultural production and income levels. The changes on the agricultural production and income levels

of the respondents as influenced by the liberalized agricultural markets, the existing social-economic and physical environmental factors will trigger off changes on their income distribution, food security, education and health status(dependent variables or indicants of the transferred programme) as shown by arrow 2.

The changes on these dependent variables could either be negative or positive and this is referred to as the consequences of the transferred programme or the existing social-economic and physical environmental factors as shown by arrow 3.

The above entire process is illustrated by Diagram 2 below.

Diag 2.


INNOVATION/NEW PROGRAMME
1
Independent Variables
1. Programme transferred/ Liberalized Agric. Mkts
2. Family size
3. Environmental conditions
4. Cultural Factors
5. Transportation Networks
6. Loan and Credit Facilities
7. Agric. Educ. & Ext. Services
8. Farming Methods
Correlates of Antecedents of the New Programme
2
Dependent Variables
1. Food security
2. Health status
3. Educational Status
4. Income distribution
Indicants of Transferred Programme
3
CONSEQUENCES
Functional/positive/ intended
1. Increased food production
2. Increased per captial income
3. Reduced death rates due to improved health care
4. Improved literacy rates
5. Improved housing conditions and supply of more pure water
6. Increase in prices of Agric. products and hence increased incomes.
Dysfunctional/negative/ unintended
1. Production of more export crops and less food crops
2. Enhanced low and skewed income distribution
3. High and rising mortality rates and malnutrition
4. Increased school dropouts & gender discrimination
5. Poor housing conditions and reduced water supply and treatment
6. Increased food prices due to rising inflation rates
Consequences or Impact of the New or Transferred Programme

2.4: HYPOTHESES

The study tested the following two major hypotheses:-

1. The change in the net incomes of the respondents due to the liberalization of the agricultural markets significantly affect the respondents' households food security, education and health status.

Dependent Variables: Respondents' Households food security, education and health status.

Independent Variable: Change in the net incomes of the respondents due to liberalized agricultural markets.

2. The Human Welfare(food security, education and health status) of the households is significantly affected by their family sizes, accessibility to public loans and credit facilities, accessibility to agricultural education and extension services, cultural factors, existing physical environmental conditions and transportation network and the methods of farming they use.

Dependent Variable : Human Welfare(Food security, education and health status) of the households.

Independent Variables: Family sizes, cultural factors,

environmental conditions, transportation network, accessibility to public loans and credit facilities, accessibility to agricultural education and extension services, land tenure system, and methods of farming they use.

2.5.1 OPERATIONAL DEFINITIONS OF VARIABLES

1. Food Security

This has been defined as the respondents' households staple food self sufficiency and ability to purchase it if not produced by the household. This is measured by the respondents' income levels and the amount of staple food they stored in respect to their family sizes. Every respondent's net monthly income before and after the liberalization periods was expressed as a percentage of Kshs.15,000(i.e.the average household expenditure in the region) so as to determine their levels of purchasing power. The levels were then described as follows: Low purchasing power(0-0.49), Average purchasing power(0.5-074), and High purchasing power(0.75-1.0). However, from the respondents' views, three(90kg) bags of staple food crops were enough to sustain an individual throughout the year. Hence, to determine the levels of food security of the households

based on the amount of staple food stored in relation to the households' family sizes, the total food storage is divided by the product of the respective household's family size and 3. The levels were then categorised as:- poorly secure(0-0.49), fairly secure (0.5-099), and highly secure(1.0).

2. Education

This refers to the formal education levels(no.of years in school) which is categorised as nursery school, primary school level(0-8), Secondary level(9-12), and college level(Over 12).

3. Income

This has been taken to mean the amount of monetary returns accruing to the households in form of salary, wages, or business returns. Remittance from sons, daughters, wife/husband, relatives and friends has also been categorised as income.

4. Health Status

This has been taken to refer to the state of the health factors of the respondents households in terms of their source of water, existence of own toilet, disease prevalence (morbidity), Sewerage system and disposal of litter, food self-sufficiency and Health affordability among the

respondents' households. Any respondent having all the above health factors positive health wise scores 6 out of 6 marks and vice versa. Thus, each respondent's total scores are divided by 6 to obtain the levels of their respective household health status. The levels were then described as follows:- Poor health status are those with less than 3/6(0-049), fair health status are those with between 3/6 and less than 4/6(0.5-047), and Good health status are those with greater than 4/6 (0.75-1.0). The assumption here is that the prevailing state of the above mentioned health factors would eventually translate their merits or demerits into an equivalent health status in the region.

5. Cultural Factors

These have been taken to refer to the respondents' attitudes towards the use of family planning methods and contraception in general. It also encompasses the respondents' attitudes towards gender education.

6. Transportation Network

This refers to the means through which the farm households use in transferring their goods and services from the farm or to the market. This is indicated by the number of good all-weather roads, railways, airstrips/lines and the like within the region.

7. Loans and Credit Facilities

These refer to formal financial assistance from the financial institutions or co-operatives or unions towards the improvement of the agricultural sector.

8. Methods of Farming

These have been taken to refer to the techniques employed by the farm households in their agricultural activities. This is indicated by the usage of machines or jembes or hoes, animals, fertilisers, officially certified or locally produced seeds, insecticides or pesticides and the type of cropping which could be mono-cropping or multiple-cropping.

9. Family Size

This has been taken to refer to the number of people who stay under the care of an individual household head. It consists of the respondent, his wife/wives, children and other relatives dependent on the respondent. In this study, it was perceived in three categories:- Large family(9 members and above), Medium family(5-8 members), and Small family(4 or fewer members).

10. Physical Environmental Conditions

These refer to the nature of the households' land holdings in terms of land topography.

11. Land Tenure System

This refers to the individual land ownership and usage rights in the region.

12. Human Welfare

This has been taken to mean food security, education, and health status of the households in the region. The human welfare status of the respondents' households was therefore measured using the households' food security, education and health status by by summing up the respective percentage levels of the food security, education and health status of the respondents' households and then dividing it by three.

2.5.2. DEFINITION OF CONCEPTS

13. Improvement

This has been taken to refer to a general upliftment of the social and economic conditions of the households.

14. Agriculture

This means the growing of crops and keeping of animals (or livestock).

15. Market

This is a point or place where sellers and buyers of commodities and services meet. It can be either an open space, inside a building or any other point or place where these sellers and buyers interact in the process of exchanging their commodities and services.

16. Agricultural Markets

These are either the input or output markets. Input markets refers to the places where the farmers purchase their farm tools, seeds, machines, services, equipment, and even labour that will enable them to produce some commodities or animals. Output markets thus refer to the places or points where the farmers sell their agricultural products.

17. Liberalized Agricultural Markets

This refers to the situation where farmers are at liberty to sell their agricultural products at any price they wish and at any place. At the same time, the owners of factors of production (or farm inputs) are also at liberty to sell their services and items to the farmer at the prices they wish without any intervention from whatever source.

18. Impact

This means changes produced by the liberalized agricultural markets, which could also be termed as the outcomes or consequences. These include changes in food supply, income distribution, health status, and educational accessibility brought about by the changes in the household's net monthly incomes.

19. Accessibility to loan, credit or good school etc.

This means the ease with which an individual obtains loan or credit; or his household members' proximity to good schools and so on. This is indicated by the ease at which an individual can negotiate for the loan or credit and his children's closeness to good schools and the like.

20. Other Sources of Income

This refers to the number of ways an individual farmer obtains income apart from agriculture and his occupation that include salary or wages from spouse, children or other relatives under his care, financial remittances by friends and relatives.

CHAPTER THREE

METHODOLOGY

3.1. RESEARCH SITE

Location and Size

The study was conducted in Koibarak Location in the Chebiemit(formerly Northern) division of Marakwet District, Rift Valley Province, Kenya. Marakwet is a new district, which was curved out of the larger Keiyo\Marakwet in 1994. It borders West Pokot district to the north, Trans-Nzoia to the Southwest, Keiyo to the South, and Baringo to the east. It lies between longitudes 35 11' and 35 43' East and latitudes 0 50' and 1 19' North. It covers a total estimated area of 1709km2 with a total arable land of 1348km2. The remaining is forest and steep Marakwet escarpment.

Administratively, the district is divided into four(4) divisions namely:- Chebiemit Division(519km2), Kapcherop Division(462km2), Tot Division(209 km2), and Tirap Division (519 km2). Marakwet District has 11 locations and 55 sub-locations with Chebiemit Division accommodating three locations(Koibarak, Moiben, and Arror) and 13 sub-locations.

Agro-Ecological Zones

The district is made up of three Agro-ecological zones namely:-

1). The Highlands ---------- 2000-3350m above sea level

2). The Escarpment---------- 1500-2000m ,, ,, ,,

3). The Valley ---------- 700-1500m ,, ,, ,,

The Highlands receive an average rainfall of about 1000-1250mm per annum, the Escarpment gets an average of about 850-1000mm per annum and the Valley an average of less than 800mm per annum. Due to the varying rainfall received in the three agro-ecological zones, different crops are grown throughout the district. The main farming systems in the Highlands zone include dairy, wool sheep, crop production composing of maize, potatoes and beans as major food crops and pyrethrum and coffee as major cash crops. Koibarak Location(region of study) falls under this zone and grows mainly maize both for food and sale, plus small quantities of Irish potatoes and pyrethrum. Farming systems in the Escarpment include crop production and dairy. Dairy is highly competitive. Major food crops grown are maize, beans, potatoes, finger millet and horticultural crops. Coffee is a potential cash crop here. And in the Valley(Kerio valley), drought resistant crops such as sorghum, finger millet, peas, green grams and other minor crops like cassava, sweet potatoes and sunflower are grown. Horticultural crop farming is also prominent in this zone. Since rainfall is inadequate here for crops to mature,

supplementation with irrigation is done in most of Tot Division and Arror Location of Chebiemit Division.

Social-Economic Profile

Only those social-economic and organisational factors deemed relevant to agricultural sector development for the district are discussed below.

Employment

The major economic activities pursued by the population of Marakwet district are in the agricultural and livestock sectors. Agricultural employment absorbs the largest number of people throughout the district. Hence, the major source of income in the district is agriculture and livestock production both of which are carried out by small-scale farmers.

Farm Holdings

The majority of the District's inhabitants are engaged in subsistence farming, involving both crop production and livestock rearing. Except for Lelan and parts of Cherangany Locations, farm holdings in the highlands are relatively small, rarely exceeding 5 hectares per household. It is common practice for families to own scattered pieces of land ranging from the valley to the plateau. Individual

cultivated plots average from about one hectare but they are generally less much smaller in the valley in terms of area cultivated.

Level of Technology

Land is generally cultivated by hoe. In some parts of the highlands, Oxen and sometimes tractors are used but on a limited extend due to the hilly nature of the land topography. Farmers in the highlands are increasingly adopting modern technology, which includes application of animal manure, the use of fertiliser, contour ploughing, terracing, ox and tractor ploughing, paddock grazing, the keeping of improved grade of animals, etc. Traditional farming practices prevail over most of the Valley area. In Arror Location for instance, the animals , mainly local sheep and goats, are left to graze unattended. A centuries-old indigenous furrow irrigation system, however, was developed in the valley that harnesses water from the escarpment to the valley and is centred mainly in Tot Division. The irrigation water supplements the rainfall and extends the growing season. Apart from agriculture and livestock. Bee keeping is also an important activity. Blacksmiths and traditional medical practitioners are common in the valley.

Land Tenure

Land in the valley is communally held, where land adjudication and consolidation have started only recently. In the highlands, the people mostly hold individual titles to land. However, these individual titles to land are owned by a homestead head but the lands are communally owned by the household heads under it. Although women's participation rate in farming operations in the district is higher than the men's, culturally, women are not allowed to own land. This is so because, in case a man dies, his wife is at free will to get married elsewhere leaving the husband's land to the children or family members if childless. Women's household heads in the district are in fact very insignificant.

Soils

The soils in the district and their suitability for farming purposes vary from location and altitude. The Highlands are fertile and suitable for cultivation except for North-Western part, mainly Sengwer and Cherangani locations. In these areas, fertility is of variable nature and soils are too shallow for cultivation. The upland soils often occur with rock outcrops and their top soil is rich of organic matter. The soils found along the foot slopes as well as on the plains have moderately high fertility. Soil

erosion is generally a problem in the valley and the escarpment. This erosion is caused by water, which sweeps down the escarpment in numerous small streams when it rains.

Poverty

The District has no visible landlines. Nevertheless it has areas that are poor. Most of the District's poor are to be found in the Kerio Valley, especially the northern part. There are also pockets of poverty in labour camps of a number of forest stations. In the valley, poor families are those with few or no livestock and very little or poor land. They lack water and have no capital. They lack opportunities in terms of adequate extension, co-operative societies, etc. They produce barely for subsistence. The poor in forest areas are usually casual or retired employees of the Ministry of Environment and Natural Resources. They have low or insecure incomes. They have no capital and cannot afford to supply themselves with adequate sustenance.

Educational status

As observed by the 1994-1996 Keiyo-Marakwet District Development Plan, despite the rampant expansion of primary schools and higher enrolment rates in the district in the last few decades, the schools could not provide for the rising population in terms of classrooms, teachers and

teaching facilities and thus, the continued low literacy levels. It notes that the number of pupils per class is normally more than the recommended size of 40 pupils. The average size is 50 pupils implying that the education facilities are over-utilised. Records in the District Education Office, Iten, shows that in 1989 there were 528 school drop-outs, increasing in 1990 to 532, and 536 and 546 in 1991 and 1992 respectively. This has been attributed to lack of school fees, gender discrimination, pregnancy or transfer to other districts. In overall, the average education standard among the District residents was noted to be upper primary level of education.

3.2: SOURCE AND QUALITY OF DATA

The data for the study were obtained from 100 randomly selected households in Koibarak Location, Marakwet district. The location consists of 5 sub-locations namely Kapsowar, Kipsaiya, Kapsumai, Kamok and Sangurur. The study relied on both primary and secondary data. The primary data was mainly obtained from the 100 farm households and a small part from the local shops\markets and Ministries of Agriculture and Health. Much of the secondary data was obtained from the Ministries of Agriculture and Health, shops\markets in the region and a small part from the households' records.

One university graduate and a form four leaver were selected to assist in the data collection. However, sessions on how to interview respondents including a detailed orientation on the questionnaire were conducted. The field work continued for about one and quarter months from beginning of March to April 1995.

3.3: UNITS OF ANALYSIS

The study specifically focused on the selected respondents' households within Koibarak location. The household head was therefore the one interviewed so as to provide the required information about the entire household.

3.4: METHODS OF DATA COLLECTION

The following methods were used to collect the data:-

Interview Questionnaire

The interview questionnaire was administered on the 100 selected farm households to collect all the information related to the theme of the study.

Observation Technique

This was used in collecting data on nature of transport network, approximating distance covered by the households to

reach health centres and schools, land topography and in confirming the secondary data.

3.5: SAMPLING PROCEDURE

Given that the region of study is one of the most highly potential areas in the district in terms of agricultural production, the location's population is more or less uniformly distributed. It is also important to note that agricultural farming in the region is done on small scale. Initially, the district agricultural office was to provide the sampling frame. However, this was not possible and therefore, the sampling frame was developed during the pre-survey by listing down all the farm households in each of the five sub-locations. The sample frames of each of the sub-locations were as follows:- 230, 218, 211, 201, 198 farm households for Kipsaiya, Kapsowar, Kamok, Kapsumai and Sangurur respectively. To ensure that each sub-location was equally represented, proportionate simple random sampling technique was then used to select the 100 farm households to be interviewed. The Table below shows how the distribution of the population and samples were drawn from the entire Location.

Table 3.1: Distribution of Farm Households and Sample Size According to Sub-Locations in Koibarak Location.

Sub-Location	Number of Farm households	Sample	Percent of sample size
Kipsaiya	230	21	21
Kapsowar	218	20	2o
Kamok	211	20	20
Kapsumai	201	20	20
Sangurur	198	19	19
Total	**1058**	**100**	**100**

3.6: METHODS OF DATA ANALYSIS

The main statistical methods that have been useful in this study include the following:

DESCRIPTIVE STATISTICS

Percentage

This statistic has been used to determine the consumer price index and the rate of price increases in the agricultural inputs and products markets in the region, and the distribution of the respondents according to all other variables where applicable. The higher the percentage, the better or the worse the human welfare of the households depending on the variable under consideration and vice versa.

Mean

This statistic has been used to determine the average income level, total number of children per household and education level of the respondents. It has also been

utilised in estimating the averages of other variables where applicable.

Range

This statistic has been used to determine the difference between the highest and lowest incomes of the households, and the highest and lowest family sizes of the respondents and other variables where applicable.

INFERENTIAL STATISTICS

Pearson's Correlation Coefficient (R)

This has been used to determine both the direction (i.e.,whether positive or negative) and strength of association between the net incomes of the households in relation to their food security, education and health status. Also between their human food security, education and health status and the factors influencing it; And to determine the association existing between all other variables where applicable.

Multiple Regression

This has been used to asses the significance of each of the independent variable(s) on the dependent variable(s) controlling for all other variables in the regression equation and the overall influence of these variables (i.e.

factors influencing human welfare status). This has been made possible by the use of the "F"-test and the R square (R2) at the 0.01 and 0.001 levels of significance.

The assumptions based on the use of multiple regression in this study include:-

(i) The regression model is linear

ii) There is no significant error in the model

iii)There is no heteroscedasticity

iv) There is no multi collinearity and auto correlation.

The regression equation appears as shown below:

$$Y = a + b_1x1 + b2x2 + b3d1 + b4d2 + b5d3 + b6d4 + b7d5 + b8d6 + b9d7 + b10d8 + b11d9 + e$$

Where

Y = Human Welfare of the Respondents' Households

a = Constant Term

b = Beta Coefficients

x1 = Liberalized Agricultural Markets(Change in the Repondents' Net Monthly Incomes)

x2 = Respondents' Family Sizes

d1 = Cultural Beliefs

d2 = Physical Environmental Conditions(Land topography)

d3 = Transportation Networks (Roads, Railway, Airport/Strip/Line etc.)

d4 = Land Tenure System(Land Ownership and Usage Rights)

d5 = Respondents' Accessibility to Loans and Credit Facilities.

d6 = Respondents' Accessibility to Agricultural Education and Extension services.

d7 = Use of Modern Methods of Farming

d8 = Use of a Mix of Traditional and Modern Methods of Farming.

d9 = Use of Traditional Methods of Farming.

e = Error Term

The Pearson's correlation coefficient (R) with the assistance of multiple regression has been useful in indicating both the direction and strength of the relationship.

Multiple regression analysis has been preferred in this case because of the following reasons:- Firstly, it enables us to understand the nature of association (i.e. whether positive or negative) between dependent and independent variables, secondly it tells us how much influence each independent variable has on the dependent variable, lastly, it indicates to us the strength and direction of the relationship that exist between each independent variable and the dependent variable.

