IMPACT OF MACROECONOMIC REFORMS ON NUTRITIONAL STATUS

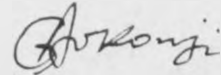## OF CHILDREN IN KENYA:

AN EXPLORATORY STUDY

by

Grace Achieng' Okonji

Presented to the Department of Economics of the University
of Nairobi in partial fulfillment of the requirements for a
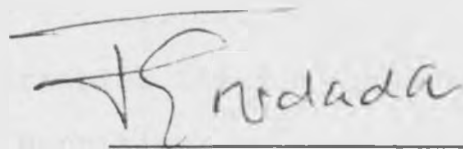Masters Degree in Economics on 30th June,1989.

This research paper is my original work and has not been presented for a degree in any other university.
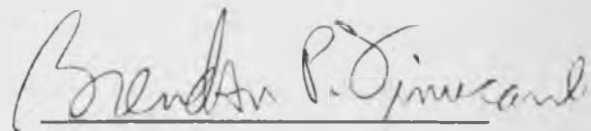
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This research paper has been submitted for examination with our approval as university supervisors.

DR. J.E.O ODADA

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LIST OF ABBREVIATIONS

NCPB	NATIONAL CEREALS AND PRODUCE BOARD
HA	HECTARES
KG	KILOGRAMS
KSHS	KENYA SHILLINGS
KSH/KG	KENYA SHILLINGS PER KILOGRAM
KCAL	KILO-CALORIES
G	GRAMMES
FAO	FOOD AND AGRICULTURAL ORGANIZATION
WHO	WORLD HEALTH ORGANIZATION
CMS	CENTIMETERS
USD	UNITED STATES DOLLARS
SDR	SPECIAL DRAWING RIGHTS
GDP	GROSS DOMESTIC PRODUCT
IMF	INTERNATIONAL MONETARY FUND
UNICEF	UNITED NATIONS CHILDREN'S FUND
LK	LINKAGE
MINS	MINUTES
MM	MILLIMETRES
F	FOOD

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ABSTRACT

This study investigates effects of macroeconomic reform policies on nutritional status of children over the period 1982 and 1988. The effects of the policies are analysed through changes occurring in household activities. Food consumption, food prices and household income are identified as the most important factors affecting nutritional status. These variables are linked to policies through changes in agricultural production. Data is derived from scanty secondary sources. The analytical approach adopted is comparative analysis and intuitive derivation of effects on nutritional status. The significance of the change in nutritional status is established by testing the difference between means over 1982 and 1988.

Nutritional status of children improved significantly in three districts studied. Malnutrition was reduced by 28.9% in Siaya; 11.6% in Muranga and 2.2% in Taita Taveta districts. Based on the limited data available, it appears that there was an improvement in nutritional status in the country over the period considered.

While the improvement on nutritional status is partly attributed to macroeconomic policies, there are non-policy factors also influencing nutrition. The improvement in nutritional status was found to be due to greater consumption of own produce. Changes in other sectors also affect nutrition apart from agricultural production.

CHAPTER ONE

INTRODUCTION

1.1 Shocks to the Economy:

Provision of adequate food to improve the nutritional status of the entire population has been a policy of the Government of Kenya since independence. Food and nutrition are the most fundamental of all basic needs. The agricultural sector plays the leading role of ensuring food security, food self-sufficiency and food distribution so that every member of the Kenyan society has a nutritionally adequate diet.[1] There are a number of areas which are not self-sufficient in production of basic foodstuffs. Such areas are not able to produce enough food to feed their population. For example, the share in total maize production in some parts of Kenya, viz central, Eastern and Coast provinces, is not proportional to their share in total maize consumption. On the other hand, provinces such as Rift Valley and Western are self sufficient in maize. Although some of these provinces are able to produce enough food staples, there are seasonal fluctuations in food availability that reduces the level of food stock at a particular time. Many districts within the provinces are faced with food insecurity, e.g. Kajiado, Laikipia, Taita Taveta. Some areas are self sufficient but are not able to retain an adequate level of stock for consumption. This is because food is sold after harvest to meet other needs or

due to lack of storage facilities. There are areas which are food insecure all the years, e.g. North Eastern, while some areas are food insecure at certain times of the year. Food insecurity in the deficit areas is met by redistribution of food from surplus areas. Even with acceptable average food supply, food security levels in certain parts of Kenya still fall below minimum acceptable levels because of inefficient distribution. The distribution in Kenya is through the National Cereals and Produce Board (NCPB), which is the official channel for sales and purchases of certain food crops.

Agricultural production expanded rapidly after independence. Agricultural GDP grew by 4.6% during the period 1964-72 (at 1972 constant prices). Considerable growth was achieved due to introduction of hybrid maize, redistribution of large estates to smallholders and growth of smallholder output. Kenya was able to maintain aggregate food self-sufficiency in a number of foodstuffs. The staple food crop, maize, showed steady growth. Between 1965 and 1981 per capita availability of nutrients was higher than FAO/WHO recommended minimum standards, as shown in Table 1.1. Despite these successes, there were many families with nutrient intakes below the recommended minimum standards. (Development Plan 1984-88, p.33)

Table 1.1: DAILY PER CAPITA NUTRIENT AVAILABILITY:1965-1981

Period	Calories	Protein
1965-70	2,412	62.9
1971-75	2,453	65.6
1976-80	2,385	64.6
1981-84	2,428	72.6
average 1965-81	2,428	64.8
FAO/WHO recommended		
average	2,362	46.0

Source: Republic of Kenya, Development Plan 1984-1988.

Good performance of the agricultural sector during the period after independence combined with high rate of growth of GDP (estimated at 6.5%), a healthy balance of payments and almost no inflation (less than 3%), placed the economy in a state of external and internal macroeconomic equilibria. After 1973, a series of shocks and crises led to a significant decline in growth and brought to the Government's attention the fact that there were growing structural problems. Disruptions in the world economy and internal imbalances affected the agricultural sector. The ensuing trends in food crop production, availability and

distribution was shaped by both the internal and external shocks, drought, and policies pursued during the period.

The economic structure was distorted following the first oil shock of 1973/74. Oil prices quadrupled in 1974, while import prices of other commodities increased by 30%. Export prices declined and international terms of trade declined by one third between 1970 and 1975. Deterioration in the commodity terms of trade led to deficits in the current account except for the year 1977. Agricultural exports, however, continued to dominate Kenya's external trade. In the period 1967-73, the agricultural share was 74.7% but it declined to 56.6% in the period 1979-81. The first oil shock was coupled with drought of 1974-75.