Despite of the above merits, multiple regression is not exceptional from demerits. Given that this technique works

on averages, outliners present a major problem with small data sets as it distorts the results. A number of variables (e.g.income levels, family sizes, human welfare status levels and average household's education level) had some few outliners. This problem was solved by temporarily eliminating these outliners from the data set and then regression analysis was run using the statistical package for social sciences(SPSS/PC+ Package). The results depending on what was labelled as the dependent variable(s) are found on **Tables 5.3** and **5.4.**

CHAPTER FOUR

DATA PRESENTATION

This chapter deals with data description and expected relationships between some of the key variables under consideration. Grouped frequencies are generally displayed with some limited explanation and discussions to justify the frequency distributions.

The objectives of this study were to find out how the liberalized agricultural market has influenced the welfare status of households in Koibarak location; and secondly to identify other factors influencing their human welfare status. Hence, data presentation as done in this chapter covers how liberalized agricultural market has affected the respondents' net monthly incomes from agricultural activities and the consequent effect on their households' welfare status. It also covers the presentation of other factors that influence the human welfare status of the households either directly or indirectly. These factors include: their family sizes, cultural beliefs, physical environmental conditions, transportation network, land tenure system, accessibility to loans and credit facilities, accessibility to agricultural education and extension services, and methods of farming used in the region.

4.1.0: LIBERALIZED AGRICULTURAL MARKETS AND ITS IMPACT ON PRICES

To understand and determine the changes in the respondents' agricultural input and output costs, their pre- and post liberalization agricultural input and output prices were noted. Changes in the respondents' households expenditures were determined through their pre-and post liberalization prices of the goods and services bought from the shop or market. The levels and trend of the price changes of the commodities and services in the region is as shown in **Tables 4.1(a), 4.1(b), and 4.1(c).**

Table 4.1(a): Trends in input price changes during the years(1993-94) in Koibarak Location(i.e.Input Market).

		Price changes(Kshs.)	
products	Quantity	1993(Base-year=0)	1994
Dipping	@cow	2.00	5.00
fertilisers	10kgs-bag	133.00	250.00
Salt	5kgs-bag	140.00	188.00
Seeds	10kgs-bag	370.00	490.00
De-worming	1/4 litre-tin	144.00	288.00
Labour	@worker per month	500.00	1,600.00
Transport*	Eldoret-Kapsowar	400.00	900.00
Vaccinations	@ animal	4.00	10.00
Jembe	@ Tortoise Brand	125.00	250.00
Panga	@ Lion Brand	79.00	150.00
Insecticides	1/8 litre-tin	150.00	220.00

*** The transport from Eldoret to Kapsowar is one way.**
Source: Respondents' Records
: Local shops and markets
: Ministry of Agriculture office

Table 4.1(b): Trends in product price changes during the years(1993-94) in Koibarak Location(i.e.Product Market)

Product(s)	Quantity	Price changes(Kshs.) 1993(Base-year=0)	1994
Maize	90-kgs-bag	1,200.00	600.00(950.00)*
Beans	16kgs-tin	440.00	240.00
Potatoes	16-kgs-tin	180.00	50.00
Vegetables(c&s)*	90kgs-bag	2,000.00	1,200.00
Pyrethrum	1 kg	14.50	17.50
Coffee	1kg	30.00	22.00
Cow	@medium size	3,800.00	6,500.00
Sheep	"	450.00	700.00
Goat	"	300.00	600.00
Meat	1kg	60.00	100.00
Skin	@ medium size	45.00	60.00
Wool	1kg	12.50	18.00

*** (C&S)- Cabbages and sukuma wiki**
*** (950.00)- Price offered by NCPB**
Source: Respondents' Records
: Local shops and markets
: Ministry of Agriculture and Livestock Development office

Table 4.1(c). Retail Price Index, 1993-1994(Kshs.):**

Products	Quantity	Price changes 1993(Base-year=0)	1994
Sugar	1kg	50.00	40.00
Milk	0.5 Lt.	13.00	17.00
Cooking fat(kimbo)	500g	40.00	59.00
Washing soap(Panga)	a piece	6.00	10.00
Tea leaves	50g	7.50	13.00
Salt	500g	7.00	12.00
Rice	1kg	34.00	45.00
Wheat	2kg packet	48.00	60.00
Bread	500g	10.00	19.00
Maize Meal(Jogoo)	2kg-packet	49.00	43.00
Exercise book(Karatasi)	48 pages	4.50	12.00
Pencil	each	1.50	5.00
Biro pen(Bic)	each	5.50	12.00

**** Actual commodity prices extracted from:-**
: The repondents' shopping records for 1993 and 1994.
: The local shops and markets
: Ministry of Agriculture office

Using 1993 as the Base year(1993=0), **Table 4.1(a)** shows that the cost of agricultural inputs more than doubled by

1994. This is indicated by the simple aggregative index of 207.16%(**see Appendix II**) derived from a list of 12 commonly used agricultural inputs by the respondents (**see Table 4.1a**). On the other hand, as is evident in Table 4.1(b), the prices of agricultural produce declined by more than half the pre-liberalization prices. This is indicated by the simple aggregative index of 0.58%(**see Appendix II**) derived from 12 commonly produced agricultural products by the respondents(**see Table 4.1b**). These findings therefore shows that whereas the cost of agricultural inputs used by the respondents has escalated in the post-liberalization period, the prices of their agricultural produce have drastically declined and presumably reducing their net incomes by more than 100%.

Also, from 13 randomly picked commodities(see **Table 4.1(c)**) commonly purchased by the respondents from the shops in the region, a consumer price index was calculated. A simple aggregative index of 170.3% means that there was a 70.3% increase in general prices over the 1993 level; and yet the incomes accruing to the respondents over the same period have declined. This portrays a real difficult situation for the households. Egerton University **PAM(1992)** findings reveal that with the liberalization of the agricultural markets, agricultural machinery(tractors, ploughs, harrows, combine harvesters, spare parts, diesel

etc.) and other input prices have sharply increased without complementary increases in output prices and thereby reducing profit in agricultural production.

4.1.1: RESPONDENTS AND THEIR LAND SIZES, LEVELS OF LAND UTILIZATION AND AGRICULTURAL PRODUCTION, AND LIVESTOCK OWNED

The study examined the respondents' land sizes, the proportion of land utilised, their levels of agricultural production, and the number of livestock owned. The distribution of the respondents according to their land sizes and levels of their land utilisation are as shown in **Tables 4.2** and **4.3** respectively. And their distributions according to their levels of food and cash crop production, and number of Livestock owned is as shown in **Table 4.4.** According to **Table 4.2** most(33%) of the interviewed respondents had between 1 and 5 hectares of land and none was landless. As is evident in **Table 4.3,** most of the respondents in 1993 and 1994 utilised 50% or less of their land owned. The table also shows that none of the respondents fully utilised or never utilised his owned land. However, the number of those respondents who utilised over 75% and less than 100% of their land in the pre-liberalization period reduced by six(6). At the same time those respondents who could only utilise 50% and less of their total land increased by six(6). This means that with

the liberalization of the agricultural markets more of the respondents were unable to utilise much of their land presumably due to increased input costs.

As is evident from **Table 4.4**, Maize which is the main staple food and also leading cash crop in the area is leading in production level. The other cereals and vegetables are produced in small quantities and mainly for family subsistence. The only two cash crops grown in the region and on indeed limited scale are Pyrethrum and Coffee. The table also shows that the respondents keep some Livestock. However, most of the Livestock were of traditional breeds and mainly kept for family subsistence needs and not for sale. In general, the average maize production per hectare among the respondents in 1994(post liberalization period) was 22-90kg bags. This is lower than the area's targeted production per hectare at the end of that year that was expected to be 32-90kg bags as indicated by the Marakwet District 1994 Annual Agricultural Report.

Table 4.2: Distribution of Respondents according to their Land Sizes(in acres)

Land Size(in acres)	No. of respondents
Nil	0
1-5	33
6-10	25
11-15	14
16-20	12
Over 20	16
Total	**100**

Table 4.3: Distribution of Respondents According to their Levels of Land Utilisation

Utilisation Level	No. of respondents 1993	1994
Nil	0	0
50% and Less	48	54
Over 50% to 75%	30	32
Over 75% and Less than 100%	22	14
100%	0	0
Total	**100**	**100**

Table 4.4: Distribution of Respondents according to Levels of Food and Cash Crops Productions, and Number of Livestock Owned during Pre-and Post Liberalization Periods

	Levels(in 90-kg bags) and number of respondents in each level in 1993 and 1994(in brackets)						
Food Crops	**Nil**	**0-5**	**6-10**	**11-15**	**16-20**	**Over20**	**Total**
Maize	0(0)	4(1)	19(9)	20(17)	13(13)	44(60)	**100**
Beans	4(10)	87(78)	7(7)	1(3)	1(2)	0(o)	**100**
Potatoes	22(20)	67(71)	9(6)	0(3)	2(0)	0(0)	**100**
Peas	79(78)	20(18)	1(4)	0(0)	0(0)	0(0)	**100**
Vegetables							
Cabbages	92(94)	6(4)	2(2)	0(0)	0(0)	0(0)	**100**
Sukuma Wiki	8(9)	89(76)	13(11)	0(4)	0(00	0(0)	**100**
Onions	84(84)	16(15)	0(1)	0(0)	0(0)	0(0)	**100**
Tomatoes	86(86)	14(14)	0(0)	0(0)	0(0)	0(0)	**100**
Cash Crops(no.of kgs)							
Pyrethrum	61(54)	30(38)	8(5)	0(3)	0(0)	1(1)	**100**
Coffee	63(71)	37(29)	0(0)	0(0)	0(0)	0(0)	**100**
	Respondents Distribured according to type and number of Livestock in 1993 and 1994(in bracket)						
Livestock	**Nil**	**1-5**	**6-10**	**11-15**	**16-20**	**Over20**	**Total**
Cows	8(8)	35(51)	27(23)	14(9)	8(5)	8(4)	**100**
Sheep	30(31)	12(22)	18(14)	12(11)	11(8)	17(14)	**100**
Goats	64(68)	18(19)	6(6)	7(4)	3(1)	2(0)	**100**
Donkeys	98(98)	2(2)	0(0)	0(0)	0(0)	0(0)	**100**
Poultry							
Hens	84(76)	8(11)	10(4)	6(2)	1(2)	1(5)	**100**

The study also went ahead to examine some of the other social, economic and physical environmental factors that determine the respondents' levels of their land utilisation and their levels of agricultural production and hence, having an impact on their well being. The factors considered

included the methods of farming used, input and output prices, accessibility to public loans and credit facilities, land tenure system, accessibility to strengthened agricultural education and extension services, physical environmental conditions, and the transportation network in the region.

The methods of farming used by the respondents were examined and were distributed as shown in **Table 4.5**. The table shows that all the respondents interviewed used free family labour in all their agricultural activities though some supplemented it with hired labour depending on their abilities. However, the table shows that those using free family labour increased by 7 respondents and those able to hire labour reduced by 7 during the post liberalization period. There was none that used or hired a tractor to plough their lands due to the sloppy nature of their lands.

Table 4.5: Distribution of Respondents according to Methods of Farming and Labour Used

Farming methods used	1993	1994	Labour used	1993	1994
Modern	4	1	Family	55	62
Traditional	31	45	Hired	45	38
Mixture	65	54	Tractor	0	0
Toatl	**100**	**100**		**100**	**100**

On finding out the nature of farming practices adopted by the respondents in their agricultural activities, their distributions is as shown in **Table 4.5** above. Modern methods of farming involved the use of artificial fertilisers, manures, certified hybrid maize seeds, pesticides, and

keeping of grade dairy cattle. Traditional methods involved the use of uncertified store seeds, non-use of fertilisers and manure, and keeping of traditional livestock of lesser quality. As is evident in the table, a few of the respondents had adopted modern practices of farming and hence, most of them still used either traditional or a mix of traditional and modern methods. However, the post liberalization period saw those respondents formerly using modern methods and those using a mix reducing by 3 and 11 respectively. Those using traditional methods increased by 14. The reason for these changes is presumably due to the increased input costs and reduced producer prices in the post liberalization period.

The respondents' accessibility to public loans and credit facilities from financial institutions and other sources for developing their farms was also noted. Only one(1) of the respondents reported to have managed to secure a loan from the Agricultural Finance Corporation(AFC). The rest 99 never received any loan or credit from any of the financial institutions or other sources but used their own incomes from agricultural activities, brewing of illicit beer, and self help harambee organizations. The reasons cited for the respondents' mass inaccessibility to the loans and credit facilities included their lack of collateral securities to offer to the lending institutions, high

interest rates attached to the loans and credit, and the bureaucratic procedures followed in the acquisition of the loans and credit which tend to be biased against the small-scale farmers.

On examining the process of land adjudication and registration in the region against the respondents, 27% of the total respondents were the sole owners of their land title deeds, 58% of them had their land deeds owned communally, and the rest 15% had not registered their land holdings and hence had no title deeds. This shows that communal relationships to land still persist over a greater part of the region meaning that most of the household heads have no direct control over their land holdings. It then implies that most of the respondents could not on their own use the land title deeds as a security to acquire a loan or credit before consulting the rest of the family members.

When the respondents were asked to indicate the frequency at which they received advises and awareness programmes on modern and appropriate methods of farming from agricultural officers, 21% of them reported to receive it on regular basis, 69% on technical basis(i.e. when there is serious need), and 10% of them reported not to have received the services at any one time. This means that most of the respondents interviewed were not in touch with the current efficient farming techniques and high yielding crops and

presumably explaining their low levels of agricultural production.

In Koibarak Location, marketing of crops like maize was a major problem owing to poor roads, exploitative prices offered by middlemen and high transportation costs from the farm to the marketing centres. The study established from the respondents, Ministry of public works and through observation the main means of transport(roads) in the region. The findings were that there is one classified(or murram) road of about 8km running through the western corner of the Location and that was poorly maintained, and the rest about 40km consist of rural access roads constructed and maintained through locally available human labour. Tarmac road or railway line is non-existent in the region. As the 1994-96 Keiyo Marakwet District Development plan notes, most of the above roads become impassable during the rain seasons and hence, most people in the region use human labour and domestic animals like donkeys to transport their goods and agricultural produce.

With the liberalization of the agricultural markets, transportation costs of such crops as maize grains to the marketing centre formerly met by the National Cereals and Produce Board(the only buyer of the crop) in the pre-liberalization era was now shouldered by the individual farmer. It is because of this reason therefore that most of

the interviewed respondents who formerly sold their maize grains to NCPB in pre-liberalization period reported having sold their maize grains to middle-men in the post-liberalization period as shown in Table 4.3 below.

Table 4.6: Distribution of Respondents According to the Main Buyers of Their Maize Grains in Pre-and Post Liberalization Periods

Buyers	1993	1994
NCPB	95	2
Middle-men	5	98
Total	**100**	**100**

Although the middle-men offered low price for the maize grains than the NCPB as shown in **Table 4.1(b)**, most of the respondents sold their maize to them as is evident in **Table 4.6**. The reasons given by the respondents for the drastic shift in their marketing system were that the middlemen could pay them instantly than the NCPB, which used to delay in paying them. Also, the cost of transporting the produce to other marketing centres was beyond the reach of most of the respondents. The middlemen could therefore transfer part of the transport costs to the respondents by offering lower price for the maize grains. The low prices offered for the respondents' agricultural produce and the accompanied high input prices presumably served as a disincentive to the would be hard working respondents and hence, explaining their low levels of agricultural production.

Hence, from the foregone discussions, the factors which have in one way or another led to the low levels of land utilisation, agricultural production and consequently low net incomes among the respondents include: their massive use of inefficient or low yielding farming methods, high agricultural input and low output prices, their inaccessibility to public loans and credit facilities, inaccessibility to agricultural education and extension services, poor land tenure system, poor transportation network, and uncondusive physical environmental conditions in the region among other factors. The resultant low-income levels among the respondents could not therefore allow them to adequately meet their household's food, education and health requirements.

4.1.2: THE PRE-AND POST LIBERALIZATION NET MONTHLY INCOME LEVELS OF THE RESPONDENTS FROM AGRICULTURAL ACTIVITIES AND OTHER SOURCES

Income level in this study is treated as the main independent variable whose variation will be used to explain the variation in all the variables that will be used to measure human welfare status(i.e.food security, health and education status) of the households in Koibarak Location. Holding other factors constant, with an increase in income bracket of a household, the food security, education and health status of its members are expected to improve and

vice-versa. The net incomes of the respondents were arrived at by calculating the difference between their yearly gross incomes from agricultural pursuits and the total incurred costs in terms of farm inputs. The net monthly incomes were then arrived at by dividing the respective net yearly incomes by twelve and their distribution levels were as shown in **Table 4.7** below.

Table 4.7: Distribution of Respondents According to Net Monthly Income Levels from Their Agricultural Activities and Other Sources both before and after the Liberalization of the Agricultural Markets

	From Agricultural activities		From Other sources	
Income level (Kshs)	**1993**	**1994**	**1993**	**1994**
Negative	0	0	0	0
Nil	0	0	0	0
<1000	24	33	41	35
1000-5000	54	54	51	53
5001-10000	16	10	7	8
>10000	6	3	1	4
Total	**100**	**100**	**100**	**100**

As shown in the table, majority(54%) of the respondents had an income level of between kshs.1000 and 5000 followed by those with less than kshs.1000. It is also evident from the table that the liberalization of agricultural markets saw those having less than kshs.1000 increasing by 9 respondents. Those having between kshs.5001 and 10000, and those with over kshs.10000 decreased by 6 and 3 respondents respectively. The average net monthly income levels of the respondents from the agricultural sector were approximately Kshs.3,505 and 2,708.50 during pre-and post liberalization periods respectively. This means that with the

liberalization of the agricultural markets, net incomes from agricultural activities among the respondents declined by an average of Kshs.797.50. The range between the highest and lowest net income earners before and after the liberalization process were Kshs.24,590 and Kshs.19,542 respectively. Both these figures show a highly skewed income distribution although the skewedness reduced in the post liberalization period. The main cause for the decline of the respondents' income levels in the post liberalization period was due to the low maize prices offered by the middle-men who were the main buyers of the produce.

It is also evident from **Table 4.7** above that the respondents had other sources of income to supplement their incomes from agricultural activities. Among these other income sources include the respondents wages and salaries from other occupations, contributions from other household members, money remittances from relatives and friends, and such practices as brewing and selling of illicit beer, gold mining and keeping of poultry.

4.1.3:THE RESPONDENTS' HOUSEHOLD EXPENDITURE AND SAVINGS

After allowing for their households monthly expenditures in terms of food, education, health, and clothing requirements, the distribution of the respondents according to their levels of savings both during the pre-and

post liberalization periods were as shown on **Table 4.7** below.