The second shock to the economy was the `coffee boom` of 1976 and 1977. There was an increase in real agricultural output of 9.5% in 1977. Farmers were allowed to receive the full benefit of the coffee boom without having to pay any taxes.[2] International terms of trade improved. The coffee boom period was characterized by increased investment by the public sector and lack of control over expenditure. The deficit in the Government budget rose from 7% of GDP in 1976 to 10% in 1980. With the decline in Government revenue after the boom, the overall budget deficit continued to increase and it proved difficult to cut recurrent expenditure (especially the salary component). In 1983-84 the deficit was reduced to 4%

of GDP and remained at this level in the following two years. The short lived coffee boom fueled inflation (estimated at 12.7% in 1977) through increases in the money supply.

The economy experienced a third shock in 1979/80. This second oil shock led to a decline in export prices while the import bill increased. Earnings from coffee exports as a percentage of total export earnings,for example, fell from 42.2 in 1977 to 22.2 in 1980 while net oil imports accounted for 17% of the total import bill after the second oil shock compared to 7.6% after the first oil shock. International terms of trade declined by nearly 50% between 1977 and 1983. Because of the drought of 1979/80, food crop production declined, leading to massive imports of food. In 1984, the economy was hit by yet another serious drought causing agricultural production to fall by 3.9%. However, the possibility of famine was averted due to policies pursued in previous years (e.g. producer incentives) and a mini boom in tea. The shortfall in maize was met by food imports. The country experienced a second but short lived coffee boom in 1986. The international terms of trade improved by 12% from 1985 to 1986. There was a record maize harvest of 32.5 million bags. The following year experienced a decline in international terms of trade and a decline in maize production of 25%.

While it appears that external factors were responsible for the shocks, there are other explanations to the decline in food crop production other than the shocks to the economy. A change occurred in the source of growth in agricultural sector. Subdivision of land came to an end. Openness of foreign markets to the agricultural sector led to export products representing the greatest share of value of agricultural production and making the sector more dependent on commercial and exchange rate policies of international economic conditions. It is believed that lack of policy discipline was a major cause of decline in food availability. An overvalued exchange rate discouraged agricultural exports. Since the mid seventies, the Kenyan shilling was pegged to the SDR. Inspite of large deficits in the current account after the coffee boom years, the Government maintained an overvalued currency.[3] Furthermore, the Government maintained low producer prices in the official marketing channel, increased instability in production and exacerbated price differentials by preventing free movement of the major food crop (maize) within the country. This lowered incentive to producers.[4] In 1980, a food shortage occurred and the Government was forced to import not only maize, but also wheat and milk to meet the deficit in production. During the period 1970-1985 growth of volumes sold to National Cereals and Produce Board (NCPB) was 2.4% while maize sales by NCPB grew at 9.2%

annually. This represents a growth in net sales of 6.8%. Food imports grew at 6.4%. This was higher than growth rate in maize production which was only 3.9% annually. During these periods of shocks and problems in the agricultural sector, studies carried out on nutritional status found out that the incidence of malnutrition, especially protein energy malnutrition which is caused by lack of food, was prevalent in certain pockets of Kenya and became more severe at the national level.[5] (See Table 1.2)

Table 1.2: PERCENT OF CHILDREN 1-4 YEARS OLD STUNTED AND MEAN

HEIGHT FOR AGE IN, 1977, 1979 AND 1982, BY PROVINCE

	1977		1979		1982	
	Percent stunted	Mean (cms)	Percent stunted	Mean (cms)	Percent 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	93.3
Nyanza	21	94.7	34	93.6	33	93.4
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 Nutrition Survey,

1982. Nairobi 1983.

1.2   The Reform Experience:

1.2.1   Government Response to the Shocks:

The shocks to the economy made it necessary for the Government to implement macroeconomic reform policies aimed at restructuring the economy. The problems facing the economy and the policies to tackle them were identified in various Government documents. After the first oil shock in 1975, the Government imposed strict import controls, credit restrictions, direct price controls and restrictive budgetary policies.   These measures were spelt out in Sessional Paper No.4 of 1975 on "Economic Prospects and Policies".   A major focus of the policies at this stage was to improve the balance of payments.   The exchange rate regime was changed from a fixed peg to the dollar to a flexible rate based on a basket valuation and calculated in real terms.   Devaluation of the Kenyan shilling has been successfully implemented.   The shilling was devalued by 12% with respect to the SDR in 1975.   In September and December, 1982, the shilling was devalued by 14% and 15%, respectively.   (See Table 1.3)

TABLE 1.3:   EXCHANGE RATE

Year	1980	1981	1982	1983	1984	1985	1986	1987
Ksh/ USD	7.57	10.29	12.73	13.76	15.78	16.28	16.04	16.52
Ksh/ SDR	9.66	11.95	14.06	14.42	15.18	17.72	19.14	19.66

Source: Economic Survey, Various issues. End of year rates.

The coffee boom of 1976/77 made the Government to abandon earlier policies aimed at stabilization of the economy. It was not until the collapse of the coffee boom and onset of the second oil shock, that the Government undertook serious measures to correct the imbalances. The Government also received a balance of payments support from bilateral donors. Foreign exchange reserves which had been run down, except for the coffee boom period, were to be raised through borrowing from external donors. The budget deficit following the collapse of the coffee boom was financed from borrowed funds.

Fiscal management and budget expenditure reform constituted a major part of the Government's effort to control its expenditures and raise its revenue after the coffee boom of 1976/77. Both Government revenue and expenditure increased significantly after independence. Between 1965 and early eighties tax revenue accounted for 15% and 35% of GDP, respectively. Expenditure restraint has been a major policy of the Government since 1982. Report of the working party on "Government Expenditure", called for reduction of involvement of the Government in the economy including sale and closure of some public enterprises. It also called for the need for improved management in the public sector to raise efficiency and limit expenditures. Following these recommendations, there has been a three year forward budget to plan for expenditures. This is

complimented with budget rationalization through expenditure restraint and efficient investment planning and execution. There was a change in the structure of the budget. From 1964 to 1973, Government expenditure on basic needs (health, education and social services) had the highest annual growth rates. These priorities were reversed in the decade after 1973 with general services expenditure growing faster than other types of expenditure.