Table 4.8: Distribution of the Respondents According to their Households Monthly Expenditures and Savings before and after incorporating incomes from other sources

	Household Expenditures		Savings (-) o.s. income*		Savings (+) o.s. income*	
	1993	1994	1993	1994	1993	1994
Negative	0	0	30	50	10	17
Nil	0	0	0	0	0	0
<1000	20	12	21	24	22	28
1000-5000	75	80	46	23	54	41
5001-10000	5	4	9	1	14	10
>10000	0	4	4	2	10	4
Total	**100**	**100**	**100**	**100**	**100**	**100**

***(-) o.s.- minus income from other sources**
***(+) o.s.- plus income from other sources**

Table 4.8 shows that most of the respondents monthly household expenditures fall between ksh.1000 and 5000 slightly higher than those whose net incomes from agricultural activities fall in the same level(**see Table 4.8**). As is evident in the table, a large number of the respondents were operating on negative savings after meeting their household expenditures with their net incomes from agriculture. The situation worsened during the post liberalization period with those respondents whose their households' expenditures fell between ksh.1000-5000 increasing by 5. On the other hand, those respondents whose savings fell between ksh.1000-5000 reduced by 3 and those with negative savings increased by 20 respondents. This means that with the liberalization of the agricultural markets, most of the respondents could not sustain

themselves with their net incomes from agriculture and thus, operated in debts. However, almost all the respondents had other sources of income to supplement what they got from their agricultural activities. This therefore enabled most of them to still save between ksh.1000-5000 although a number of them were still operating in debts. The average monthly savings among the respondents after incorporating income from other sources were ksh.3,622 and 2,557 in 1993 and 1994 respectively. On the other hand, their average total monthly farm input costs were ksh. 2,064 and 532 in 1993 and 1994 respectively. This implies that the respondents were going to remain with either very little or no savings after attending to their agricultural activities and hence, unable to adequately attend to their households food, education and health requirements.

The study inquired into the respondents' other sources of income in pre-and post liberalization periods and they were distributed as shown in **Table 4.9** below.

Table 4.9: Distribution of Respondents According to Other sources of income

Source of income	1993	1994
Wage or salary from employment	30	29
Other household members	68	68
Pelatives and friends	34	37
Others(brewing, poultry, mining)	59	58

Apart from agriculture acting as the main employer and income generator among Koibarak residents, the people engage themselves in other activities to boost their incomes. It is also evident from the table that relatives and friends play a vital role in assisting those in need in the community. However, the post liberalization saw assistance from relatives and friends serving greater role as shown by 3 more respondents benefiting from it.

4.1.4: FOOD SECURITY STATUS OF THE RESPONDENTS' HOUSEHOLDS

Food security in this study is one of the main dependent variables whose variation will be explained by the liberalization of the agricultural markets. However, food is one of the main basic needs of life and hence, the quantity and quality of food an individual consumes matters a lot. When the respondents were asked whether they were self-sufficient in food production, mainly of cereals(maize) which is their main staple, their pre-and post liberalization responses were as shown on **Table 4.10** below.

Table 4.10: Distribution of Respondents' Households According to Their Staple Food Self Sufficiency both before and after Liberalizing the AgriculturalMarkets.

Respondents Households'	Frequency		Percent	
Food status	1993	1994	1993	1994
Self-sufficient	18	12	18	12
Not-self sufficient	82	88	82	88
Total	**100**	**100**	**100**	**100**

The table shows that most of the respondents could not produce enough to sustain their households the year round

both in 1993 and 1994. However, the situation became even worse in 1994 with 8 more respondents formerly self-sufficient in 1993 now joining the non-self-sufficient group. The reason they gave for not being self-sufficient in staple food is twofold: first, was due to the fact that most of them sold much of their food production than their food storage in the post liberalization period so as to compensate for the reduced prices of their agricultural produce. Secondly, was due to their large family sizes.

Table 4.11: Distribution of respondents according to the proportion of staple food(maize) sold and stored

	Proportion sold		Proportion stored	
	1993	1994	1993	1994
Nil(0)	0	0	0	0
0< - 0.5	7	3	93	97
0.5<-0.75	37	37	63	63
0.75<-<1	56	60	44	40
1(whole)	0	0	0	0
Total	**100**	**100**	**100**	**100**

	Total produced		Total sold		Total stored	
Crop	**1993**	**1994**	**1993**	**1994**	**1993**	**1994**
Maize	**4,144**	**5,189**	**3,278**	**4,238**	**866**	**951**

On examining the amount of maize(main staple food and income earner) the respondents produced, sold and stored, the findings were as shown in **Table 4.11.** The table shows that most of the respondents sold over three-quarters of their total maize production in 1993 and 1994. However, in the post liberalization period, those respondents who sold more than three-quarters of their total maize production increased by 4 and those who kept(stored) at least half of

it to meet their households food demands reduced by 4. This was the only way they could meet their pressing financial demands but in one way or another, it threatened their food securities. This has also been worsened by the fact that majority of them as shown on Table 4.6 fall in the low-income bracket and thus, unable to purchase most of their food requirements during shortage periods. It is also clear from the table that from the total amounts produced of the staple food in 1993 and 1994, the proportion kept or stored by the respondents to meet their households food demands was less than what they required. Assuming that each respondent had a family size of 8(the average family size among them), the total population among the respondents is 800. If an individual needs 3(90kgs) bags of staple food to sustain him or her the year round(as earlier noted), then the respondents needed at least 2400(90kgs) bags of the staple food to sustain their families. The total amount of staple food the respondents kept in 1993 and 1994 to sustain their families is quite below the required amount and hence, explaining their being not self-sufficient in staple food production.

The family sizes of the respondents were noted by the study. Thirty-two percent of the respondents had small families(6 members and below), 43% of them had medium sized families(7 to 9 members), and 25% had large family sizes(10

members and above). On average, the family size among the respondents was approximately 8(i.e.7.969). The reasons for such large family sizes among the respondents is presumably their low use of family planning devices and desire to have male children. The study established that majority(79%) of the respondents had a negative attitude whereas 21% had positive attitude towards the use of family devices. This shows that there is a high dependency ratio in the region and hence, the respondents have many mouths to sustain with the little kept maize. The situation is even worse with most of the respondents falling in the low-income bracket as shown in **Table 4.7.**

When the respondents were asked to state where they got most of their food requirements to see them through the famine periods, their responses were as shown on **Table 4.12** below.

Table 4.12: Distribution of Respondents According to Other Sources of Food during their famine periods.

	Frequency		Percent	
Food source	**1993**	**1994**	**1993**	**1994**
Famine food relief	51	66	51	66
Friends and relatives	28	19	28	19
Shops/market	21	15	21	15
Total	**100**	**100**	**100**	**100**

Table 4.12 above shows that, the government or non-governmental food relief hand outs was the main source of food in Koibarak location during the famine periods both before and after the liberalization of the agricultural

markets but more so, after the liberalization process. This is shown by nine(9) of those respondents who could get food assistance from their friends or relatives during famine periods and six of them who could purchase theirs from the shops or market in 1993 now(in 1994) relying on famine food relief donations. The table also shows that mutual assistance during hardship times among the respondents played an important role. This is evidenced by 28 and 19 respondents reporting having received food assistance from their relatives and friends during their food shortage times in pre-and post liberalization periods respectively.

Those respondents with children less than 2 years during the interview time were also identified and it turned out that there were sixty two(62) of them in 1993 and seventy(70) of them in 1994. On examining their hospital immunisation cards, 29(i.e. 46.8%) of them in 1993 as compared to 34(i.e.48.6%) in 1994 had a birth weight equal to or less than 2.5kgs; and 33(i.e. 53.2%) of them in 1993 as compared to 36(i.e.51.4%) in 1994 had a birth weight of greater than 2.5kgs. Holding other factors constant, the reason attributed to the underweight(i.e.less than 2.5kgs) by the respondents was presumably due to lack of enough and/or necessary foods to the mothers. This is because of the fact that majority of the respondents were unable to sustain their households food wise throughout the year and

at the same time, most of them were low income earners(i.e. had low food affordability). The situation is also worsened by the fact that there is poor crop diversification in the region and therefore denying them a chance to enjoy a balanced diet locally.

Thus, the foregone discussion shows that most of the respondents were not self-sufficient in staple food production and more so in the post liberalization period. The possible reasons for this include their large family sizes due to their negative attitude towards use of family planning devices, their tendency of selling more and keeping less of their staple food(maize) that could not sustain their families, and their low and unevenly distributed incomes that could not afford them to buy food for their households. This therefore suggests a moderate or weak positive relationship between liberalized agricultural markets and food security status in the region.

4.1.5: EDUCATION STATUS OF THE RESPONDENTS' HOUSEHOLDS

Education status is one of the key dependent variables that are influenced by one's level of income. Education as a learning process enables an individual to become aware of his/her environment. Holding other factors constant, the higher the level of education of an individual, it is expected that his/her attitude towards cultural norms and

beliefs changes and thus, becoming more open to new ideas and innovations. The formal education standard attained by the respondents and their household members was noted and the average for each household was determined and the result is as shown in **Table 4.13.** It is important to note that all the respondents interviewed and their aged household members had a formal education.

Table 4.13: Distribution of Respondents According to Their Average Households' Formal Education Standards.**

Average Formal Education Standard	Frequency	Percent
Primary	73	73
Secondary	27	27
College	0	0
Total	**100**	**100**

***** The average formal education levels of the respondents households were arrived at by summing up the number of years in school for all household members of each household and divide it by the respective household size.**

The table shows that most of the household members had primary education. As is evident in the table, 73% of the respondents had an average household formal education of primary, 27% had an average of secondary education, and none had an average of college education. This shows low literacy levels among the respondents.

The study went ahead to identify those respondents with children who sat for the Kenya Certificate of Primary Education(KCPE) in 1992 and 1993 and examined their performances and prospects of continuing with their studies. Out of those whose children sat for the KCPE examination in 1993 and 1994, the children of 38 of the

respondents in 1993 and 26 in 1994 performed well. On examining their prospects of continuing with their studies by interviewing the respondents, their responses were as shown in **Table 4.14** below.

Table 4.14: Distribution of Respondents with Children who sat for K.C.P.E in 1992 and 1993 and Performed Well in Accordance to Their Prospects of Pursuing Their Studies in 1993 and 1994

Prospects of pursuing studies	Frequency		Percent	
	1993	1994	1993	1994
Never joined secondary school due to lack of fees	6	9	15.8	34.6
Called to join highly placed schools but Joined local harambee school due to lack of fees	10	10	26.3	38.5
Joined form 1 but later dropped out due to lack of fees	5	4	13.2	15.4
Joined the school admitted to with or without problem	17	3	44.7	11.5
Total	**38**	**26**	**100.0**	**100.0**

As is evident from the table, those respondents who were unable to pay for their children school fees were on increase in the post-liberalization period. This is indicated by the higher percentages of those children who never joined secondary school, those called to highly placed schools but opted to join the local fairly cheap harambee schools, and those who joined form 1 but dropped out due to lack of school fees in the post than in pre-liberalization period.

On examining the respondents' perception towards gender education, the responses were that forty three percent of the respondents in 1993 as compared to 48% of them in 1994 valued educating their sons. Twenty four percent of them in 1993 as compared to 22% of them in 1994 valued educating their daughters. Thirty percent of them in 1993 as compared to 25% of them in 1994 had no bias in educating their children. And three percent of them in 1993 as compared to 5% of them in 1994 were not able to educate their children. This means that gender accessibility to educational opportunities in Koibarak Location is biased against the females especially so in this era of SAPs where the government has introduced cost sharing in all levels of learning. Hence, despite women being key players in the development of the rural areas and especially in agricultural sector within Koibarak Location, they have continued receiving a raw deal in the provision of educational opportunities.

Basing on the above findings, it is worth noting that with the liberalization of the agricultural markets, more of the respondents were unable to pay school fees for their children due to their contracting net monthly incomes from agriculture(respondents main income earner) due to the drastic fall in the prices of their agricultural products.

This has also been worsened by the government's introduction of cost sharing in all levels of learning. This has therefore contributed to the increasing level of school dropouts among the respondents' children. It has presumably also accelerated the respondents biased gender education favouring their male than the female children.

Hence, the relationship between the liberalization of the agricultural markets and education status of the respondent's household members suggest a weak negative relationship.

4.1.6: HEALTH FACTORS STATUS OF THE RESPONDENTS' HOUSEHOLDS

The health status of an individual is quite paramount in determining his/her level of work performance. An individual with ill-health does not have the motivation and energy to work. Health status in this study was measured by the following health factors:-

- Has piped water,
- Absence of disease infections,
- Good sewerage system and disposal of litter,
- Self sufficient in staple food,
- Sound Health affordability(i.e. to be determined by main source of medication).
- Existence of own toilet

The range of scores was from zero(0) for those who had none of the above health factors positive to six(6) for those who had all the above listed health factors positive. On the basis of these arbitrary scores respondents were, in terms of their health status, distributed as shown in **Table 4.15(a)** below.

Table 4.15(a): Distribution of Respondents According to Their Health Factors Status Scores before and after the Liberalization of the Agricultural Markets

Health factors Status Scores	Frequency		Percentage	
	1993	1994	1993	1994
Good(4 and more scores)	12	7	12	7
Fair(3 scores)	26	28	26	28
Poor(less than three scores)	62	65	62	65
Total	**100**	**100**	**100**	**100**

According to **Table 4.15(a)** above, before and after the liberalization of the agricultural markets, most of the respondents had a poor health status. However, the situation became worse with the liberalization of the agricultural markets as shown by the three(3) more respondents joining the poor health factors status category and five(5) of them dropping from the good health factors status category in 1994.

On examining the respondents responses on the listed health factors , the findings were that 18 of the respondents in 1993 as compared to 10 in 1994 were accessible to piped water and the rest derived their water needs from streams, bore holes, water ponds and the river.

Though piped water exists in the region, many of the respondents could not afford the monthly service fee and hence denying themselves access to the piped water. All the above mentioned sources of water may in one way or another be polluted and hence, unsafe for human consumption. This means that more of the respondents were not accessible to clean water in the post liberalization period and hence, explaining the reported high prevalence of diseases among the respondents' households such as Malaria, amoebiases, colds, typhoid, pneumonia, asthma, skin diseases and the like. There was also a lack of public health services and awareness programmes coupled with lack of enough and affordable health centres or facilities to the common man.

Five percent of the total respondents had well-maintained sewerage system and clean compounds devoid of litter, and the rest 95% of them had poor sewerage system and lots of litter lingering in their compounds. Sixty three percent of the respondents had toilets but 37% of them had no toilets. They thus relieved themselves either in the bushes or in neighbours' toilets. This is a great threat in the spread of infectious and contagious diseases given that majority of them fetched their water from the streams, bore holes, water ponds and the rivers.

As shown on **Table 4.10**, those respondents who were not self-sufficient in staple food increased by six percent during the post liberalization period.

The study further found out that, fifty percent of the total respondents in 1993 as compared to 28% of them in 1994 sought medication from a private hospital when one of their members fell sick. Seventeen percent of them in 1993 as compared to 33% in 1994 went to government hospital or dispensaries. And 5% of them in 1993 as compared to 39% of them in 1994 relied on traditional medicines.

Table 4.15(b): Morbidity Status of the Respondents Households in 1993 and 1994.

	Frequency			
	1993		1994	
Source of Morbidity	**under 5**	**over 5**	**under 5**	**over 5**
Acute Respiratory infections (pneumonia, Asthma, cancer, tuber-closes)	3	2	1	2
Measles	2	0	4	0
Yellow Fever	0	1	0	0
Cardiac	0	0	1	0
Meningitis	0	1	0	0
Ulcers	0	1	0	0
Malaria	0	3	2	1
Amoebiasis	0	1	0	3
Deaths due to lack of Pre-natal care	1	0	2	0
Excessive Drinking	0	0	0	1
Drowning	1	0	0	0
Road accidents	0	0	1	1
Murder	0	1	0	0
Unknown	0	0	3	1
Total	**7**	**10**	**14**	**9**

Total Pop. Aged under 5 yr. 1993 - 121 Over 5 yr. 1993- 634
1994 - 106 1994- 667

Source: Respondents' Records.

Table 4.15(b) above indicates that, a share of immunizable and preventable diseases such as measles, yellow fever, cardiac, ulcers, malaria, acute respiratory infections, amoebiasis, and deaths due to lack of prenatal care in total morbidity of the interviewed households in Koibarak Location is estimated at 82.4% and 69.6% in 1993 and 1994, respectively. These figures were arrived at by summing up all those who died of the above mentioned diseases in each year and determining their respective total percentages of those who died in these years. The reasons put forward to explain this scenario were among other factors due to lack of public health services and awareness programmes, poor health conditions in the region, and the government's introduction of cost-sharing in their health centres making it expensive to most of them. The negative effects of the liberalized agricultural markets on the households' incomes must have also worsened the situation due to their low affordability.

From calculated statistics(**see Appendix 11, pg.169**), under 5 mortality rate rose up sharply in 1994 registering 132.1 as compared to 57.9 in 1993. This is quite a high figure as compared to the current Kenya's National Under 5 mortality rate of 66.7. This could partly be attributed to the small sample size taken, which might have been biased. The poor health conditions prevailing in the region coupled

with the government's introduction of cost sharing in its hospitals may have also contributed to this. Over 5-mortality rate stood at approximately 15.8 and 13.5 in 1993 and 1994 respectively. This means that, for every 1000 people who have lived beyond 5 years, about 16 number of deaths in 1993 and about 14 in 1994 would be recorded in the region annually. The crude death rates in the region stood at approximately 22.5 and 29.8 in 1993 and 1994, respectively. This means that for every 1000 people(i.e. of all ages) in the region, about 23 and 30 deaths in 1993 and 1994 respectively, were recorded annually.

Apart from the over 5 mortality rate that showed a decline between 1993 and 1994, the other two measures of mortality(i.e.under 5 mortality rate and crude death rate) indicated a rising mortality or death rate between the same period. Although the U5MR and CDR figures seemed low partly due to the small sample taken which might have been biased, these suggest an increasing mortality or deaths in the region. The reasons that could explain the rise on the two rates presumably include poor health conditions, lack of public health services and awareness programmes, and lack of adequate and affordable health facilities in the region coupled with the government's introduction of cost-sharing in its health centres. The increased medical care costs coupled with the declining net incomes of the respondents

has therefore affected their affordability to health care for their members.

From the foregone discussions, it is worth noting that most of the interviewed respondents experienced poor health conditions and more so during the post-liberalization period. The reasons which could explain this state of affairs include:- the respondents inaccessibility to clean water, absence of latrines, insufficient staple food supply, high disease prevalence in the region, and their poor affordability of hospital medication. All these therefore could translate into a poor health status of the respondents' households.

CHAPTER FIVE

DATA ANALYSIS AND INTERPRETATION

This chapter deals mainly with data analysis and discussion of the results. As noted earlier in chapter three, the main methods of data analysis here are percentages, means, Pearson's correlation coefficient(r), and multiple regression. Data analysis here will be presented in two parts.