1981-83 was a period of severe budget restrictions. Budgetary outlays per capita decreased by 4.6%. Social services expenditure fell by 7.1% per annum. In the period 1981/82 to 1983/84, Government Development expenditure as a percentage of GDP declined from 23.2% to 21.5%. The share of total Government expenditure in GDP fell from 34% to 26%. The budget deficit was reduced to less than 5% of GDP in 1983. In 1986 it rose again to 7.3% of GDP. Expenditure reductions have been aimed at specific sectors and functional categories. For example, in the agricultural sector the Government cut capital expenditures rather than recurrent expenditures.(see Table 1.4)

Table 1.4: PUBLIC EXPENDITURE ON AGRICULTURE BY MAJOR

FUNCTIONAL CATEGORIES AS PERCENTAGE OF TOTAL

	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
Recurrent Expenditure						
Crop Development	37	35	40	65	34	24
Livestock Development	26	33	27	15	30	29
Land and Farm Development	5	5	4	2	5	2
Agriculture and Livestock Education	18	18	15	9	15	23
KARI	–	–	4	2	5	5
Development Expenditure						
Crop Development	61	66	44	54	63	57
Livestock Development	18	17	28	23	9	12
Land and Farm Development	7	6	12	12	17	13
Agriculture and Livestock Education	7	6	8	8	3	1
KARI	–	–	–	–	–	9

Source: The Application Accounts; various years.

The Government has actively used agricultural pricing policy to create incentives for increased agricultural production. Producer price increases have exceeded price increases in every year since 1980. (See Table 1.5).

Table 1.5: Agricultural Producer Prices[1]

Percent changes.

Year	Nominal	Real
1977	+11.6	+ 0.5
1978	+ 1.5	- 6.9
1979	+ 0.7	- 5.1
1980	+15.9	+ 4.8
1981	+ 4.0	+ 0.6
1982	+ 6.5	+ 3.7
1983	+29.8	+25.4
1984	+ 7.7	+ 5.2
1985	+28.6	+18.9
1986	+ 6.5	+ 2.4

1 Cereal prices deflated by input prices.

Source: Economic Survey and Statistical Abstract,various issues.

A complimentary approach in agriculture is to focus Government services and investment increasingly on support

of agricultural research and extension, emphasizing infrastructure development and similar activities. Food and nutrition became so crucial after 1980 that the Government issued Sessional Paper No.1 of 1981 on "National Food Policy". The specific objectives of the policy were to:

(i)   maintain a broad self-sufficiency in the main foodstuffs in order to enable the nation to be fed without using scarce foreign exchange on food imports;

(ii)   achieve a calculated degree in security of food supply for each area of the country;

(iii)   ensure that these foodstuffs are distributed in such a manner that every member of the population has a nutritionally adequate diet. (GOK, 1981, P.2.)

The policy measures undertaken included wage restraint which was introduced in 1973, relaxed in 1976 and strictly enforced in 1982. The average wage rate dropped by 15% in 1983 and by a further 4% in 1985. Between 1964 and 1980 the Government increased its share of public wage employment from 30% to 50%. This trend is unlikely to continue due to limited expansion possibilities. Monetary policy became a major issue after the collapse of the coffee boom. Restrictive credit policy was also imposed since 1982. Interest rates have been adjusted to positive levels in order to eliminate the excess demand for credit, and markets

have been freed to determine interest rates and to promote new credit instruments and institutions (e.g. more credit to agriculture). From 1982, there have been moves toward import liberalization. This has only achieved much progress after 1985.

The above policies were documented in the fourth Development Plan, 1979-1983. After the second oil shock and the recession of 1981/82, the economy was faced with new problems that called for revision of the plan. Revised policies and strategies were contained in Sessional Paper No.4 of 1980 on "Economic Prospects and Policies," and in Sessional Paper No.4 of 1982 on "Development Prospects and Policies." The need to revise the Development Plan was also due to increased borrowing by the Government from external donors that called for realistic policies. In 1986 the Government issued Sessional Paper NO.1 of 1986 on "Economic Management for Renewed Growth" which outlines the present goals of the Government and structural reforms to be undertaken. The Sessional Paper formed the basis for the current, 1989-1993 Development Plan. On the basis of these documents, the Government entered into agreements with the World Bank and the IMF for financial assistance. It was now clear that the Government could not finance the external deficit from long term capital inflows. The IMF and the World Bank Policies are however, subject to conditionality and a reform macroeconomic policy package in which the

period of implementation is defined and limited and subsequent borrowing are based on past performance criteria.

A typical reform package in Kenya consists of: exchange rate devaluation; reduction of government deficit; restraining expenditure to generate saving for emergency relief; ceiling on net domestic assets of the Central Bank and Government borrowing from the banking system with implicit understanding of good management of exchange rate, elimination of the import deposit scheme and progressive implementation of trade liberalization; increased agricultural prices; reduction of bank lending and reforms in credit policy;stronger market and price initiatives and reorientation of export markets; and import liberalization and maintenance of Kenya's external competitive position.

1.2.2   Experience with the World Bank and the IMF

Kenya was one of the first countries to benefit from the IMF's Extended Fund Facility in 1975. Approval was given on the basis of the revision of the 1974-78 Development Plan as spelt out in Sessional Paper No. 4 of 1975. Conditions included devaluation of domestic currency by 12%. A small withdrawal was made but the coffee boom of 1977 pre-empted further withdrawals. In 1978, a standby agreement was signed with the IMF but was cancelled and replaced with 1979 standby agreement to enable the country to withdraw from the upper credit tranche. Conditions

included: ceilings on net borrowing by the Government from the Central Bank; elimination of the export deposit scheme which had been introduced in 1978 and acceptable management of the exchange rate. The Government was not able to comply with these conditions and the agreement was replaced in 1980 with another standby programme. The standby programme with the IMF was based on Sessional Paper No. 4 of 1980. Conditions included ceiling on Central Bank lending to the Government and trade liberalization. The Government was not able to comply with these conditions because Government borrowing from Central Bank was increased to finance public salary increases, defence expenditure and food imports. Only a small withdrawal was made and the agreement was cancelled in 1981. In the same year (1980), Kenya was one of the first countries to qualify for structural adjustment loan of the World Bank. The main objectives of the loan were to: rationalize industrial protection; study and simplify the administration of the export compensation scheme; promote efficient use of external resources; and enhance the effectiveness of public investment. Conditions included: reduction in budget deficit; change in the manner of deficit financing; trade liberalization; export promotion; and reform of the interest rate regime.

Kenya benefited from a second structural adjustment loan by the World Bank in 1982. The main objectives of the loan were to: achieve structural reforms in the industrial

sector; reduce excessive industrial protection; hasten the process of liberalization; study and design a more uniform tariff structure; develop and implement an export insurance and financing scheme; achieve Government divestiture from commercial activities; and start gradual devaluation of the Kenya shilling.

In a review of the two structural adjustment loans, it was realized that the conditions were too many and too complex to implement within the given period. In 1982 the Government negotiated a standby programme with the IMF. Conditions included ceilings on Central Bank lending to the Government; reduction of budget deficit from 10.6% to 7.5% of GDP; commitment to import liberalization in the medium term; and devaluation of the Kenya shilling in two trenches of 14% and 15%, respectively. Both the IMF and the World Bank agreements of 1982 were based on Sessional Paper No. 4 of 1982.

In 1983 a standby arrangement was reached between Kenya and the IMF with conditions calling for realignment of the exchange rate, reduction of Bank lending, a reform in the credit policy, and increased agricultural prices. This was the first programme to be fully implemented. The 1985 agreement with the IMF included restraining expenditure to generate savings for emergency relief, stronger market and price initiatives, a reorientation of the Kenyan economy towards export markets, import liberalization, and

maintenance of Kenya's external competitive position. Following poor implementation of the previous structural adjustment loans, the World Bank decided on a more disaggregated sector specific operations loan. The first of such loans was contained in the 1986 agreement. The objectives were to: improve production and investment incentives through marketing and pricing reforms, support restructuring of the public investment and expenditure programmes, support import of agricultural inputs, improve agricultural extension services, increase credit availability to smallholders and improve agricultural research.

The issues that emerge from these policies are that the World Bank policies are mainly sector specific, medium term and growth oriented while the IMF policies are mainly short-term in nature. Standby programmes dominate the IMF policies. The polices of the IMF and the World Bank can be grouped into two broad categories i.e. demand management and supply promotion policies. The demand management side would include, among others, devaluation, wage restraint, reduction in net borrowing by the Government from the Central Bank and cuts in public expenditure. The main objective of demand management policies is short term adjustment (stabilization of balance of payments, reduction of budgetary deficit and control of inflation). Demand management policies are favoured by the IMF. They usually

involve reduction in output in the short run. Supply promotion policies are mainly medium term in nature and aim at augmenting the supply of domestically produced goods and services. They include institutional reforms, devaluation, reforms in interest rate structure, price decontrol, export promotion and trade liberalization. These are typical of the World Bank policies. Some of the policies overlap. For example, devaluation works from the demand and supply sides. Supply side of policies is growth oriented. The World Bank policies are based on the fact that growth is necessary for the improvement of living standards, but as the Managing Director of the IMF put it;

> "the forms of adjustment that are most conducive
> to growth and to protection of human needs will
> not emerge by accident. They have to be
> encouraged by an appropriate set of incentives and
> policies"[6]

The IMF and the World Bank seem to agree on policy direction. For example,while structural adjustment loans have been associated with the World Bank, in 1987 the IMF also released its first structural adjustment facility. Coordination is shown in similarity of conditionality. Therefore it does not make much practical sense to separate the two. The nature of the policies is summarized as follows:

"the policies aim at adjusting prices to scarcity
values, freeing the market to determine prices,
shifting resources from Government into private
hands, rationalizing Government's remaining role
in development and reforming institutions to carry
out Government's new role" (Roamer, 1988)[7]

The policies are pro-market, pro-private sector and
pro-open liberalized economy. Killick (1984) in a review of
the IMF activities summarized the objectives as;

"Strengthening of the balance of payments
situation was invariably the primary aim.
Objectives concerning inflation and growth were
secondary, while the distribution of income and
wealth scarcely featured at all among the stated
aims"[8]

There is a greater tendency towards macroeconomic
aggregates and human aspects are ignored at the time of
design of policies or left to the trickle down theory of
growth. Controversies arise over implementation of these
policies. The policies may have affected the human
dimension in a manner not intended. These sentiments have
been expressed at a number of national and international
forums in the last few years.UNICEF's report by Cornia et
al, calls for adjustment with a human face as a result of
deterioration in human life in some countries. The World
Bank has of late recognized the need for studies and

projects on social dimension of adjustment policies. A recent study by the IMF and the World Bank has expressed concern that adjustment policies might have had adverse effects on poverty groups.[9]

1.3 Statement of the Problem

Macroeconomic reform policies have been focused on macroeconomic aggregates (growth, inflation and balance of payments) with little or no attention on the human aspects,[10] yet these policies frequently include changes that are of particular concern to rural households, e.g. reduction on government expenditures, increased food prices and reduced real wages. (Pinstrup-Andersen (1987).

Controversies arise over continued implementation of the policies. Short term demand management policies are more controversial because they involve reduction of output, employment and incomes. Such reductions imply that sacrifices are made in the short run. The Kenya Government is committed to continued implementation of these policies but the impact of the policies both at the macro level and at the human level is not known. In particular while the Government continues to pursue the goal of improving the nutritional status of the population, (Sessional Paper No.4, 1981), the impact of macroeconomic reform policies on nutritional status still remains an empirical question.

The policies affect different groups differently. Some groups are likely to benefit in the short run while others bear the burden of economic reform. On the other hand, some groups who bear the burden in the short run may or may not benefit in the long run. The direction and magnitude of the effect of these policies on nutritional status in Kenya have not been studied.

1.4 Objective of the Study

The objective of this study is to investigate the impact of macroeconomic reform policies on nutritional status of children in Kenya with a view to making appropriate recommendations on possible measures that can mitigate their negative effects.

1.5 Significance Of The Study

Recent annual budget speeches of 1986/87 and 1987/88, Budget Rationalization Document and Sessional Paper No. 1 of 1986, are indications of the Government's continued commitment to reform the economy and to incorporate structural adjustment policies in the planning process. It is therefore important that this study attempts to reduce the existing knowledge gap by bringing to Government's attention the overall impact of past policies on the important human aspect-nutrition. This may assist the Government to incorporate appropriate measures in the design of future policies that can help to protect the nutritional status of the population. The information generated will also assist the Government to strengthen the activities already existing that are aimed at achieving the goal of improving the nutritional status.

Assessing the effects of macroeconomic policies on nutritional status of children is important because nutritional status of children is a sensitive indicator of change occurring in households' resources. Furthermore, the consequences of malnutrition in children which manifest themselves in stunting or mental retardation are irreversible. The `trickle down` process which was intended to improve the welfare of the population does not seem to work. Even if it did work, there is no assurance that the same people who get hurt in the short run will benefit in

the long run. For example, adjustment policies are justified on the ground that short run costs are acceptable because long run benefits will outweigh the costs. The question to ask is who bears the immediate burden of adjustment? (Addison and Demery 1985). There is no evidence that the same child who is stunted in the short run will benefit in the long run. A malnourished labour force cannot be the basis for a robust economy (Jolly, 1987). The future labour force must be protected now by generating information from this study that will assist towards achieving the long term goal of the Government.