PART ONE

This part covers discussion of the analyzed results of the variables by percentage, mean and Pearson's Correlation Coefficient(r) and Multiple Regression. Pearson's Correlation Coefficient(r)and Multiple Regression becomes the main statistical tools in this part. Pearson's correlation coefficient(r) as a statistical tool has been chosen as a measure of the nature of association between the dependent and independent variable(s) in that, multiple regression alone would not give a complete picture of the nature and strength of the relationships between the variables. In most cases, the significance of the correlation coefficient is taken into consideration as a means of assessing the strength of the nature of the

association between variables. Furthermore, this part is divided into two sections.

The first section is concerned with the association between the net change in the net monthly incomes of the households(i.e.,independent variable) due to liberalization of the agricultural markets and their food security, educational, and health status changes(i.e.,human welfare measures - also dependent variables) between same periods. The second section is concerned with the association between the human welfare status of the households(i.e.,dependent variable) and the factors influencing it(i.e.independent variables). To integrate the cited literature review in chapter two in this chapter, the results are compared with the works of other researchers after the analysis and discussion of every independent variable.

PART TWO

This covers mainly the hypothesis testing by use of multiple regression analysis. However, a deep analytical approach to the results from the adopted method will be offered in this part in order to conclude the data analysis of the study.

PART ONE

Section I

5.1.0: THE RESPONDENTS' NET MONTHLY INCOME LEVELS

According to the research findings, majority of the respondents had low income levels both before and after the full liberalization of the agricultural markets. However, the liberalization policy saw the net monthly incomes of the respondents reduce sharply. This is clearly shown in **Table 4.7** where nine(9) more of the respondents joined the less than Kshs 5,001 and three(3) of them dropped out of the over Kshs 10,000 in the post-liberalization period. The average net monthly income levels among the respondents before and after the liberalization policy were Kshs.3,505 and Kshs.2,708.50 respectively. On average, the figures represent a decline of kshs.796.50 in the respondents' net monthly incomes. Among some of the reasons that were given by the respondents for this decline were increased agricultural input prices accompanied by a drastic reduction in the prices of agricultural output. Also due to increased educational and health costs, and the reduced government expenditure in most of the basic areas of life such as education, health and entertainment. This was further worsened by the consequent introduction of cost sharing in all government institutions offering the above mentioned basic services of life.

5.1.1: CHANGE IN THE NET MONTHLY INCOMES OF THE RESPONDENTS AND ITS IMPACT ON THEIR HOUSEHOLDS' FOOD SECURITY, EDUCATION AND HEALTH STATUS

Here, the change in the net monthly incomes of the respondents due to the liberalization of the agricultural markets features out as the main independent variable. This change in the net monthly incomes of the respondents has been used to establish the nature and strength of the association existing between it and the changes in the food security, education and health factors status of the respondents' households. Attempts are also made here to relate the findings with previous studies that have been conducted elsewhere although on a limited basis.

Table 5.1: Pearson's Correlation Coefficient Analysis of the change in the net monthly incomes of the respondents due to the liberalization of the agricultural markets and the corresponding effect on their households' food security, education and health Status

CORRELATIONS/VARIABLES V2 V3 V4 WITH V1 :

Correlations:	**V1**
V2	0.0340
V3	-0.2787*
V4	-0.1592

1-tailed Signif. * -0.01 ** - 0.001

KEY:

V1 = Change in the net monthly incomes of the respondeents (in Kenya Shillings)

V2 = Change in the respondents' households food security status (in terms of self sufficiency in food and food affordability)

V3 = Change in the respondents' households education status

V4 = Change in the respondents' households health factor status.

5.1.2: CHANGE IN THE NET MONTHLY INCOMES OF THE RESPONDENTS AND THEIR HOUSEHOLDS' FOOD SECURITY STATUS

There is a close relationship between a household's income level and its food security status. Holding other factors constant, as the households' net income increases, we would also expect its ability to purchase food for its members to rise and vice versa. A Pearson's correlation coefficient of -0.1592 shows that the association between change in the net monthly incomes of the respondents and the change in their households' food security status is negative. This means that, with the liberalization policy, the net monthly incomes of the respondents declined and therefore making them unable to purchase their food requirements. Although the prices of locally produced food stuff may have reduced, and especially those of maize grains, most of the households were forced to sell more of their food produce to supplement their low income levels and therefore, doing away with a larger part of their food stocks. This is clearly confirmed by the fact that despite majority of the households(i.e. 99%) selling more than 3/4 of their total food production(maize grains), still majority of them were classified as low-income earners. SAPEM(Ibid) observed that the regulation of prices and the removal of food subsidies in Mozambique as a result of SAPs have meant diminished access to food. This is so because, with higher prices, many people can no longer purchase food for their

families. The 1993/1994 Kenya National Economic Surveys showed that the high input prices resulting from the liberalization of the agricultural markets has led to a decline on the total acreage dedicated to a number of food crops and some temporary industrial crops by small holders. This has affected the country's food reserves and forced the country to import foodstuffs to supplement local production and that the situation worsened for farmers who strived to sustain farming enterprises while faced with increased costs of production as well as increased cost of living.

Multiple regression results in **Table 5.3** show a very weak negative relationship to exist between the change in the net monthly incomes of the respondents and the change in their households' food security status due to the liberalization of the agricultural markets. The level of significance of this relationship is given as 0.3076 and which is not significant at 0.01 level of significance. This means that, as the net monthly incomes of the respondents decrease, it leads to a decrease in their ability to purchase their households' food requirements.

It can therefore be concluded that, liberalization of the agricultural markets has never helped to boost the net incomes of the respondents but instead, it reduced it and thereby worsening their households' food security status due to their reduced food affordability.

5.1.3: CHANGE IN THE NET MONTHLY INCOMES OF THE RESPONDENTS AND THEIR HOUSEHOLDS' EDUCATIONAL STATUS

Pearson's correlation coefficient of -0.2787 shows that the association between the change in the net monthly incomes of the respondents and the change in their households' educational status is negative. This kind of association between the two variables is significant at 0.01 level of significance indicating a strong negative relationship. This means that, the change in the net monthly incomes of the respondents has strongly affected the education status of their household members negatively. The reason for this is that, with the liberalization of the agricultural markets, the net incomes accruing to the respondents declined drastically and thereby making them unable to meet their households' educational requirements.

The Multiple Regression results on **Table 5.3** also confirm the strong negative relationship between the two variables and with a significance of 0.0057. It can therefore be concluded that, the liberalization of the agricultural markets has negatively affected the respondents' net monthly incomes. This has therefore made many respondents unable to meet their households' educational requirements and especially now that the government has cut its expenditure on education and the introduction of cost sharing in all levels of learning.

Kenya National Development Plan(1994/98) reveals that educational status as measured by adult literacy rates, pre-primary and primary enrolment and retention rates, accessibility to and quality of educational facilities and services marginally worsened during the 1980s due to the SAPs which have led to the government's cuts on educational expenditure and the introduction of cost-sharing through the user fees in all levels of learning. The situation is worse in the rural areas where the farmers' incomes have been reduced due to high costs of production and accompanying low prices for agricultural products.

As noted earlier in chapter four, the study found out that with the discussed state of affairs, many children in the region dropped out of school completely or never joined their merited secondary school due to lack of school fees.

5.1.4: CHANGE IN THE NET MONTHLY INCOMES OF THE RESPONDENTS AND THEIR HOUSEHOLDS' HEALTH STATUS

There is a close relationship between a change in the net income of a household and the change in its affordability to good health care and status. As it is expected, a decline in the prices of food stuffs may either increase the ability of the household to purchase more food items for its members given its income remains constant, or it may reduce its ability to purchase it if at all the household is among those whose product prices may have

fallen and thereby reducing its income level. According to the Pearson's correlation coefficient analysis in Table 5.2, the association between the change in the net monthly incomes of the respondents and the change in their health status due to the liberalization of agricultural markets is positive. A correlation of 0.0340 and which is not significant at 0.01 level of significance implies the existence of a very weak and insignificant positive relationship between the two variables. This means that, the total liberalization of the agricultural markets has led to the prices of locally produced food stuffs within the region to decline. This has thus enabled many households to enjoy a wide variety of food diets and at cheap cost and hence, slightly improving their health status. Despite of this benefit, the drastic fall in the prices of these locally produced food stuffs which are also the leading sources of income in the region(and especially maize grain) has played a big role in the drastic reduction of the net monthly incomes of the respondents. This has contributed to their inability to meet the costs of their daily households' medical requirements. Hence, the benefits that may have arisen due to the reduced prices of the locally produced foodstuff have been outweighed by the costs involved in the reduced net monthly incomes of the respondents.

The Multiple regression results on **Table 5.3** confirm the very weak positive relationship existing between the change in the net monthly incomes of the respondents and the respective changes in their health status with a significance level of 0.7406. This implies that, the reduction in the prices of their agricultural produce has only minimally helped to improve their households' food bracket and therefore slightly improving their health status. However, the reduced prices of the agricultural produce have seriously reduced their income levels and consequently eroding their ability to meet the cost of their households' medical requirements.

The emerging conclusion here therefore is that, despite the liberalization of the agricultural markets lowering the prices of most of the locally produced food stuffs in the region and thereby increasing the chances of many households to enjoy a balanced diet; the fall in the net incomes of the respondents due to the fall in the prices of their agricultural produce has seriously tampered with their purchasing power. This has therefore reduced their ability to meet their households' medication requirements and thus, contributing to the prevailing poor health status among them. **SAPEM (1991)** findings in Mozambique reveal that SAPs mean increased suffering and deprivation to some social groups (i.e.,the old, youth, poor peasants, disabled, women

headed households, unemployed, etc.) in a context where it is uncertain whether the economies under the pain of these programmes will recover in the long run. It goes on to note that, yet the SAPs contain certain standard prescriptions; the cutback on the health budget will entail workers paying more for medical treatment from contracting wages or incomes especially among the wage earners and peasant farmers, respectively. This is quite in agreement to the study's findings.

Section II

5.2.0: OTHER FACTORS INFLUENCING THE HUMAN WELFARE STATUS OF THE HOUSEHOLDS

Table 5.2: Pearson's Correlation Coefficient Analysis of Other Social-cultural, Economic and Physical Environmental factors influencing the human welfare status of the households in The Region.

CORRELATION/VARIABLES V6 V7 V8 V9 V10 V11 V12 V13 V141 V142 V143 WITH V5:

Correlations:	V5
V6	-0.391
V7	0.3192*
V8	0.3960**
V9	0.0986
V10	-0.1305
V11	0.4334**
V12	0.0000
V13	0.0814
V141	0.0772
V142	0.7142**
V143	-0.7332**

1-tailed signif. * - 0.01 ** - 0.001

KEY:

V5 = Human welfare of the respondents' households
V6 = Family sizes of the respondents
V7 = Their Cultural beliefs
V8 = Physical environmental conditions
V9 = Transportation network (roads, railways, airport/strip/line etch)

V10 = Liberalized agricultural markets(in terms of the change in the net monthly incomes of the respondents)
V11 = Land Tenure System (Land Ownership and Usage Rights)
V12 = Respondents' Accessibility farm Loans and Credit Facilities
V13 = Respondents' Accessibility to agricultural education and extension services.
V141 = Use of modern methods of farming.
V142 = Use of a mix of traditional and modern methods of farming
V143 = Use of traditional methods of farming

Apart from the liberalized agricultural markets influencing human welfare of the respondents' households in the region, it has also been influenced by other various social-cultural, physical environmental, demographic and economic variables(or factors). These factors directly or indirectly affect the human welfare of the households through their realised levels of agricultural production that is a direct translation of their income levels. According to the multiple regression analysis on **Table 5.4**, 66.4% of the total variation in the human welfare of the respondents' households is explained by all these factors(i.e.,independent variables) including liberalization of agricultural markets. The F test is significant at 0.01 level of significance which shows that all the independent variables(i.e.,family sizes of the households, their cultural factors, physical environmental conditions, transportation networks, land tenure system, accessibility of the respondents to credit and loan facilities, their frequency of receiving agricultural education and extension

services, and the methods of farming they use) entered on the regression equation nearly explains three-quarters of the variation in the human welfare of the respondents' households(the dependent variable). The other 33.6% is explained by the error term. Egerton University **PAM(1992)** found out that the improvement on the agricultural productivity is mainly constraint by lack of suitable production recommendations, lack of and/or high cost of inputs such as fertilisers, lack of credit, poor processing and marketing incentives, poor information flow from research to farmers, and infrastructural limitations. And that, in order to increase agricultural production to desired levels, these constraints must be alleviated. Increased agricultural productivity in Africa and Third World countries in general where agriculture plays a paramount role in the improvement of their living standards, can only be achieved through a good network of the extension services to farmers, a good transportation system, improved marketing and distributive facilities of the crops produced, provision of loans and credit facilities, satisfactory producer prices and a good reception to new agricultural innovations which are lacking in Africa and developing countries as a whole**(La-Anyane, 1985)**.

5.2.1: **FAMILY SIZE**

Family sizes of the respondents as a factor that determines the human welfare status of the households is a crucial factor which needs serious attention. Pearson's Correlation Coefficient of -0.0391 shows the association between the two variables to be a weak negative and that is not significant at 0.01 level of significance. This means that family size among the households in the region affected their human welfare status negatively. This is reflected in the fact that majority of the respondents' households had large family sizes and hence, having a negative impact on their food security, educational, health and income status because of the large number of dependants to feed and support financially. **African Demographic and Health Surveys (Feb 1992)** found out that, policy makers throughout Africa are increasingly recognising that rapid population growth places a heavy burden on development effort particularly on the human resource sectors of health, education, food, security and employment. They have therefore emphasised family planning programmes with the aim of reducing fertility and thus, population growth. Equally important, many African policy makers have included family planning as a crucial element among strategies geared towards the improvement of the health of mothers and children.

The multiple regression results on **Table 5.4** also confirms the relationship between the respondents' households family sizes and their human welfare to be weak weak a significance of 0.1888. For every one standard deviation increase in the family size of the households, there is a corresponding 0.005369 standard deviation decrease in their human welfare. Table 4.6 shows that majority of the respondents' households had family sizes of more than 6.

It is thus apparent that households with large family sizes are associated with a relatively poor state of human welfare due to the more number of dependants a household head supports in terms of food, education and health requirements. Households in Koibarak Location are victims here.

5.2.2: CULTURAL FACTORS

Moral restraint and voluntary abstinence from indiscriminate sexual activities help an individual to plan his/her family and also to avoid sexual transmitted diseases. This is purely a function of the individual's degree of adherence to societal norms and beliefs on matters related to sexual behaviour. A society characterised by a strong degree of adherence to cultural norms and beliefs on matters related to these behaviours is expected to have a

low prevalence of sexual diseases and sometimes small family sizes. However, this strong adherence could also be a hindrance to reception of ideas and technology meant for development. A Pearson's Correlation Coefficient of 0.3192 that is significant at 0.01 level of significance shows a strong adherence to cultural beliefs among the respondents strongly affected their households' human welfare positively. This is partly attributed to the fact that majority(i.e.,79%) of the respondents had a negative attitude towards use of the modern artificial methods of family planning and contraception in general. Instead they preferred the traditional natural methods of family planning that demands self discipline and strong moral restraint especially in matters related to sexual relationship. This therefore explains the quite low prevalence or absence of sexually related diseases in the region. It could also be attributed to the fact that majority(i.e.,48%) of the household heads valued educating their sons whom they saw as their future developers and hence gender discrimination in education provision.

Multiple regression results in **Table 5.4** show a weak positive relationship to exist between cultural beliefs of the respondents and their households' human welfare with a significant level of 0.0467 that is not significant at 0.01 level of significance. For every one standard deviation

increase in the cultural beliefs, there is a 0.14572 standard deviation increase(or improvement) in the human welfare of the households. This means that, the adherence to cultural beliefs by households in the region positively affected their human welfare. Thus, as the number of people who strongly observe their cultural beliefs on matters related to having small family sizes, avoidance of indiscriminate sexual relationships and educating male children as the future potential developers of the region increase; their human welfare is expected to rise. This is due to the small and easily supportable family sizes, low prevalence of sexual related diseases and more future investments from the educated sons respectively.

5.2.3: PHYSICAL ENVIRONMENTAL CONDITIONS

Pearson's Correlation Coefficient of 0.3960 that is significant at 0.001 level of significance reveals the existence of a strong positive relationship between the physical environmental conditions and the human welfare of the respondents' households. Multiple regression analysis results on **Table 5.4** show that, environmental conditions as a factor that influences human welfare of the households is significant at 0.07660 indicating a weak positive relationship. For every one standard deviation increase(or improvement) in the physical environmental conditions, there

is a 0.07429 standard deviation increase(or improvement) in the human welfare status of the households. This means that despite the hilly nature of the farms hindering land mechanisation, the prevailing environmental conditions in Koibarak Location play a major role in the human welfare improvement of the households even if the other factors work against it. This can be attributed to the naturally rich agricultural soils, which prevail in the region.

Hence, basing on the above analysis, if the physical environmental conditions are enhanced in the region through such measures as afforestation, soil conservation, use of fertilisers and prevalence of adequate rain, the human welfare of the households is bound to improve irrespective of the number of people it has to cater for.

5.2.4: TRANSPORTATION NETWORK

The transportation network prevailing in Koibarak location has a moderate positive association with the human welfare of the respondents' households in the region. Pearson's correlation coefficient of 0.9986 in Table 5.2 indicates that the association between the two variables is positive. This means that, the state of human welfare of the households tends to improve with the improvement of the transportation networks in the region. In other words, if the means of transport is improved, more households will be

able to market their farm products at far destinations where they can earn higher prices with ease and thereby encouraging them to aim at higher levels of agricultural production to realise the higher incomes. However, this is not possible in Koibarak Location where most of the people are served by poor and sometimes impassable roads and hence, explaining the relatively poor state of human welfare of the households. The situation is further worsened by the quite low prices paid by the private agents or merchants who happen to be the main buyers of their agricultural produce(mainly maize) in the post-liberalization era.

Multiple regression results in **Table 5.4** also confirm transportation networks to have a very weak positive relationship with the human welfare of the respondents' households and with a significant level of 0.8806. For every one standard deviation increase(or improvement) in the transportation networks, there is a 0.04133 standard deviation increase(or improvement) in the human welfare of the households in the region. This means that, the improvement of the human welfare of the households depends on the improvement of transportation networks in the region although not entirely. **African Farmer (1994)** observes that, many countries have not invested much in rural infrastructure(especially, transport) due to civil conflict or the austerity policies imposed by structural adjustment

programmes with the consequent result of reduced scope for public investments especially in the agricultural sector. Koibarak location has fallen a victim of the same circumstances.

5.2.5 : **LAND TENURE SYSTEM**

Land tenure system that defines an individual right to land ownership and usage is a very important factor in determining the state of human welfare of a people. Land tenure system and human welfare of households in Koibarak Location have a very strong association between them. A Pearson's Correlation Coefficient of 0.4334 that is significant at 0.001 level of significance shows a very strong positive association between the two variables. This could be attributed to the fact that majority(i.e.58%) of the respondents had their land title deeds communally owned meaning that most of the people in the region had an access to land usage and thus, no or quite minimal cases of landlines. Multiple regression results on **Table 5.4** also confirm the positive relationship between the two variables.