Studies that have been carried out in Kenya on nutrition have not linked the problem of malnutrition to macroeconomic reform policies, yet these policies have dominated the economic and development issues in Kenya since early eighties.[11] Studies that have been done in other parts of Africa, Asia and Latin America point towards negative effects of macroeconomic reforms on children. There is therefore a need to determine whether the situation is the same in Kenya and recommend measures that can assist the Government in protecting its future labour force.

End Notes

1. Details of strategies to increase food production are contained in Sessional Paper No 4 of 1981 on "National Food Policy".

2. Killick criticized the Kenyan authorities for making no attempt to offset the expansionary monetary effects by proceeds from the "coffee boom" see page 190 of "The IMF Stabilization edited by Killick,

3. For more discussion on Kenya's attitude to devaluation see Killick Page 191-192. (see as 2)

4. In 1976 and 1977 NCPB could not purchase all that farmers supplied, private traders could not absorb the surplus due to restrictions on regional movements of maize farmers responded by reducing the area planted. See 1 above page 6.

5. Stunting was defined as percentage of children below 90 percent of the international standard median height for age. Usually it indicates nutritional deficiency in the early period of a child's growth.

6. Address by Mr DeLarosiere before the economic and social council of the nations as cited in Food and Nutrition Bulletin page 87.

7. For detailed analysis of each aim see Roamer pages 5-12. "Macroeconomic Reform in Developing countries."

8. Citation by Killick in Food and Nutrition Bulletin March 1987 page 69.

9. See for example, study by unicef edited by Cornia,et al, Adjustment with a human face Vol 1 and 2. see also the World Bank and the Fund study entitled" Strengthening efforts to reduce poverty," and unicef publication, "The State of the World Children"(1989)

10. See for example studies by Rwegasira d., Killick T., Van der Hoeven and Vandemoortele.

11. See historical review of studies done on food and nutrition in Kenya in Jansen, Horelli and Quinn ed.

CHAPTER TWO

REVIEW OF LITERATURE

2.1 Identification Of Variables Linking Macroeconomic Reforms to Nutrition.

Very little research has been done on short-term effects on the nutritional status of children of adjustment and reform policies and hence empirical evidence was until recently nearly non existent. Pioneering work on this aspect has been undertaken by UNICEF in some countries of Asia, Africa and Latin America (See UNICEF report edited by Jolly, Cornia and Stewart,1987). Case studies are available for Zimbabwe, Botswana, Brazil, Chile, Ghana, Jamaica, Peru, Philippines, South Korea and Sri Lanka. These studies focus on impact of adjustment and reform policies on vulnerable groups. Groups identified as vulnerable vary between countries but almost all the studies identify children of low income households as vulnerable, particularly the age group of less than five years. None of the studies focus specifically on nutritional status which is simply treated as one of the outcome indicators of child welfare. All the studies point toward controversies in implementation of adjustment policies and its effects on child welfare.

Studies available have identified variables whose changes overtime are related to child welfare (changes in nutritional status, mortality rates, disability, child infection and disease), and these variables have been shown

to change during periods of adjustment in some countries.Studies available point to the evidence that the causal factors linking policies to child welfare are numerous and complex.

Variables identified in the studies can be grouped into three categories and include;input variables which influence availability of resources for children. Household money income and distribution has been used in studies by Macedo (1988); UNICEF (1988a); UNICEF (1988b); Boyd (1988); Figueroa (1988); Suh and Williamson (1988). Data available from these studies show an increase in proportion of people below the poverty line, except for a study by Suh and Williamson in South Korea. The inequality in the distribution of income to some degree reflects the unequal distribution of agricultural land,for example in Jamaica. Restraint on government expenditure has been implemented by most countries particularly restraint in education and health expenditures. Its effect on access to services vary in different countries. Most studies document that real government expenditure per capita in the social sector declined in most of the countries (Macedo, 1988; Figueroa, 1988; Raczynski, 1988; Boyd, 1988; Davies and Sanders, 1988; UNICEF, 1988c). Expenditure on food subsidies show close linkage with nutritional status in studies by Raczynski (1988); Figueroa (1988) and Davies and Sanders (1988).

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The second set of variables show availability and use of food and key social services needed for the production of child welfare. These variables indicate the changes that took place between input variables and outcome variables. Changes in the availability and use of food show changes in food consumption by households. In a number of countries where economic reforms have been undertaken, the cost of a basic basket of goods required by households exceeded the income of many households. Moreover, in some countries, price increases were on all items making it impossible for substitution of food within or outside the basket. (See Quinn et al 1988; UNICEF 1988a; Boyd 1988). Other process variables linking policies to outcome variables are; access to government services and access to educational facilities. Data available on access to health services and access to education services show an improvement in some case studies and a decline in others. (See Boyd 1988; Macedo 1988; UNICEF 1988a; Raczynski 1988; Suh and Williamson (1988).

The third set of variables are outcome variables which show survival and welfare of children. Findings from studies available show deterioration in nutritional status through increased rates of malnutrition. Boyd (1988) used secondary data on nutrition for two periods, 1977 and 1985. He found out that in Jamaica children 0-4 years showing signs of malnutrition increased from 39% to 41%. Quinn et al (1988) in analysis of the response of Botswana to

economic recession found out that there is relationship between malnutrition and crop production. Deterioration in nutritional status of pre-school age children in Philippines is shown in a study by UNICEF (1988b).In Sri Lanka, UNICEF (1988c) found out that the combined effects of falling real wages, rising food prices and food stamps led to high rates of malnutrition. Davies and Sanders (1988) found out that although Zimbabwe passed on some of the economic costs of adjustment to households, the package adopted did not adversely affect child welfare. Child/infant mortality rates are used as outcome of child welfare. The complex linkage between human nutrition and variables influenced by economic crises and macroeconomic policies has been traced by Pinstrup-Andersen (1987). He identified two variables that directly influence nutritional status, that is, health and food consumption. He analyzed the likely impact of policies on health, food prices, food consumption and the consequences of these changes on nutritional status. The study is incomplete and concentrates on identifying areas for further research.

2.2 Overview of Literature:

It is clear that literature available on nutritional status effects of macroeconomic reform policies is scanty. More information is needed to explain the complex causal linkages between adjustment policies and nutritional status.

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Literature available gives scanty, scattered and sometimes data which is generated over different periods, making it difficult to draw conclusions.For example, Boyd's study in Jamaica gives data on malnutrition for the period 1978-1985, while data on income distribution is for the periods 1958 and 1971/72. Malnutrition and income distribution are related. Such differences do not allow data to be interpreted in a meaningful way. Studies conclude that nutritional status has deteriorated in most of the countries where macroeconomic reform policies have been implemented. They do not tell us much about the factors that brought about such deterioration. It is therefore difficult to identify which of the variables led to change in nutritional status. Variables used in explaining child welfare have their limitations in explaining nutritional status. Infant/child mortality rate is used as an outcome indicator of child welfare but as an indicator of nutritional status it is not a good indicator. There are many causes of infant/child mortality. Malnutrition could be one of them. Most studies have focused on short-term effects of policies. This is in order considering the shocks the countries went through in the seventies, which needed immediate solutions. The short term analysis is also justified considering that there were many short term policies ranging from one to three years which overlapped with medium term policies. Policies have mainly been

analyzed from demand side. There is need to analyze supply side of policies as well.

There is a problem of whether to analyze a package of policies or specific policies. Policies are interrelated. It is difficult to isolate them into specific policies. Cornia (1987) groups policies into three categories: expenditure reducing policies, expenditure switching policies and institutional and policy reforms. This is convenient for analytical purposes but does not solve the problem of policy overlap.

The greatest weakness in the studies is lack of data availability in a coherent manner. Better data is needed to explain why malnutrition rates changed.

The present study borrows a lot from the past studies to investigate whether macroeconomic reform policies have had any effect on the welfare of children. Unlike the past studies, the present study is focused on one aspect of child welfare - nutritional status. The present study makes an attempt to trace the variables closely linked to nutritional status and policies through agricultural production. Some variables used in the past studies may be very useful but have not been used in the present study because of lack of data, e.g. mothers' time allocation. Time use for example, is an important indicator of individuals total energy requirements estimated on the basis of energy these individuals would spend if they had no activity, and how

much time is allocated to child care but in rural areas data on time use may only be reliable if collected over a period of one year to capture seasonal changes. The present study is focused on short term effects of demand management and supply promotion policies. It follows the same concepts of grouping variables into input, process and outcome variables.

CHAPTER THREE

3. CONCEPTUAL FRAMEWORK AND METHODOLOGY

3.1 The Conceptual Framework

The relationships between nutrition and macroeconomic reform polices are numerous and complex. Protein-energy malnutrition is the focus of this study. Therefore, the conceptual framework presented here is focused on the effect of the policies on nutrition through changes in agricultural production. The flow chart in Figure 1, traces these changes through effects of selected policies.

The conceptual framework is based on three important assumptions:

(i)   It is assumed that households' activities are aimed at maximizing nutritional status of their children.

(ii)   It is assumed that all activities in which households have control are reflected in their consumption patterns.

(iii)   It is assumed that households have access to both product and factor markets and can therefore buy and sell food, non-food labour and other inputs at different times of the year.

Based on these assumptions, the nutritional status of an individual is influenced by food consumption. Food

consumption by an individual at risk of being malnourished, i.e. a child is determined by availability and use of food in the household.(see linkage no. 1,hereafter referred to as LK.1)

The key factors influencing food consumption are households income and prices of food and non food commodities that the households wish to acquire (LK.5 and LK.2). Food availability determines access to nutrients by households, therefore it is important that households have access to the type of food that provide adequate nutrients for normal growth. Food prices and household income are the major factors influencing demand and supply of food, and hence food availability (LK.7 and LK.6). Food prices are influenced by supply related factors, e.g. domestic food production (LK.8), and demand related factors, e.g. income (LK.3). It is assumed that lower food prices should result in more food consumption. The command of households over food availability is likely to be determined by the level and sources of income. High prices of food may deny many households access to the proper nutrients. This depends on whether households depend on the market for food. Nutrient supply may be inadequate due to a fall in food availability. When the ratio of staple food prices to income changes in a particular region over a period of time, the population would be expected to modify their dietary patterns which in turn would be expected to influence nutritional status.

The structure of agricultural production changes during periods of macroeconomic reform. A decline in domestic production of food may reduce access to food for households who depend on own produce for consumption (LK.4 and LK.1) or as a source of income (LK.9). Food production may fall because of policies which favour inedible cash crops relative to food and livestock production. Food production is influenced by access to productive assets e.g. land, credit and other inputs. It is also influenced by area under food crops and non-food crops and prices of these crops. Increased agricultural production may result in increased food production (LK.13). Increased food consumption is the primary goal of increasing food production (Rubeinstein, 1984). Increased agricultural production may earn the households more income to purchase food and increase food consumption (LK.12,LK.10,LK.5). If increase in agricultural production is through inedible cash crops then food needs may compete with non-food needs (Dewey 1979). This is reflected in expenditures allocated to food and non-food items relative to income.

The important variables identified above which change during periods of macroeconomic reform include:

    (i)   Food availability and consumption

    (ii) Food prices, and

    (iii) Household income

These variables are influenced by macroeconomic reform policies either directly or indirectly through various channels.

Macroeconomic policies are likely to influence price levels in a number of ways:

(i)   Through the demand for and supply of food and non food items and the exchange rate;

(ii)   Through depressed export prices and or sharp increases in import prices;

(iii)   Through changes in structure of crop production in relation to cash crops and food crops; and

(iv)   Through changes in investment patterns in agricultural production as a result of policies on interest rates and credit availability.

The flow chart traces how selected policies may affect agricultural production and hence nutrition. Kenya's major exports are from agriculture. Devaluation would therefore be expected to have a significant effect on this sector. Devaluation may restructure incentives in agricultural crop production in such a manner that households shift production from food crops to cash crops (LK.15,LK.13,LK.11). This will affect food availability (LK.4), food prices (LK.8) and incomes (LK.9) of the households. If for example, devaluation results in increased production of non-edible

but income earning crops, income of households may increase. An increase in income implies that more income is available for food purchase. This will increase food availability (LK.15,LK.12,LK.10,LK.7). Whether food availability increases also depends on what happens to food prices. Food prices may be under the control of the government at a level which the households cannot afford, given the average income. On the other hand, some food prices not controlled by the government may be beyond the purchasing power of the households. Devaluation has income effect via higher prices of exportables and price effect via changes in relative prices. For example, if devaluation leads to a decline in supply of edible crops, there will be an increase in prices of food. How devaluation affects food consumption and hence nutritional status depends on whether the income earned is enough to purchase a nutritionally adequate diet. If households shift consumption to food items with low calorie or protein value, their nutritional status may not improve. This will be reflected in the nutritional status of the most vulnerable members of the households - the children.