An emerging conclusion is that, the more people are accessible to land ownership or usage rights in a region, the higher is their level of human welfare improvement because of the reduced problems associated with landlines

controlling for all other variables that determine human welfare.

5.2.6: ACCESSIBILITY OF THE RESPONDENTS TO FARM LOANS AND CREDIT FACILITIES.

In many developing countries and especially within the rural areas, farmers' ability to increase agricultural production is constrained by lack of loans and public credit facilities to improve or work on their farms. Some new techniques like improved seeds, artificial fertilisers, insecticides or pesticides, and irrigation activities need additional capital investments. But some farmers who are not accessible to loans and public credit facilities have ended up financing these expenditures from their savings, sale of non-productive assets, sale of illicit beer, borrowing from private sources and self-help mutual contributions. The Pearson's correlation coefficient results on Table 5.2 reveal that there is no any relationship between the respondents' accessibility to loans and public credit facilities and their households' human welfare status. This means that loans and public credit facilities do not play any role in the human welfare improvement in the region. This is attributed to the fact that 99% of the total respondents interviewed were not accessible to loans and public credit facilities to work on or develop their farms. Instead, they relied on their savings, sale of illicit beer,

and self-help mutual contributions or assistance. It could also be attributed to the fact that most of the land holdings in the region were still under communal ownership and thus, private or individual users of the land title deeds as security of acquiring these loans and credit facilities from the lending institutions was not possible. Penny(1968) examined the failure of government credit programmes for small-scale farmers to expand production and cited several reasons why they have not succeeded. The major point is that, the attitudes of the peasants in traditional agriculture militates against their using credit for productive investment, a view he backs with evidence from North Sumatra where peasants feel that the debt is something to be avoided, but if the government wants to provide cheap credit, they are usually willing to take the hand out. Multiple regression results by Enter Method on **Table 5.4** also confirm the absence of relationship between the two variables.

As a conclusive remark therefore, loans and public credit facilities to the farmers in Koibarak Location had no any role in the improvement of human welfare of the households in the region.

5.2.7: ACCESSIBILITY OF THE RESPONDENTS TO AGRICULTURAL EDUCATION AND EXTENSION SERVICES

Whereas the provision of appropriate and more superior development technology remains critical, well-co-ordinated agricultural education and effective communication with farmers through a strengthened research-extension-farmers' linkage, and on-farm demonstrations could be an avenue by itself, for substantial agricultural production improvement. Studies done by **Egerton University PAM(EU, 1995)** found out that increased farmer knowledge on proper fertiliser and high yielding seeds are through regular extension demonstrations have had positive impact on farm productions. However the provision of agricultural and extension services to farm households in Koibarak Location has a moderate association with their human welfare. Pearson's correlation coefficient results reveal the association between the two variables to be positive and with a correlation of 0.0814 that is not significant at 0.01 level of significance. This negative relationship between the two variables is further confirmed by the multiple regression results on **Table 5.4.** The weak positive relationship is attributed to the fact that majority(i.e.79%) of the respondents interviewed were not easily accessible to agricultural education and extension services on modern and appropriate methods of farming. And hence, they have ended up sticking to their inefficient traditional methods of farming which have made

them to experience low levels of agricultural production and low income levels. **Dixon(1993)** observes that, agricultural education and extension services have been least successful in reaching the poorest farms and instead tended to concentrate on commercial production. Most extension services have also focused on male farmers, and yet much of the basic food production in these areas was in the hands of women. Therefore, in the absence of wider changes, programmes involving the development of rural institutions often tend to reinforce the existing pattern of inequality.

The emerging conclusion is that, farm households tend to improve their human welfare if they are provided with appropriate agricultural education and extension services that are lacking in Koibarak Location and hence explain the deteriorating households' human welfare in the region.

5.2.8: METHODS OF FARMING

Generally, the methods of farming used in Koibarak Location have a positive association with the human welfare of the households in the region except with the use of purely traditional methods of farming that revealed a negative association. On examining the methods of farming used by the respondents, the results were that one(1)of them used modern methods, 54 of them used a mix of traditional and modern methods, and 45 of them used traditional methods.

This means that majority of them combined traditional and modern farming methods in their agricultural undertakings. Pearson's correlation coefficient of -0.7332 that is significant at 0.001 level of significance shows a very strong negative relationship between the use of traditional methods of farming and the human welfare of the households in the region. This means that, the use of traditional methods of farming negatively affected the human welfare of the respondents' households. This could be attributed to such factors as heavy use of family labour, use of uncertified local seeds, keeping of poor breeds of traditional livestock, no use of fertilisers, and no proper farm management. All these contribute to inefficiency in the agricultural production processes and therefore cannot allow the farm households to easily compete with those using modern methods of farming especially in this era of liberalized agricultural markets that demands factor efficiency to guarantee the farmers' survival. The consequent result therefore is low net incomes accruing to the farm households. **Mbithi(1974:1-2)** and **Erozer/FAO/PBFL (1977:7-10)** emphasised the fact that agricultural modernisation or innovations are aimed at improving the welfare of the rural people through increased agricultural productivity. And that this can only be improved through the provision of the necessary facilities that accompany the use

of high yielding crop varieties coupled with closer supervision and advice on accepted or recommended husbandry, inputs such as fertilisers, tools, seeds, and the like. These are lacking in most of these rural areas and thereby explaining the resultant low levels of agricultural production in Koibarak Location. The use of modern methods of farming, and a mix of traditional and modern methods have Pearson's correlation coefficients of 0.0772 and 1.0000 respectively. The former is not significant at 0.01 level of significance whereas the latter is significant. These show relatively weak and very strong positive associations to exist between the use of modern farming methods and the mix of traditional and modern methods, respectively, and the human welfare of the respondents' households. The strong positive association that the mix of modern and traditional farming methods had with human welfare of the households is due to their use of fertilisers, tractors, hired labour, certified seeds and the like, which assures a high level of agricultural production and thus high income levels to improve their human welfare(i.e.guarantees the households sufficient food, access to education opportunities and good medical care). And the weak positive relationship existing between the use of modern methods of farming and the human welfare of the households is attributed to the fact that modern farming methods such as the use of tractors cannot be

used in the region due to the relatively steep nature of most of the land holdings. The use of a mix of traditional and modern farming methods such as the use of fertilisers and certified seeds has therefore boosted the levels of agricultural production in the region and hence increasing the households' income levels. This has enabled them to meet their food, education and health requirements and thereby enhancing their human welfare. Multiple regression results in Table 5.4 show the use of modern and traditional methods of farming to have a negative relationship with the human welfare of the households.

Thus, from the general analysis of the social-cultural, economic, physical, demographic and physical environmental factors that influence the human welfare of the households, the emerging conclusion is that, these factors have in one way or another contributed to the deteriorating human welfare of the households in the region. These findings are quite in agreement to those of the **Keiyo/Marakwet District Development Plan(1994-1996)** which reveal that despite the district being endowed with rich natural resources, development(human and economic) has remained low due to the poor infrastructure(e.g.,no.of good roads, poor livestock management practices, lack of credit and banking facilities, poor farming methods, lack of electricity, inadequate water supplies, low levels of income and lack of housing

facilities) and high population growth rate. The development plan therefore notes that, the liberalization of agricultural markets will worsen the situation due to the direct effect on the agricultural sector that is the peoples' sole source of food, employment and income generation. This is so because modern methods of farming such as the use of tractors, fertilisers, pesticides or insecticides is either not affordable or inapplicable in the region. Tractors are not affordable or inapplicable due to low-income levels and the steep nature of most of the households' land holdings, respectively. The small and uneconomical land holdings that are also communally owned have also played a role. The use of traditional methods of farming in the region is associated with inefficiency and low agricultural productions and therefore, low income levels that cannot allow the households to meet their food, educational and health requirements.

PART TWO

STATISTICAL TESTING OF THE HYPOTHESES

Here, statistical analysis of the data is undertaken with the view of testing the hypotheses identified in chapter two. As emphasised earlier in chapter three, multiple regression analysis is used as the main method of analyzing the data. More information and inferences are made

on the nature and magnitude of the research problem basing on the regression results of the tested Hypotheses. This is the part where the last conclusive remarks concerning the study are made and thereafter to be followed by a brief and specific conclusions in chapter 6.

Table 5.3: Bivariate Correlation Analysis of the Change in the Net Monthly Incomes of the Respondents and the effect on Their Households' Food Security, Educational and Health Status due to the Liberalization of the Agricultural Markets

Dependent Variable: V2(change in the households' Food Security Status)

Multiple R	0.10466
R Square	0.01095
F = 0.11026	Signif. F = 0.7406

Variable in the Equation

Variable	B	SE B	Beta	T	Sig T
V1	-1.45744E-E6	1.42093E-06	-0.10466	-1.026	0.3076
Constant	-0.15289	0.02031		-7.529	0.0000

Dependent Variable: V3 (change in the households' Educational Status)

Multiple R	0.27-865
R Square	0.07765
F = 1.05205	Signif. F = 0.3076

Variable in the Equation

Variable	B	SE B	Beta	T	Sig. T
V1	-4.70908E-05	1.66518E-05	-0.27865	-2.828	0.0057
Constant	7.25690	0.23797		30.495	0.0000

Dependent Variable: V4 (Change in the households' Health Status)

Multiple R	0.03405
R Square	0.00116
F = 7.99738	Signify F = 0.0057

Variable in the Equation

Variable	B	SE B	Beta	T	Sig.T
V1	4.056941E-06	1.22179E-05	0.03405	0.332	0.7406
Constant	0.55679	0.17460		3.189	0.019

KEY:

V1 = Change in the Respondents' net monthly incomes(in Kenya shillings)

V2 = Change in the food security status of the respondents' households

V3 = Change in the respondents' households educational status.

V4 = Change in the respondents' households health factors status

The first hypothesis test how the change in the net monthly incomes of the respondents due to the liberalization of the agricultural markets has affected the food security, education and health factors status of their households. The null hypothesis is tested against the first research hypothesis as follows:-

Ho: The change in the net monthly incomes of the respondents due to the liberalization of the agricultural markets has no effect in their households' food security, education and health status.

HA: The change in the net monthly incomes of the respondents due to the liberalization of the agricultural markets has a significant effect on their households' food security, education and health status.

The dependent variables are changes in the food security, education and health status of the respondents' households(i.e.V2, V3 and V4, respectively) and the independent variable is the change in the net monthly incomes of the respondents(i.e.V1) as shown in Table 5.3.

Bivariate correlation analysis carried out between each of the dependent variables against the independent variable is shown on **Table 5.3.** The results indicate that, apart from the health status of the households showing a positive

relationship with the change in their net monthly incomes due to the liberalization of the agricultural markets, the other two variables(i.e. the respondents' households food security and education status) showed a negative relationship. The relationship between the change in the respondents' net monthly incomes and the respective changes in their households' food security status is a very weak negative relationship with a significance level of 0.3076 and which is not significant at 0.01 level of significance. When R square(R2) was determined by the Enter Method, change in the net monthly incomes of the households alone explained 1.1% of the total variation in their food security status when all the other factors influencing their food security status were considered. For every one standard deviation decrease in the net monthly incomes of the respondents, there was a 0.10466 standard deviation decrease in their households' food security status controlling for all the other factors that influence their food security status.

On the basis of the above results, the null hypothesis against this variable is not rejected. This means that, liberalization of the agricultural markets has worsened the respondents' households food security status through their low affordability(i.e.low incomes) and also due to the fact that majority(84%) of them have been compelled to sell over 75% of their total food production so as to supplement their

meagre incomes and thereby eroding the households' food stock. **Daily Nation(July 28, 1994)** noted that the liberalization of wheat and maize trade has led to overall price reductions of 15% and 7% on all wheat and maize products, respectively. This has led to a reduction in the incomes accruing to the affected farm households who in one way or another must have responded by selling part of their food stocks and therefore interfering with their self sufficiency in food. **FAO** and **WHO** have also found household affordability of food to have declined throughout the 1980s and may be even in 1990s due to the declines in real per capita incomes coupled with the reigning inflationary food prices.

When variable three(i.e.V3) which stand for the change in the education status of the respondents' households was examined, multiple correlation results on **Table 5.4** show a very strong negative relationship to exist between it and the change in the respondents' net monthly incomes with a significance value of 0.0057 which is significant at 0.01 level of significance. For every one standard deviation decrease in the net monthly incomes of the respondents, there was a 0.27865 decrease in their households' education status controlling for all the other factors that influence their education status. Basing on the above results, the null hypothesis against this variable(i.e.V3) is not

rejected. This means that, with liberalization of the agricultural markets, the net monthly incomes of the respondents declined due to the sharp fall in the prices of their agricultural produce and the corresponding high agricultural input prices as shown on **Tables 4.1(b) and 4.1(a)** respectively. This has therefore made education costs beyond the reach of most of the households in the region especially now that the government has reduced its expenditure on education and introduced cost sharing at all levels of learning.

An examination of the multiple correlation analysis of variable four(i.e.V4) standing for the change in the health status of the respondents' households revealed the existence of a very weak positive relationship between it and the change in the respondents' net monthly incomes due to the liberalization of the agricultural markets. The relationship has a significance value of 0.7406 and that is not significant at 0.01 level of significance. When the R square(R2) was conducted by Enter Method, change in the net monthly incomes of the respondents' households alone explained 0.1% of the total variation in their households' health factors status when all the other factors influencing their health status were considered. For every one standard deviation decrease in the net monthly incomes of the respondents due to the liberalization of the agricultural

markets, there was a 0.03405 increase(i.e.improvement) in their households' health factors status controlling for all the other variables that have been considered to affect their health status. This means that, although the liberalization of the agricultural markets may have minimally improved the health factors status of the households through their accessibility to a wide variety of locally produced food stuffs; the resultant quite low net incomes accruing to them(i.e.,of course as farmers) could not enable them to meet their medical requirements that are inflationary in nature. This thus explains the relatively poor state of their status.

From the above analyses, a conclusion that emerges is that, the change in the net monthly incomes of the households due to the liberalization of the agricultural markets is likely(in most cases) to affect their welfare status negatively. However, the reduced prices of the locally produced food stuff in the region and the emergence of a wide variety of food due to the liberalization policy may have in one way or another boosted the households' food affordability and sufficiency. But the accompanied high prices of agricultural inputs and the escalating transportation costs have negated these benefits. Hence, an improvement of the households' welfare status could only be realised through the government's intervention by offering

subsidies or reducing taxation on agricultural produce to cushion the farm households from the increasing agricultural input costs.

Thus, the issue of liberalizing the agricultural sector is still a major delicate issue to many African countries, especially Kenya, who cannot compete favourably in the world market with the rich industrialised countries due to its factor inefficiency. **United Nations Economic Commission for Africa(E/ECA/CM 15/6/Rev 3)** observe that, it has become abundantly clear by now that, both on theoretical and empirical grounds, the conventional SAPs are inadequate in addressing the real causes of economic, financial and social problems facing African countries that are of a structural nature. And that, with the introduction of SAPs to Africa, social services and welfare especially education, food, public health and sanitation, housing and portable water have rapidly deteriorated, especially in the rural areas such as Koibarak Location.

Table 5.4: Multiple Regression Analysis Results of Other Social-Cultural, Demographic and Economic Variables (or Factors) Influencing The Human Welfare of The Households.

Dependent Variable: **V5**(Human Welfare of the households)
Multiple R 0.81458
R Square 0.66354
F = 17.0987 the Equation Signify F = 0.0000

Variables in the Equation

Variables	B	SE B	Beta	T	Sig. T
V6	-7.11794E-03	5.36946E-03	-00.09523	-1.326	0.1888
V7	0.05988	0.02962	0.14572	2.021	0.0467
V8	0.05037	0.07429	0.07660	0.678	0.4998
V9	6.228710E-03	0.04133	0.01017	0.151	0.8806
V10	4.435778E-07	8.28314E-07	0.03716	0.536	0.5938
V11	0.06559	0.03289	0.17386	1.994	0.0496
V12	---	---	---	---	---
V13	0.03496	0.04462	0.08140	0.783	0.4354
V141	-0.25137	0.11738	-0.16075	-2.142	0.0353
V143	-0.19130	0.02530	-0.56974	-7.556	10.0000
Constant	0.50949	0.04661		10.931	0.0000

Variables not in the Equation

Variable	Beta in	Partial	Min Toler		
V142	1.00000	1.00000	-3.369E-16	-	-

KEY:
V5 = Human Welfare of the Respondents' Households
V6 = Family Sizes of the Respondents
V7 = Their Cultural Beliefs
V8 =Physical Environmental Conditions(Land topography)
V9 = Transportation Networks(Roads, Railway, Airport/Ship/Line etc.)
V10 = Agricultural Marketing Arrangements
V11 = Land Tenure System (Land Ownership and Usage Rights)
V12 = Respondents' Accessibility to farm Loans and Credit Facilities.
V13 = Respondents' Accessibility to Agricultural Education and Extension Services to the farmers
V141= Use of Modern Methods of Farming
V142= Use of a Mix of Traditional and Modern Methods of farming.
V413= Use of Traditional Methods of Farming.

The regression equation appears as shown below:

$$Y = a + b1x1 + b2x2 + b3d1 + b4d2 + b5d3 + b6d4 + b7d5 + b8d6 + b9d7 + b10d8 + b11d9 + e$$

$$= 0.5095 + 0.372x1 - 0.095x2 + 0.146d1 + 0.077d2 + 0.010d3 + 0.174d4 + 0.081d6 - 0.016d7 - 1d8 - 0.570d9 + 17.1$$

Where

Y = Human Welfare of the Respondents' Households
a = Constant term
b = Beta coefficients
x1 = Agricultural Marketing Arrangements(Change in Net Monthly Incomes of the Respondents)
x2 = Family Sizes
d1 = Cultural Beliefs
d2 = Physical Environmental Conditions(Land topography)
d3 = Transportation Networks(Roads, Railway, Airport/Ship/Line etc.)
d4 = Land Tenure System(Land Ownership and Usage Rights)
d5 = Respondents' Accessibility to farm Loans and Credit Facilities.
d6 = Respondents' Accessibility Agricultural Education and Extension Services.
d7 = Use of Modern Methods of Farming
d8 = Use of a Mix of Traditional and Modern Methods of farming.
d9 = Use of Traditional Methods of Farming.
e = Error Term

In hypothesis two, null hypothesis is tested against the alternative hypothesis as follows:-

Ho: The Human Welfare(i.e.food security, education and health status) of the respondents' households is not affected by their family sizes, cultural factors, physical environment conditions, transportation networks, agricultural marketing arrangements, accessibility to agricultural education and extension services, land tenure system, accessibility to loans and credit facilities, and the methods of farming they used.