Agricultural price policy works on the supply side of policies to stimulate supply of agricultural produce. Producer prices should be high enough to give incentives to farmers to expand food production. An increase in production of crops will benefit farmers via higher incomes and more

food available for consumption,(LK.16,LK.12,LK.10,LK.5) and (LK.16,LK.13,LK.4,LK.1)   The benefits from increase in producer prices may depend on how many farmers produce for the market.   Price incentive policies may have no effect on those who do not produce for the market.   Although producer prices are an important reform policy in increasing production, there may be other non policy variables influencing production, e.g. prompt payment and rainfall patterns.   Commodity price controls are supposed to protect the low income consumers, but in most cases it may benefit the urban consumers more than rural consumers.   Whether farmers benefit from price policies depends on whether they have the capacity to increase production by having access to adequate credit and land. Credit policy, therefore, has an influence on credit availability which affects investment in agriculture.   High interest rates imposed on acquiring credit, may favour large borrowers at the expense of small-borrowers.   The limited supply of credit available is rationed.   Agriculture is likely to have less credit. Reduced access to credit may reduce access to inputs for production by smallholders, consequently reducing their access to food and income and hence nutritional status (LK. 17,LK.13,LK.4) and (LK.17,LK.12,LK.10).

Government budget policy has implications for expenditure allocated to specific sectors (LK.14). Generally governments do not trim their services

proportionately; some services are more vulnerable than others. Expenditure reduction in agriculture may affect infrastructure and extension services and therefore have adverse effects on agricultural production. Expenditure cuts in other sectors such as health may affect nutritional status if cuts are from the functional categories in which low income households are dependent, e.g. primary health care.

Policies are inter-linked and converge on the same variables. They are implemented to compliment each other. The channels through which macroeconomic reform policies affect nutritional status are varied and complex and cut across many sectors. The conceptual framework adopted here is, however, sector specific.

Figure 1:   Conceptual Framework.

key:
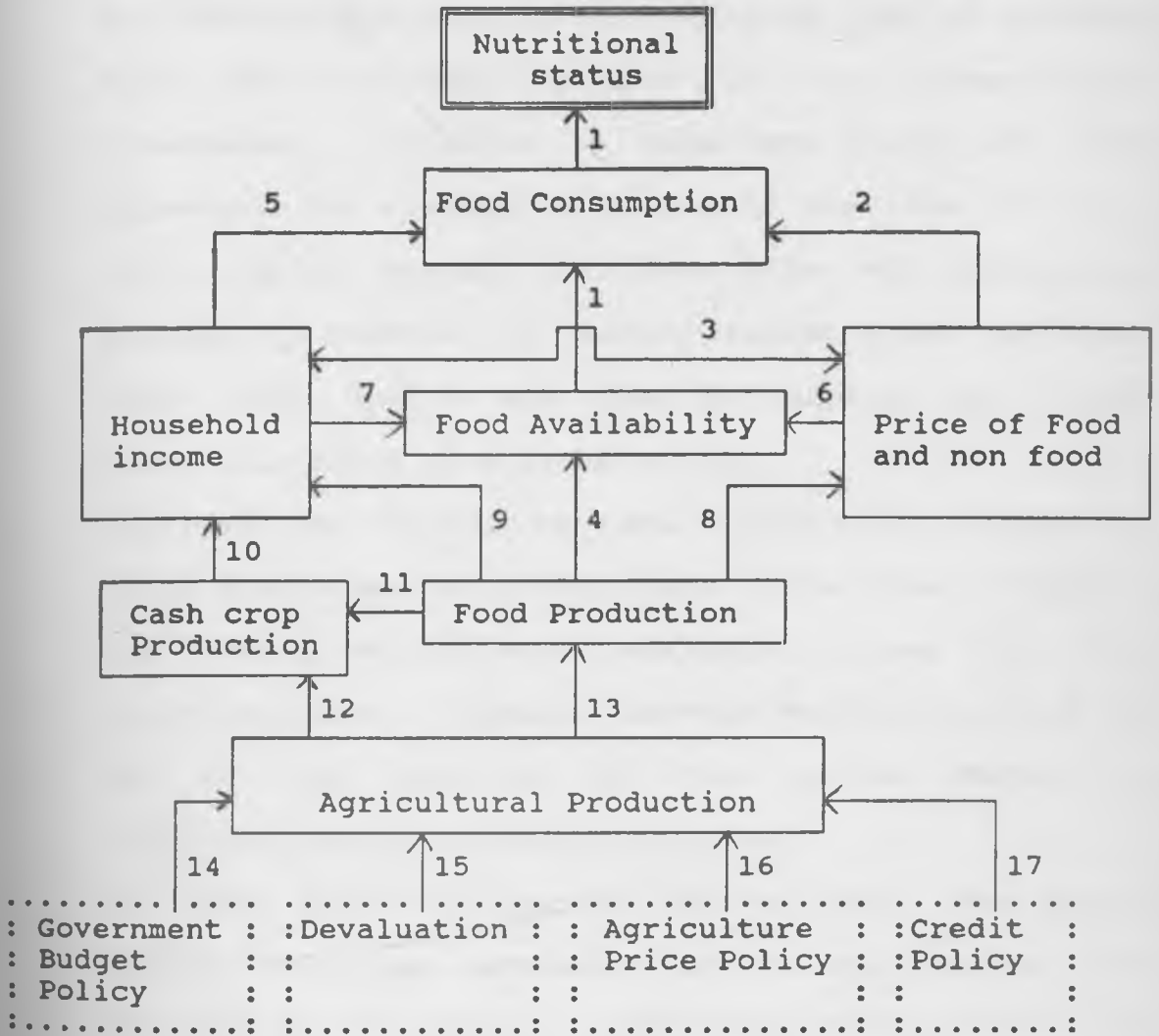
▭ (double box)	=	Outcome Variable
▭ (single box)	=	Main input and process variables
⋮⋯⋮ (dotted box)	=	Macroeconomic reform policies
⟶	=	Causal link

3.2   Methodology

3.2.1   The Target Population

The target population in this study is that of children aged six to sixty months in low income rural households.   Children in this age group are more vulnerable to changes in household diet due to their fast rate of growth.   Children below six months are assumed protected by breast-feeding,while children above sixty months are able to compete for their reasonable share in household diet.

The study is focused on rural households in Muranga, Taita Taveta and Siaya districts.   The three districts are located on different ecological zones and offer good comparison.   Baseline surveys were carried out in two of the districts by the Central Bureau of Statistics that strengthens the study.