Ha: The human welfare(i.e.food security, education and health status) of the respondents' households is significantly affected by their family sizes, cultural

factors, physical environmental conditions, transportation networks, agricultural marketing arrangements, accessibility to agricultural education and extension services, Land tenure system, and the methods of farming the used.

The dependent variable here is the human welfare of the respondents' households(V5) and the independent variables are the respondents' family sizes(V6), cultural factors(V7), physical environmental conditions(V8), transportation network(V9), agricultural marketing arrangements(V10), agricultural education and extension services(V13), land tenure arrangements(V11), methods of farming used(V141, V142, V143) and accessibility to loans and credit facilities(V12).

The Multiple regression analysis on **Table 5.4** conducted between the dependent variable and the independent variables reveal that 66.4% of the total variation in the human welfare of the respondents' households is explained by all the above mentioned factors. The F-test is significant at 0.01 level of significance that means that the influence that the above factors have on the human welfare of the respondents' households is very strong. According to these multiple regression results, cultural factors, physical environmental conditions, transportation network, and land tenure system are variables that have a positive relationship with welfare status of the respondents'

households. The rest of the variables have a negative relationship. Apart from the households' cultural factors, physical environmental conditions and land tenure system that have relatively weak positive relationship with their welfare status, transportation network has a very weak positive relationship with it. The relationship between the cultural factors, physical environmental conditions, transportation networks, Land tenure system, and the human welfare of the households has significant levels of 0.0467, 0.4998, 0.8806 and 0.0496, respectively. On the basis of these results, the null hypothesis of no effect is rejected. For every one standard deviation increase(i.e., adherence or improvement) in the cultural factors and transportation networks, there are 0.02962 and 0.04133, respectively standard deviations increase(i.e.improvement) in the respondents' households human welfare in the region. The weak positive relationship prevailing between the cultural factors and the human welfare status of the respondents' households could be attributed to the fact that majority(i.e.79%) of them were still adhering to their cultural norms and beliefs on sexual matters. And thus, we expect sexual immorality to be still low and possibly minimal cases of sexual related diseases such as Aids, gonorrhoea, syphilis and so on among them. The weak positive relationship between the transportation networks and human

welfare of the respondents' households could be attributed to the fact that most of them were served with very poor roads that could not enable them to transport their agricultural inputs or products from or to the market with ease and at affordable prices. **Rodhes(1993)** found out that, among public investments, rural roads have a strong impact on agricultural development through reduced transport costs. And improving rural roads to an all-weather standard boosts farm incomes especially of crops such as tea and dairy products whose poor post-liberalization harvests have been attributed to poor road conditions. Human welfare is therefore enhanced by improved access to goods that must be obtained on daily basis, such as water, food and fuel. But the poor status of physical infrastructure(e.g., roads) in Koibarak Location militates against this.

Farming methods(i.e.,use of modern or traditional methods) used by the respondents, their family sizes, their accessibility to agricultural education and extension services, and their households' human welfare has negative relationships. On the other hand their use of traditional farming methods has a strong negative relationship with their households' human welfare. Overall, their uses of modern farming methods, traditional methods, their family sizes, and their accessibility to agricultural education and

extension services have significant levels of 0.0353, 0.000, 0.1888, and 0.4354, respectively.

On the basis of the above results, the null hypothesis of no effect is rejected. For every one standard deviation increase on the respondents' use of a traditional farming methods, their family sizes, their use of a modern farming methods, and their inaccessibility to agricultural education and extension services, there are 0.56974, 0.09523, 0.16075, and 0,08140 standard deviation decreases(or deterioration) in the households' state of human welfare, respectively. The extremely weak negative relationship between the respondents' use of modern farming methods and their human welfare could be attributed to the fact that, apart from the region being relatively hilly in nature and therefore inhibiting land mechanisation, most of them are low income earners who cannot afford the hiring of tractors, labour, fertilisers and the like. They therefore use family labour and self-help organizations. This has contributed to their low levels of agricultural production especially so with the liberalization of the agricultural markets that requires factor efficiency in the agricultural production processes. With this scenario, most of the farm households in the region have been driven into a vicious cycle of poverty characterised by low net incomes that have made them unable to use modern farming methods but instead use inefficient

traditional methods. These have in turn contributed to their low levels of agricultural production and low-income levels among them. **Egerton University(PAM, Ibid)** also reveals that farmers' technology adoption behaviour is influenced by many factors, which include social-economic circumstances. It notes that farmers will adopt innovations that are cheap, of immediate benefit, easy to comprehend and use, and are compatible with their social and farming requirements. However, it reveals that the current input-pricing system seems to favour economies of scale and skew benefits away from the small holder maize farmer.

The use of traditional methods of farming by the respondents also has a relatively weak negative relationship with their human welfare. This has been brought about by the fact that most of them are small-scale(or peasant) farmers with low levels of agricultural production that has made most of them to fall in the low income group and hence unable to meet their food, educational and health requirements. However, studies by **Mbithi(1974)** and **Erozer, FAO/PBFL(1977)** have revealed that agricultural modernisation and innovations are aimed at improving the welfare of the rural people through increased agricultural productivity. And that the productivity especially of the poor section of the rural agricultural population can only be improved through provision of the necessary facilities which

accompany the use of the high yielding crop varieties coupled with closer supervision and advice on accepted or recommended husbandry, inputs such as fertilisers, tools, seeds and so on. Unfortunately, the provision of these necessary facilities is lacking in Koibarak Location and hence, contributing to the low levels of agricultural production among farm households in the region.

However, the weak negative relationship between the family sizes of the respondents and their human welfare could be attributed to the fact that majority(i.e., 68%) of them had large family sizes of greater than six members. The average number of dependants a household head had in the region was about 8(i.e.,7.969). And hence, since majority(i.e.,55%) of the households were low-income earners, most of them could not manage to feed, educate or attend to their medical needs.

The accessibility of the respondents to loans and credit facilities to work on or develop their farms has no any relationship with their households' human welfare. This has been contributed by the fact that most of them were not accessible to these loans and credit facilities and hence, they heavily depended on their savings, sale of illicit beer and self-help mutual assistance in most of their agricultural activities. This implies that farmers in Koibarak location were not in any way relying on loans and

public credit in the pursuit of their agricultural activities and hence, not influencing their human welfare. On the basis of these results, the null hypothesis about the respondents' accessibility to loans and credit facilities having no effect on their human welfare is not rejected. **Agency for International Development(1973)** observes that credit provide an increment of funds with which the borrower can produce or consume. Hence, credit institutions must lend the bulk of the available funds to small-scale farmers as they are considered more efficient than the large-scale enterprises. But in contradiction to these, most public credit programs lend primarily to larger farmers. Also, loans from the public credit institutions must be on terms as attractive as alternative sources of finance; if not, farmers will find their investment through other sources in so far as money is available.

The accessibility of the respondents to agricultural education and extension services and their households' human welfare has a weak positive relationship whose significance level is 0.4354. The null hypothesis of no effect cannot be rejected based on this result. The results further show that, for every one standard deviation increase in the provision of agricultural education and extension services to the respondents, there is a 0.08140 standard deviation improvement in their households' welfare status controlling

for all other variables that determine their human welfare status. This weak positive relationship is attributed to the fact that only minority(i.e.21%) of the respondents interviewed were adequately provided with these agricultural education and extension services by the agricultural and veterinary field officers whereas majority(i.e.79%) of them were either totally neglected or assisted only under critical circumstances. **KARI(1991b)** have found out that the information gap between research institutions and farmers that has resulted into the farmers low yield can only be reduced through an effective-farmer communication. This can be possible through on-farm research demonstrations that are lacking in Koibarak location.

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CHAPTER SIX

CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

6.1: CONCLUSIONS

The primary objective of this research was to investigate how the liberalized agricultural markets have affected human welfare in Koibarak Location. And its secondary objective was to examine other social-cultural ,economic, demographic and physical environmental factors influencing the improvement of human welfare in the region. Here, the study has attempted to explore the extent to which the improvement of human welfare of households in the region has been influenced by these factors.

1: Liberalization of agricultural markets is likely to affect net incomes accruing to farm households and income distribution in general negatively in Marakwet district. The changes in the agricultural input and product prices as shown on Tables 4.1(a) and 4.1(b) respectively, and the change in the average households' net incomes from Kshs. 9,790.15(in 1993) to Kshs.4,519.80(in 1994) due to the liberalization of the agricultural markets demonstrates this negative effect. Thus, liberalization of the agricultural markets is a very significant factor that determines households' net incomes.

2. Changes in the net incomes of the farm households as a measure of liberalized agricultural markets is a significant factor that determines their human welfare(i.e.changes in their food security, education and health status). Multiple regression analysis results on **Table 5.4** shows that this factor is significant at 0.0057, 0.3076 and 0.7406 levels in determining the changes in the respondents' households food security, education and health status respectively. As the net incomes accruing to the respondents rise, their households' food security, education and health status are expected to rise (or improve). This comes about due to the fact that their abilities to meet their households' food, educational and health requirements tend to increase.

3. Among the social-cultural, demographic, economic and physical environmental factors that influence the human welfare of the respondents' households that were considered are: family size, cultural factors, physical environmental factors, methods of farming used, land tenure system, accessibility to loans and credit facilities, and provision of agricultural education and extension services. The use of a mix of modern and traditional methods of farming by the respondents was the most important factor in the improvement of their human welfare. The relationship between their use

of a mix of modern and traditional methods and their households' human welfare is significant at 0.0000 level. Thus, as the farm households who combine modern and traditional farming methods increase, human welfare in the region is likely to improve. Both their uses of modern and traditional methods have very strong negative relationship with their human welfare although the use of purely traditional methods has a stronger negativity. Based on these findings, the null hypothesis of the methods of farming used by the respondents having no effect on their human welfare is rejected.

Family sizes of the respondents affected their households' human welfare negatively. The study therefore concludes that, as the family size of a household increase, there is a likelihood for the household to experience problems in meeting the consequent increase in the requirements of its members. The negative relationship between family sizes of the respondents and their respective households' human welfare is confirmed by the multiple regression analysis results on **Table 4.10**. The households' cultural factors, existing physical environmental conditions, transportation networks, land tenure system, and accessibility to agricultural education and extension services affected their human welfare positively. It is therefore worth to note that, as people strongly adhere to

their cultural norms and beliefs which forbid indiscriminate sexual behaviour, and as the physical environmental conditions become favourable to agricultural undertakings, and as the transportation network become improved, and land ownership and usage rights assured to all and most of the farm households receive well-co-ordinated agricultural education and extension services; there is a likelihood that their levels of agricultural production and hopefully income levels will increase and hence, promoting the general upliftment of their living standards(i.e.improved human welfare). Basing on these results, the null hypothesis of the above six mentioned variables having no effect on the households' human welfare in the region is rejected at 0.01 level of significance. It was also found out that the farm households' access to loans and credit facilities to work on or develop their farms had no any influence on their human welfare. This is so because most of them relied on their savings, family labour and self-help mutual organizations in their agricultural endeavours.

6.2: RECOMMENDATIONS

The issue of liberalizing agricultural markets has been imposed on the developing countries whose economies are still quite fragile(or in infant stage of development) characterised by very inefficient methods of production,

distorted marketing system and hence, unable to support or accommodate such a demanding policy. This, in turn, among other reasons has led to reduced returns on the agricultural sector(i.e.thier main backbone) and thereby enhancing a deterioration of social dimension(i.e.human welfare) in most of these countries and especially among the most of the vulnerable groups such as the low income earners, the unemployed, the peasant farmers, women headed households and the physically and mentally or socially handicapped.

1. Agricultural sector is a significant factor in as far as the improvement of Human welfare in most of the developing countries is concerned. The more favourable the prices of agricultural products, the more likely that the households' net incomes could increase and so to their states of human welfare. In order to make their net incomes increase, there is an urgent need to check at the corresponding prices of agricultural inputs through the government's effort to reduce taxes charged on these inputs so as to realise a consequent reduction in their prices. Such reductions on agricultural input prices would make them affordable to most of the farmers through whom their intensive use would realise them high levels of agricultural production and hence high-income levels that can enable them improve their states of human welfare.

2. There is also need for the IMF and World Bank to realise that developing countries are characterised by different social-economic, political and physical environments that call for different policies that are timely and appropriate to these environments. And hence, they should avoid using aid disbursement conditionalities to unleash untimely and inappropriate policies to these developing countries. The IMF and World Bank as the principal international financial institutions from which most developing countries borrow loans to meet their economic hardships have on most occasions used this prime position to impose many untimely and inappropriate policies on these developing countries. An example here is the liberalization of agricultural markets and others that have always landed them in economic and political instabilities climaxed by declining economic growth, civil and tribal wars and other related antisocial behaviour. This study and others of this nature have revealed that little attention, if any, has always been given to the views of the clients in implementing most of such policies. This crucial finding then suggests that perhaps the developing countries (i.e.the policy clients) should be given more say in deciding on the policies to be implemented by IMF and World Bank or any other foreign financial body and if not, they(i.e.developing countries)

should evolve policies within their boundaries which can adequately take advantage of their situations. This is possible through such already initiated policies as the current popularised thesis of *"Adjustment with a human face"* in the African context that lays much emphasis on human-centred development process as this aspect of social dimension has been seen to have been under played by most of these foreign policies. This means that if the issue of liberalizing agricultural markets was done on a gradual basis and with intensive consultations by the IMF and World Bank on the affected developing countries especially on matters related to the appropriate modalities of implementation, the policy could be more effective in improving the economic and social dimensions of the affected countries.

3. Most developing countries and especially rural areas of Kenya do not have adequate capital, information/knowledge and complementary infrastructures in general to utilise in the development of the agricultural sector. For liberalized agricultural markets to succeed in improving the human welfare of these regions, the additional inputs required by the new programme must be available to the farmers and at reasonable prices. That is, there must be a market for the output at reasonable prices and if not, the adoption of the

new programme will not be profitable; and the credit institutions must lend the bulk of available funds to small-scale farmers as the existing public credit programmes lend primarily to already progressive farmers. Also, transport network should be improved especially in the rural areas, the farmers should be in close contact with the agricultural education and extension services on matters related to new and appropriate methods of farming, and the land holdings for these farmers should also be registered and offered title deeds so as can use it as security to acquire loans from the lending financial institutions, and so on.

6.3: SUGGESTIONS FOR FURTHER RESEARCH

1. This study was conducted when liberalized agricultural markets' policy just started taking roots. Therefore, since an adequate time has now elapsed for its effects to be felt, it would be beneficial to carry out more studies of this kind in different parts of the country with different communities and especially in the rural areas where agriculture is the peoples main source of food, employment and income generation. This is important for purposes of comparison and future policy making.

2. There is also need to examine the impact of this policy on the social, demographic and psychological structures of most of the communities in the country. These aspects were

not adequately addressed by this study because of limited time and resources.

3. A detailed comparative study should also be done on the impact of this policy on the small-scale (peasant) farmers and large-scale farmers. This would assist policy makers to identify and recommend modalities of cushioning the most vulnerable groups on the negative impacts of this policy.

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APPENDIX 1

UNIVERSITY OF NAIROBI

DEPARTMENT OF SOCIOLOGY

RESEARCH ON LIBERALIZATION OF AGRICULTURAL MARKETS AND ITS IMPACT ON HUMAN WELFARE

CONFIDENTIAL: FOR RESEARCH ONLY

IDENTIFICATION.

PROVINCE : ----------

DISTRICT : ----------

LOCATION : ----------

SUB-LOCATION :----------

HOUSEHOLD NO : ----------

NAME OF HOUSEHOLD HEAD : ----------

LANGUAGE OF QUESTIONNAIRE : **ENGLISH**

LANGUAGE(S) USED IN INTERVIEW : **ENGLISH, KISWAHILI AND MARAKWET**

RESPONDENTS' LOCAL LANGUAGE : **MARAKWET**

TRANSLATOR'S USED LANGUAGE : **MARAKWET, KISWAHILI AND ENGLISH**

NUMBER OF VISITS :----------

DATES : ----------

INFORMATION QUESTIONNAIRE

Good day! I would be very grateful if you could provide me with information about your household's human welfare changes since Kenya adopted the new strategy of liberalized agricultural markets.

1.(a) NAME: ----------
(b) AGE: ----------
(c) ETHNICITY: ----------
(d) MARITAL STATUS: ----------

2.(a) What is your occupation ----------
(b)(i) How much income did/do you get per month in Kenya shilling
----------1993 ----------1994
(c) From which other sources apart from agriculture did/do you derive your income and how much per year?

		Amount per year (Kshs)	
	Source	**1993**	**1994**
i)	Wife/husband?	----------	----------
ii)	Sons and daughters?	----------	----------
iii)	Friends and relatives?	----------	----------
iv)	Poultry?	----------	----------
v)	Other sources?(mention)	----------	----------

d) How did/do you spend your income in terms of the main expenditures?

		1993	**1994**
i)	Investment on capital/farm	---------	--------
ii)	Household immediate expenditures	---------	--------
iii)	Others(mention)	---------	--------

3(a) What is the size of your household's parcel of land in acres and who owns the title deed to it?
---------- acres? ----------Title deed?
(b) How many acres are under the growth of:
I) Food crops? ----------
ii) Cash crops? ----------
c) How many acres were under the growing of the same types of crops in 1993?
i) Food crops? ----------
ii) Cash crops? ----------
(d) How much of the above types of crops did you produce last year, 1993?
i) Food crops in terms of 90-kg bags? ----------
ii) Cash crops in terms of 90-kg bags? ----------
(e) How many do you expect to produce this year?
Food crops in terms of 90-kg bags? ----------
ii) Cash crops in terms 90-kg bags? ----------

(f) If there is change, what reasons do you attribute to these changes in the produces of the respective crops?

i) Change in prices in favour of cash crops? ---------

ii) Increased factor (or input) crops? ----------

iii) Mention other factors ----------

(g) What were/are the prices charged on these produced crops?

	Prices charged in Kshs 1993	1994
Type of crop		
Food crops per 90-kg bag	----------	----------
Cash crops per 90-kg bag	----------	----------

4(a). What kind of tools/equipment did/do you use in farming?

	1993	1994
i) Family labour/self-help organization	-----	------
ii) Hired labour	-----	------
iii) Tractors	-----	------
iv) Others(mention)	---------	---------
	---------	---------

(b) Of the farm inputs you used, what were the prices charged on each of these?

	Prices charged in Kshs 1993	1994
Type of input		
i) Fertilisers	--------	--------
ii) Seeds	--------	--------
iii) Machinery/labour/tools	--------	--------
iv) Transportation	--------	--------
v) Insecticides/pesticides	--------	--------
iv) Transportation from and to markets of inputs/output	--------	--------
vii) Others(mention)		
----------	--------	--------
----------	--------	--------

(c) Where did/do you get funds to work on your farm?

	1993	1994
i) Credit/loan from agricultural related financial institutions(e.g. AFC, ADC)	------	-------
ii) Own income from agricultural/other sources	------	-------
iii) Others(mention)	------	-------

5(a) Which types of food crops did/will you produce and what quantities of each?

Quantities of each in

	Kind of crop	(in terms of 90-kg bags) 1993	1994
i)	Maize	---------	---------
ii)	Beans	---------	---------
iii)	Potatoes	---------	---------
iv)	Peas	---------	---------
v)	Vegetable	---------	---------
vi)	Others(mention)	---------	---------

b) Of the above produced bags of food crops, how much were/are, sold to the market?

	1993	1994
No. of bags sold	---------	---------
Total no. of bags produced	---------	---------

6(a) Which livestock did/do you have and what their numbers?

	Type of livestock	Total number in 1993	1994
i)	Cattle	----------	---------
ii)	Sheep	----------	----------
iii)	Goats	----------	----------
iv)	Others (mention)	----------	----------

(b) If there is any change in the number of each or any of them, what reasons do you give for this?

i)	Financial demands(or sold)	----------
ii)	Input costs	----------
iii)	Epidemics/diseases	----------
iv)	Others(mention)	----------

(c) How much income did you get by selling the livestock of livestock products?

	Livestock/products sold	Amount received in 1993	1994
i)	Livestock(e.g. cattle)	---------	--------
ii)	Milk	---------	--------
iii)	Meat	---------	--------
iv)	Skins	---------	--------
v)	Wool	---------	--------
vi)	Others(mention)	---------	--------

(d) Which inputs did/do your incur in the up-keeping of these livestock and what were/are their respective prices?

Input type	prices charged (Kshs) 1993	1994
i) Dipping	----------	---------
ii) Salt	----------	---------
iii) De-worming	----------	---------
iv) Labour	----------	---------
v) Transportation	----------	---------
vi) Vaccinations	----------	---------
vii) Others(mention)	----------	---------

(e) How often do you receive advises on the modern and appropriate methods of agricultural production from the agriculture education and extension field officers? ---

(f) If not often, rarely or not at all, give reasons.

---

7. (a) Which other food commodities did/do your household consume yet were/are not produced by the family?

Food Commodity	Prices charged (Kshs) 1993	1994
i) Maize(posho)	---	---
ii) Maize(grain)	---	---
iii) Milk(0.5 it tetrapak)	---	---
iv) Beans(mixed)	---	---
v) Wheat flour(2kg packet)	---	---
vi) Sugar(1kg)	---	---
vii) Tea leaves	---	---
ix) Blue band/cooking fat	---	---
x) Rice	---	---
xi) Others(mention)	---	---

(b) If there is any doing away of some of the above-mentioned commodities by the household this year (1994), what are the reasons for this shift?

i) Financial constraints ---
ii) The household started growing/producing them ---
iii) Disappeared from the shops/region ---
iv) Others(mention) ---

8(a) Have you ever experienced any famine in the last two/one years? --- 1993 ---1994

(b) If yes, what were the reasons of the famine?

	1993	1994
i) Poor climatic conditions	---	---
ii) Increased farm input costs	---	---
iii) Poor methods of production/seeds	---	---
iv) Others(mention)	---	---

(b) During the famine period, where did you get food from?

	1993	1994
i) Food relief	---	---
ii) Relatives/friends	---	---
iii) Bought from the shop/market	---	---

9(a) How many children and other relatives/are under your care, and what were/are their respective ages?

	Names	Age (in yr.)
Spouse	---	---
Children 1.	---	---
2.	---	---
3.	---	---
4.	---	---

5.---------- --------
6.---------- --------
7.---------- --------
Relatives:1.---------- --------
2.---------- --------
3.---------- --------
4.---------- --------

(b) If your youngest child or relative was born in the last two years, what was the child's weight on birth?

	1993	1994
	-----kg	----- kg

(c) If less than 2.5kgs.,give reasons.

10(a) For how long did/do you travel to reach the nearest health centre (hospital or dispensary)?
1993 ------kms. 1994 ------CMS.

(b) Which type of health centre did/do you visit when sick or if the family member fall sick?

		1993	1994
i)	Government hospital	--------	--------
ii)	Private hospital	--------	--------
iii)	Traditional doctor/medicine-man	--------	--------
iv)	Do not believe on treatment	--------	--------
v)	Others (mention)	--------	--------

(c) Why did/do you visit the mentioned health centre/form of treatment and not the other?

		1993	1994
i)	Financial constraints	------	-------
ii)	(In)availability of good drugs/treatment	-----	-------
iii)	Cultural factors	------	-------
iv)	Others (mention)	------	-------

Observation

11. What are the observable physical and mental characteristics of the children or relatives in the household as compared to that of the household head?
(i) Good ----------
(ii) Fair ----------
(ii) Poor ----------

12(a) Apart from the children and relatives you mentioned to be under your care, are there any who died in the last two years?

	1993	1994
i) Less than 5 years?	----------	----------
ii) Over 5 years?	----------	----------

(b) How many died in each category and what were the causes of their deaths?

	No. of deaths		Reasons for deaths	
Age group	1993	1994	1993	1994

i)Under 5 years ----- ------ ------- -------
ii)Over 5 years ----- ------ ------- -------

13(a)Is your spouse still living with you? -------
(b) If divorced or separated, what were the reasons?
i) Financial difficulties/differences ----------
ii) Cultural factors(e.g.relationships, incest,etc)-----
iii) Working in two or, at other home ----------
iv) Others(mention)----------
(c) If death, what ailment was he/she suffering from?------

14(a)If you have a small child, or if those under you have any, how often do they breast-feed?

	1993	1994
	------	--------

(b) If not often or not at all, what reasons do you give for this? ----------
----

i) Lack of adequate breast milk due to lack of enough necessary foods

	1993	1994
	--------	-------
ii) Separation by place of work/college with child	--------	-------
iii) Cultural factors	--------	-------
iv) Others(mention)	--------	-------

15(a)Do you use birth control methods? ---------
(b)If yes, Why?----------
i) Have had enough children ----------
ii) High cost of living in maintaining large family ----------
iii) Fear of sex-related diseases ----------
iv) Others(mention) ----------
(c) If no, why?
i) Still need more children----------
ii) Expensive to buy them ----------
iii) Not available in the health centre/shops ----------
iv) Cultural factors ----------
v) Others (mention) ----------

16(a)Does your household own a toilet ----------
(b) If no, why? ----------
i) Expensive to erect? ----------
ii) The neighbour's is enough and within reach?
Iii) Cultural (mention) ----------
iv) Others(mention) ----------

Observation
17(a)What is the type of housing occupied by the household?

		1993	1994
i)	Grass-thatched and walls smeared with mud	----	-----
ii)	Grass-thatched and cemented walls	----	----
iii)	Mabati-thatched and mud smeared walls	----	----
iv)	Mabati-thatched and cemented walls	----	----

(b) If it is of the types i), (ii), and (iii), why?

i) Financial constraints ----------
ii) Weather conditions ----------
iii) Cultural factors ----------
iv) Other (mention) ----------

18(a) What were/are family members' levels of education?

	Name	Years	Level attained
Parents:	----------	-------	----------
	----------	-------	----------
Children i):	----------	-------	----------
ii):	----------	-------	----------
iii):	----------	-------	----------
iv):	----------	-------	----------
v):	----------	-------	----------
vi):	----------	-------	----------

(b) If the children scored high points and never joined secondary schools, or joined "Harambee" schools, what were/are the reasons?

	1993	1994
(i) Financial constraints	----------	----------
(ii) Cultural factors	----------	----------
(iii) Others(mention)	----------	----------

(c) Whom among your children (i.e. gender) did/do you value educating in the prevailing economic status of the country?

	1993	1994
(i) Boys	----------	----------
(ii) Girls	----------	----------
(iii) Both	----------	----------
(iv) None	----------	----------

(d) How far did/do your children travel to reach school?

1993 ----------**km.** **1994** ----------**km.**

(e) What is the status of the school's teaching facilities?

(i) Permanent buildings/trained teachers/ teaching facilities ----------

(ii) Semi-permanent buildings/less than 3/4 trained teachers/insufficient teaching facilities ----------

(iii) Others(mention) ----------

19. Where did/does the household fetch water from?

	1993	1994

(i) Piped water -------- ---------
(ii) Borehole/stream/river -------- ---------
(iii) Others (mention) -------- ---------

20. What forms of transport network prevail within this region?

(i)Tarmac Roads/Airstrip/line/port ----------
(ii) Murram roads ----------
(iii) Impassable/muddy roads/ ----------
(iv) Others (mention) ----------

APPENDIX II

SUPPLEMENT TO CHAPTER FOUR

Table 4.1(a).

Producer Price Index (P.P.I) = 100/11(5/12 + 250/133 + 88/140 + 490/370 + 288/144 + 288/144 + 1600/500 + 900/400 + 10/4 + 250/125 + 150/125).

= 100/11(0.42 + 1.88 + 0.63 +1.32 + 2 + 3.2 + 2.25 + 2.5 + 2 + 1.2 + 1.47)

= 100(21.27)/11

= 207.16%.

Table 4.1(b).

Product Price Index(P.P.I) = 100/12 (600/1200 + 240/440 + 50/180 + 1200/200 + 7.5/14.5 + 22/30 + 6500/3800 + 700/450 + 600/300 + 100/60 + 60/45 + 18/12.50

= 100(0.5 + 0.55 + 0.28 + 0.6 + 1.20 + 0.73 + 1.7 + 1.56 + 0.5 + 1.67 + 1.33 + 1.44)/12

= 100(12.07/12

= 100.58%

Table 4.1(c).

Consumer Price Index(C.P.I) = 100/13 (40/50 + 17/13 + 59/40 + 10/6 + 13/7.5 + 12/7 + 45/34 + 60/48 + 19/10.5 + 43/49 + 12/4.5 + 5/1.5 + 12/5.5

= 100/13(0.831 + 1.48 + 1.67 + 1.73 + 1.71 + 1.32 + 1.25 + 1.81 + 0.88 + 2.67 + 3.33 + 2 + 18)

= 100/13(22.14)

= 2214/13

= 170.3%

Table 4.5(b).

Under 5 Mortality Rate(U5 MR) in 1993:

$$= \frac{\text{No of deaths aged under 5 in 1993} \times 1000}{\text{Total pop. Aged under in 1993}}$$

= 7/121 x 1000

= 57.9

Under 5 Mortality Rate (U5MR) in 1994:

$$= \frac{\text{No of deaths aged under 5 in 1994} \times 100}{\text{Total pop. aged under 5 in 1994}}$$

= 14/106

= 132.1

Over 5 years Mortality Rate (O5MR) in 1993:

= No. of deaths aged over 5 years in 1993 x 1000
Total pop. aged over 5 years in 1993
= 10/634
= 15.8

Over 5 years mortality rate(U5MR) in 1994:

= No. of deaths aged over 5 years in 1994
Total pop. aged over 5 years in 1994
= 9/667
= 13.5

Crude death Rate (CDR) in 1993:

= No, of deaths in the pop. in 1993 x 100
Total pop. in 1993
= 17/755 x 1000
= 22.5

Crude death Rate (CDR) in 1994:

= Total of deaths in the pop. in 1994 x 1000
Total pop. in 1994
= 23/773
= 29.8222

APPENDIX III

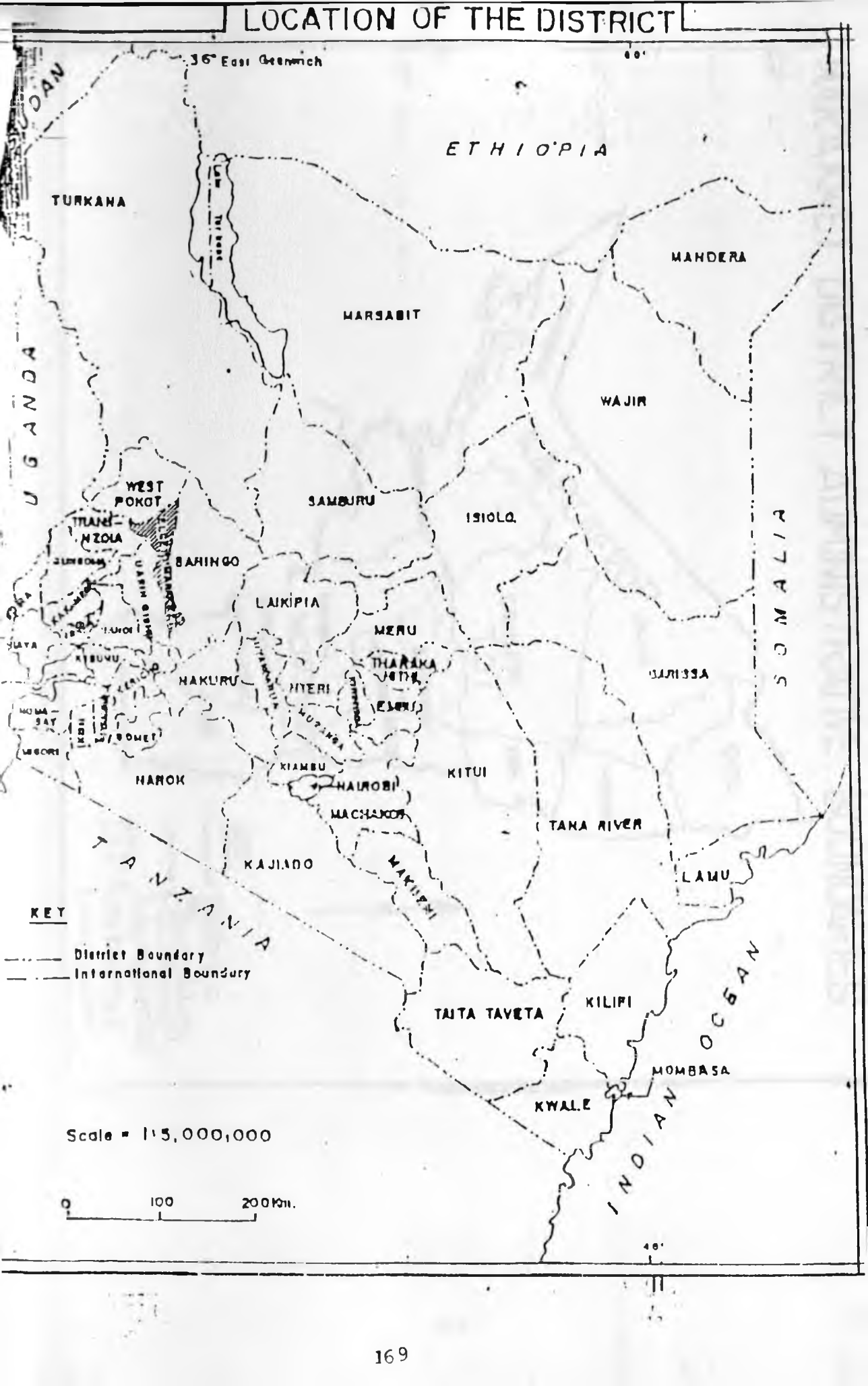
CODED DATA FOR ANALYSIS

ID	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V141	V142	V143
01.	613	0.46	0.67	0.33	0.49	7	0	0	0	613	0	0	0	0	0	1
02.	4418	0.65	0.38	0.50	0.51	10	0	0	0	4418	0	0	0	0	1	0
03.	4658	0.66	0.67	0.67	0.67	3	1	0	0	4658	0	0	1	0	0	1
04.	4453	0.65	0.46	0.17	0.43	4	0	0	0	4453	1	0	0	0	1	0
05.	685	0.53	0.28	0.50	0.44	5	1	0	0	685	0	0	0	0	0	1
06.	271	0.48	0.35	0.67	0.50	6	1	0	0	271	0	0	0	0	1	0
07.	3985	0.64	0.13	0.17	0.31	7	0	0	0	3985	1	0	0	0	0	1
08.	8963	0.80	0.37	0.33	0.50	5	0	0	0	8963	0	0	1	0	1	0
09.	947	0.61	0.40	0.33	0.45	7	0	0	0	947	0	0	0	0	0	1
10.	928	0.72	0.50	0.77	0.66	5	0	0	0	928	1	0	0	0	1	0
11.	601	0.57	0.54	0.33	0.48	6	1	0	0	601	0	0	0	0	0	1
12.	553	0.55	0.58	0.50	0.54	6	0	0	0	553	0	0	0	0	1	0
13.	456	0.57	0.49	0.17	0.41	7	1	0	0	456	0	0	0	0	0	1
14.	9948	0.83	0.77	0.33	0.64	8	0	0	0	9948	1	0	1	0	1	0
15.	5508	0.69	0.31	0.50	0.50	6	1	0	0	5508	0	0	0	0	0	1
16.	9154	0.81	0.32	0.17	0.43	9	0	0	0	9154	1	0	1	0	0	1
17.	837	0.19	0.39	0.17	0.25	8	0	0	0	837	0	0	0	0	1	0
18.	8750	0.79	0.25	0.50	0.51	7	0	0	0	8750	0	0	1	0	1	0
19.	4935	0.67	0.28	0.00	0.32	5	0	0	0	4935	0	0	0	0	0	1
20.	6832	1.00	0.61	0.33	0.65	6	1	0	0	6832	1	0	1	0	0	1
21.	931	0.33	0.29	0.00	0.17	9	0	0	0	931	0	0	0	0	0	1
22.	1050	0.84	0.73	0.33	0.63	11	1	0	0	1050	1	0	1	0	1	0
23.	874	0.37	0.45	0.17	0.33	7	0	0	0	874	0	0	0	0	0	1
24.	4622	0.46	0.38	0.33	0.39	10	1	0	0	4622	0	0	0	0	0	1
25.	1492	0.36	0.16	0.33	0.28	10	0	0	0	1492	0	0	0	0	0	1
26.	2638	0.59	0.61	0.50	0.57	3	0	0	0	2638	0	0	0	0	1	0
27.	4432	0.65	0.48	0.17	0.43	10	0	0	0	4432	0	0	0	0	0	1
28.	3278	0.61	0.26	0.50	0.46	7	0	0	0	3278	0	0	0	0	1	0
29.	1876	0.25	0.60	0.00	0.28	9	0	0	0	1876	0	0	0	0	0	1
30.	850	0.58	0.61	0.33	0.51	3	1	0	0	850	1	0	0	0	1	0
31.	2629	0.39	0.22	0.00	0.22	10	0	0	0	2629	0	0	0	0	0	1
32.	3277	0.61	0.40	0.17	0.39	7	0	0	0	3277	0	0	0	0	1	0
33.	5475	0.45	0.37	0.33	0.38	23	0	0	0	5475	1	0	0	0	0	1
34.	7620	0.76	0.44	0.33	0.51	9	0	0	0	7620	0	0	0	0	1	0
35.	613	0.50	0.35	0.33	0.40	7	0	0	0	613	0	0	0	0	1	0
36.	6766	0.56	0.28	0.67	0.50	10	0	0	0	6766	1	0	0	0	1	0
37.	2242	0.43	0.42	0.17	0.34	11	0	0	0	2242	0	0	0	0	0	1
38.	4271	0.64	0.62	0.33	0.33	7	1	0	0	4271	0	0	0	0	1	0
39.	536	0.39	0.19	0.17	0.25	6	0	0	0	536	0	0	0	0	0	1
40.	682	0.63	0.53	0.33	0.50	8	0	0	0	682	0	0	0	0	1	0
41.	518	0.26	0.60	0.67	0.51	8	0	0	0	518	0	0	0	0	0	1
42.	13875	0.97	0.28	0.50	0.58	10	0	0	0	13875	1	0	1	0	0	1
43.	2144	0.57	0.33	0.33	0.41	7	0	0	0	2144	0	0	0	0	0	1
44.	675	0.53	0.40	0.00	0.31	6	0	0	0	675	0	0	0	0	1	0
45.	901	0.60	0.24	0.00	0.28	9	0	0	0	901	1	0	1	0	0	1
46.	4172	0.64	0.70	0.33	0.56	7	0	0	0	4172	1	0	0	0	1	0
47.	576	0.56	0.42	0.00	0.33	6	0	0	0	576	0	0	0	0	0	1
48.	1017	0.85	0.35	0.83	0.68	6	1	0	0	1017	0	0	1	0	1	0
49.	793	0.24	0.45	0.50	0.40	10	0	0	0	793	0	0	0	0	0	1
50.	726	0.29	0.31	0.00	0.20	12	0	0	0	726	0	0	0	0	0	1
51.	708	0.16	0.21	0.00	0.12	11	0	0	0	708	0	0	0	0	1	0
52.	2358	0.58	0.50	0.33	0.47	5	0	0	0	2358	0	0	0	0	0	1
53.	4240	0.64	0.43	0.00	0.36	7	0	0	0	4240	0	0	0	0	0	1
54.	6783	0.73	0.31	0.50	0.51	4	0	0	0	6783	0	0	1	0	0	1
55.	5185	0.70	0.33	0.21	0.41	8	0	0	0	5185	0	0	0	0	0	1
56.	3625	0.62	0.26	0.17	0.35	6	0	0	0	3625	0	0	0	0	0	1
57.	2576	0.36	0.23	0.17	0.25	8	0	0	0	2576	0	0	0	0	1	0
58.	976	0.30	0.38	0.67	0.45	7	1	0	0	976	0	0	0	0	0	1
59.	4881	0.67	0.43	0.33	0.48	9	0	0	0	4881	0	0	0	0	0	1

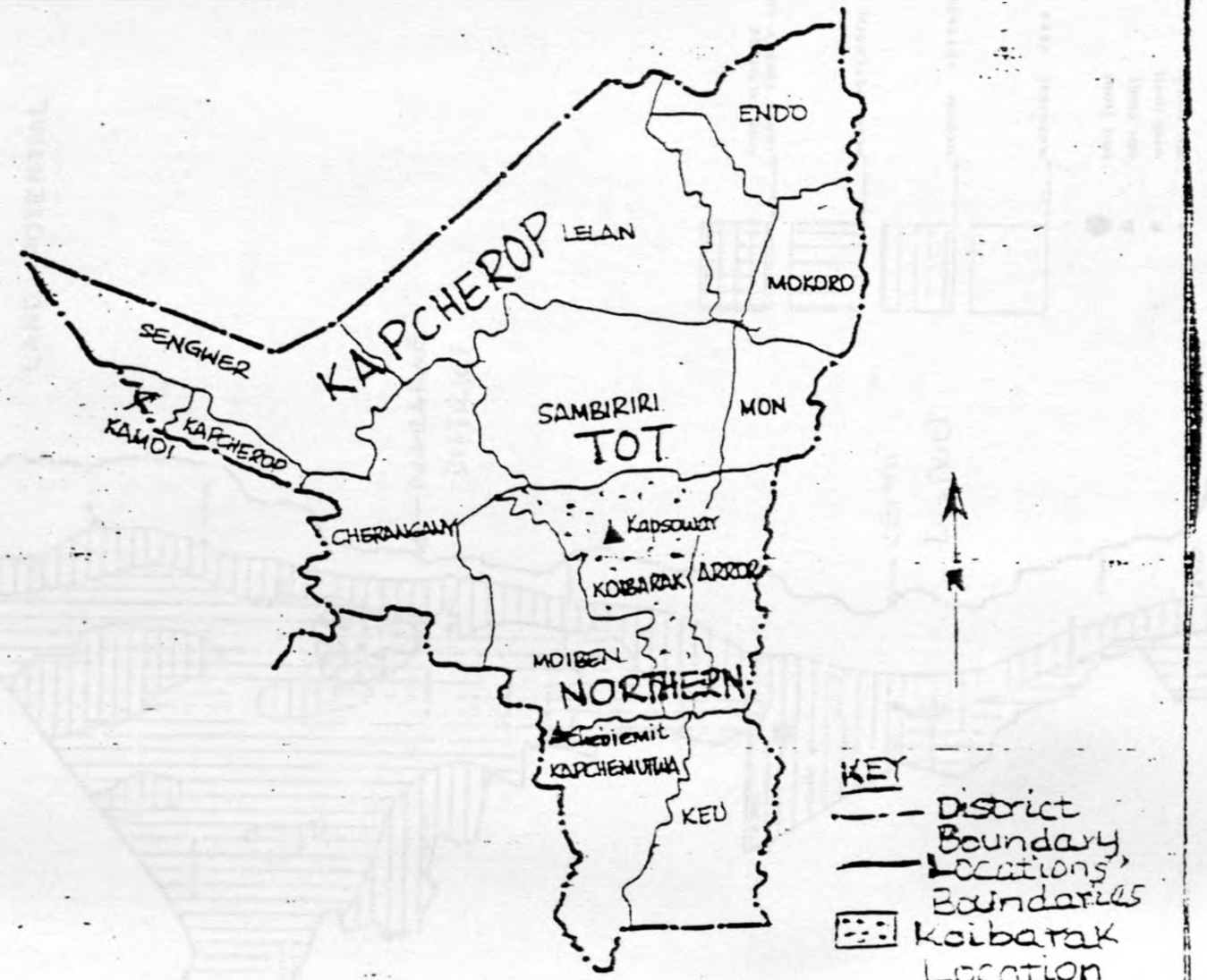
60.	5251	0.68	0.39	0.33	0.47	6	0	0	0	5251	1	0	0	0	1	0
61.	823	0.29	0.17	0.17	0.21	9	0	0	0	823	0	0	0	0	0	1
62.	30241	1.00	0.48	0.67	0.72	10	1	0	0	30241	1	1	1	0	1	0
63.	1906	0.43	0.36	0.00	0.26	6	0	0	0	1906	0	0	0	0	0	1
64.	10186	0.84	0.72	0.67	0.74	10	1	0	0	10186	1	0	1	0	1	0
65.	711	0.60	0.33	0.17	0.37	3	0	0	0	711	0	0	0	0	0	1
66.	4083	0.64	0.57	0.17	0.46	10	0	0	0	4083	0	0	0	0	1	0
67.	3042	0.33	0.42	0.17	0.31	11	0	0	0	3042	0	0	0	0	0	1
68.	23385	1.00	0.63	0.50	0.71	11	0	0	0	23385	0	1	1	1	0	0
69.	1776	0.23	0.13	0.17	0.18	8	0	0	0	1776	0	0	0	0	0	1
70.	6883	0.73	0.30	0.17	0.40	8	1	0	0	6883	1	0	0	0	1	0
71.	1162	0.45	0.38	0.00	0.28	7	0	0	0	1162	0	0	0	0	0	1
72.	621	0.54	0.50	0.33	0.46	5	0	0	0	621	1	0	0	0	1	0
73.	2715	0.23	0.53	0.50	0.42	10	0	0	0	2715	0	0	0	0	0	1
74.	6988	0.73	0.46	0.50	0.56	7	1	0	0	6988	1	0	1	0	1	0
75.	4319	0.62	0.17	0.00	0.26	6	0	0	1	4319	0	0	0	0	0	1
76.	5263	0.68	0.56	0.33	0.52	9	0	0	0	5263	1	0	0	0	1	0
77.	3404	0.62	0.21	0.17	0.33	4	0	0	0	3404	0	0	0	0	0	1
78.	5028	0.67	0.53	0.33	0.51	11	0	0	0	5028	0	0	0	0	0	1
79.	1169	0.36	0.70	0.33	0.46	9	0	0	0	1169	0	0	0	0	0	1
80.	1496	0.55	0.56	0.00	0.37	4	0	0	0	1496	0	0	0	0	0	1
81.	700	0.57	0.27	0.17	0.34	5	0	0	0	700	0	0	0	0	0	1
82.	2438	0.92	0.60	0.33	0.62	9	0	0	0	2438	1	0	1	0	1	0
83.	900	0.43	0.40	0.33	0.39	7	0	0	0	900	0	0	0	0	0	1
84.	600	0.56	0.25	0.33	0.38	6	0	0	0	600	0	0	0	0	1	0
85.	6072	0.70	0.40	0.00	0.37	7	0	0	0	6072	1	0	0	0	0	1
86.	475	0.51	0.34	0.17	0.34	8	0	0	0	475	0	0	0	0	0	1
87.	477	0.59	0.31	0.00	0.30	8	0	0	0	477	0	0	0	0	0	1
88.	633	1.00	0.30	0.33	0.54	6	1	0	0	633	1	0	1	0	1	0
89.	7177	0.74	0.65	0.17	0.52	13	0	0	0	7177	0	0	0	0	1	0
90.	11068	0.87	0.52	0.67	0.69	14	0	0	0	11068	1	0	0	0	0	1
91.	843	0.45	0.00	0.25	0.23	4	0	0	0	843	0	0	0	0	0	1
92.	6917	0.73	0.54	0.17	0.48	8	1	0	0	6917	0	0	0	0	1	0
93.	4734	0.66	0.33	0.17	0.39	11	0	0	0	4734	1	0	0	0	0	1
94.	6855	1.00	0.35	0.33	0.56	8	1	0	0	6855	1	0	1	0	1	0
95.	1498	0.99	1.00	0.31	0.77	7	0	0	0	1498	1	0	1	0	0	1
96.	2358	0.58	0.67	0.67	0.64	4	0	0	0	2358	0	0	0	0	1	0
97.	421	0.54	0.85	0.50	0.63	4	0	0	0	421	0	0	0	0	0	1
98.	5553	0.69	0.24	0.50	0.48	6	1	0	0	5553	0	0	0	0	1	0
99.	416	0.53	0.27	0.00	0.27	7	0	0	0	416	0	0	0	0	0	1
100.	9356	0.78	0.76	0.17	0.57	10	0	0	0	9356	0	0	1	0	1	0

Where **1= Yes or positive, 0= No or Negative**
for Variables V6, V7, V8, V9, V11, V12, V13, V141, V142, and V143

LOCATION OF THE DISTRICT



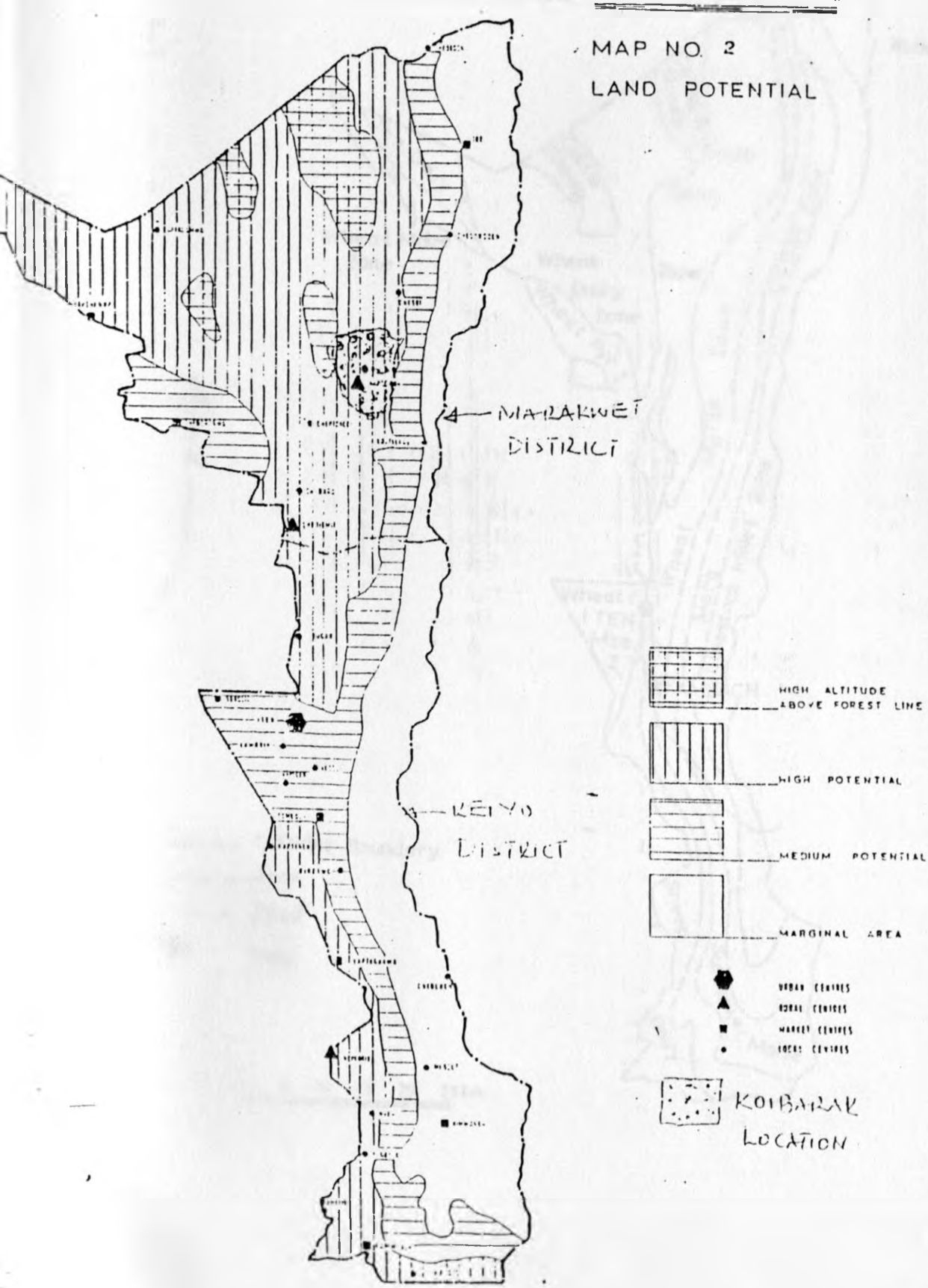
MARAKWET DISTRICT ADMINISTRATIVE BOUNDARIES

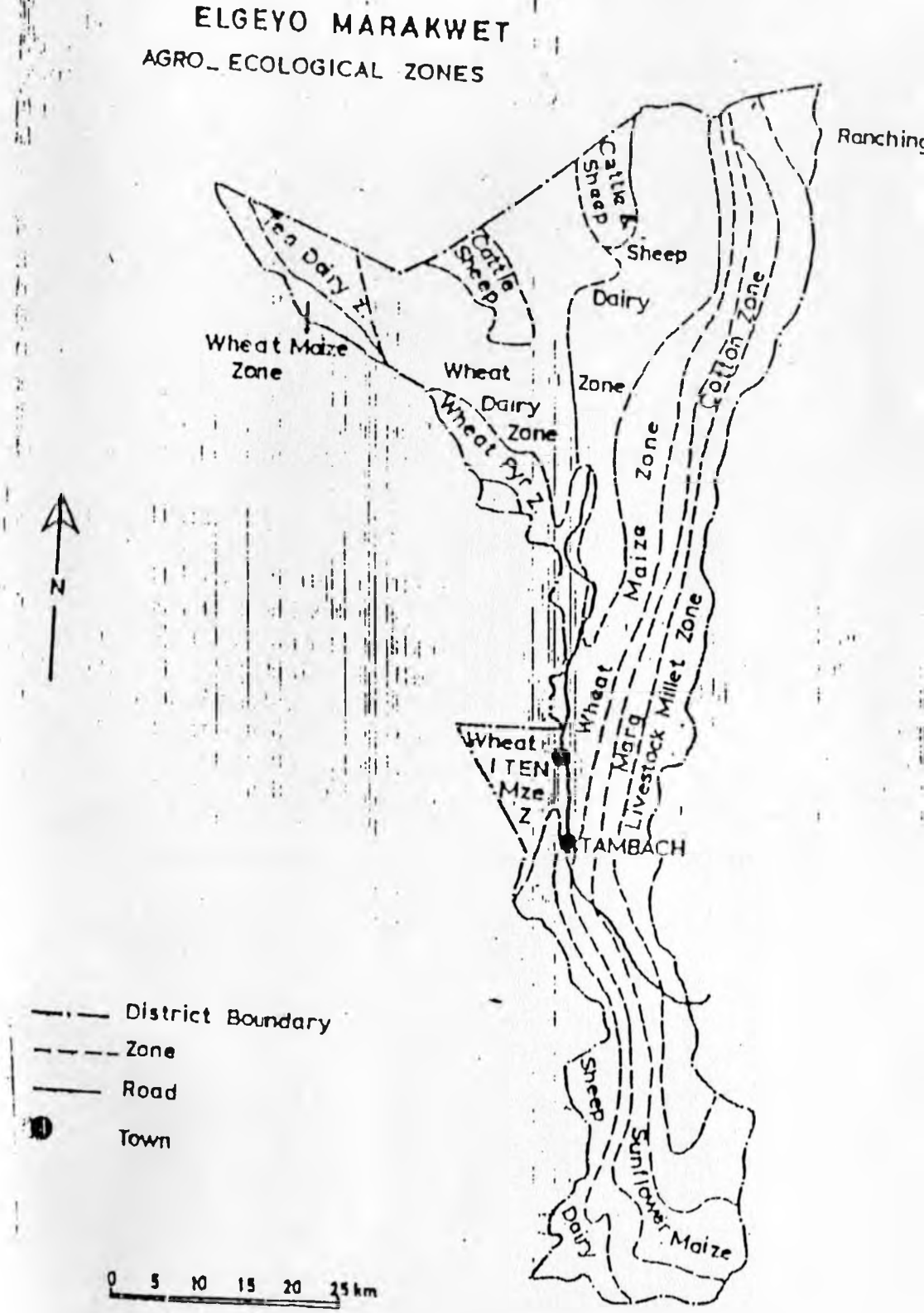


ELGEYO MARAKWET DISTRICT

MAP NO. 2

LAND POTENTIAL




ELGEYO MARAKWET
AGRO_ECOLOGICAL ZONES
Ranching
Cattle Sheep
Sheep
Dairy
Cattle Sheep
Tea Dairy Z.
Wheat Maize Zone
Wheat Dairy Zone
Wheat Pyr Z.
Cotton Zone
Maize Zone
Wheat Marg Livestock Millet Zone
Wheat
ITEN
Mze
Z
TAMBACH
N
District Boundary
Zone
Road
Town
0 5 10 15 20 25 km
Sheep
Sunflower
Dairy
Maize