The study covers the period 1982 to 1988.   The period before 1982 was dominated by crises, shocks and cancellation of policies aimed at correcting them.   It is difficult to isolate effects of shocks and crises from effects of policies.   Serious reform measures were, however, undertaken in the eighties.   The study makes use of a survey which was carried out in 1982 on nutrition to trace the changes in nutritional status between 1982 and 1988.

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3.2.2   The   Data

The study has used data on: domestic food production at
the district level; area cultivated of selected crops;
nutrient content per unit for five selected crops;
rural retail prices of five major food staples and
official retail prices of selected commodities; state
and extent of malnutrition; household consumption and
expenditure pattern; and main sources of income for
rural households.For assessing other factors affecting
nutrition, data has been generated on access to health
services and expenditure on health; access to credit
land and other inputs,plus ownership of cattle. In
addition, data was obtained on inflation, and rainfall
patterns.

3.2.3   Sources of Data

The study is based on secondary data. Data on food
production and area under crops was obtained from
provincial agricultural annual reports of the Ministry
of Agriculture and Agriculture Production Survey which
were undertaken by Central Bureau of Statistics.
Estimates from Ministry of Agriculture are based on
expected yield per hectare under crops.Information on
export crops was generated from annual reports of the
Coffee Board of 'Kenya and Economic Survey, various
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cattle was obtained from Agriculture Production Survey
and Baseline Survey Report of Siaya district.

Malnutrition data was obtained from surveys undertaken
by the Ministry of Planning and National Development.
Information on monthly retail prices of staple food
crops in the three districts is collected weekly and
published by months in the Market Information Bulletin
by the Central Bureau of Statistics.

Data on household expenditure patterns and sources of
income was obtained from Household Budget Survey of the
Ministry of Planning and National Development and also
from Baseline Survey Report of Taita Taveta.

Information on nutrient content of food was obtained
from data compiled by Nutrition Corporation of
Netherlands. Data on food consumption was obtained from
Household Budget Survey and Agriculture Production
Survey of the Ministry of Planning and National
Development and Food and Nutrition Planning
Unit,(Nutrition Survey).   Information on rainfall
patterns was obtained from District Agriculture Annual
Reports.

3.3.3   Methods of Analysis

For analytical purposes the policies, are taken as a
package.   Short term overall effect of policies on
nutritional status is investigated through changes

occurring in agriculture and food production. Comparative analysis which examines historical relationships among variables is adopted in the study.

(i) Nutritional status of children is indexed by height-for-age of children comparable to the international standardized measure given by WHO. Stunted or chronic malnutrition is given by height-for-age less than 90% of the reference median height-for-age. Children with height-for-age greater than 90% of the reference median are considered normal. Height-for-age is a good indicator of past nutrition problems as opposed to the other measures e.g. weight-for-height which is a measure of present state of nutrition.

The significance of the change in nutritional status will be established by testing the difference between the means in 1982 and 1988, using the following formula (see Koutsoyiannis).

$$\hat{\sigma}^2 = \frac{\sum_{j=1}^{k} n_j (\bar{Y}_j - \bar{\bar{Y}})^2}{K - 1}$$

$\hat{\sigma}^2$ Est. population variance
n_j sample size
K number of samples
$\bar{Y}_j$ sample mean
$\bar{\bar{Y}}$ common population mean

(ii) Calculations of food availability per capita are made by use of data on food production and total population projection figures. Estimates of per capita food availability as a percentage of requirements of each

food item are calculated by use of FAO/WHO minimum requirement values.Indices of per capita food availability are calculated from total per capita availability of five food staples. Nutrient availability per capita is calculated from food supply of major staples and nutrient content of food items. Since the concern of this study is protein-energy malnutrition, only two types of nutrients are considered: protein content and energy content.Data compiled by Nutrition corporation of Netherlands on foods mostly eaten by people in East Africa gives the nutrition content of the food per one hundred grammes as shown in Table 3.1.

TABLE 3.1: NUTRITIVE VALUE OF SELECTED FOOD COMMODITIES CONSUMED IN EAST AFRICA

Food item	Calorie content Per 100. g (KCals.)	Protein content (per 100 grammes)
Maize	345	9.4
Beans	320	22
Potatoes	92	1.7
Sorghum	343	11
Millet	339	10

Source: Nutrition Co-operation of Netherlands,1987.

(iii)   In the areas of food prices, a distinction is made here between official controlled retail prices and actual rural retail prices of major staples. Average yearly change in prices is calculated from the monthly prices. Actual rural prices are used in calculation of value of food. Average yearly rate of inflation during 1982-1988 is calculated from inflation rates for individual years. The five staples identified here are maize, beans, potatoes, sorghum and millet. Price index of each staple is calculated using simple average of relatives.

(iv) Household income is difficult to estimate, hence household expenditure is used as a proxy for household income. Per capita expenditure on food is calculated as a ratio of expenditure on food to total expenditure per household. Data on major sources of income are taken as given in the surveys. Proportion of income obtained from crops is calculated from this source.

(v) Food availability is calculated from production of major staples. It is difficult to calculate the proportion of food imports distributed to each of the districts. Therefore food availability is limited to domestic food production at the district level.

(vi) The comparative analysis of the trends in above variables and the implications for nutritional status is derived from intuitive interpretation of the information generated. Policy implications for the changes in the above variables, and other factors that may explain the changes, such as rainfall patterns and access to health, are analyzed.

CHAPTER FOUR

4. EFFECT OF MACROECONOMIC REFORM POLICIES ON NUTRITION.

4.1 Trends in Crop Production

Much of the performance of the agricultural sector in the eighties may be attributed to macroeconomic reforms aimed at control of inflation and external equilibrium. In particular, policies have been aimed at stabilizing prices, increasing income and increasing crop production for both export and domestic market. The effect of macroeconomic reforms on nutrition can be evaluated in terms of changes in area under export crops and food crops, production levels of crops, per capita availability and nutrient availability of selected crops. The effects of these variables on food prices, household income and food consumption is important in this study for analyzing effect of policies on nutritional status.

4.1.1 Factors affecting Crop Production

The effects of macroeconomic reforms on crop production by households depends on whether they have the capacity to benefit from policies. For analytical purposes we shall look at only access to productive assets and other inputs, and rainfall patterns prevailing in different ecological

zones. Access to productive assets, for example, land and inputs, is crucial if output is to be increased. Among rural households, more than 70% have less than six acres of land. The inequality in access to land is more pronounced across different ecological zones. In Muranga, Siaya and Taita Taveta districts, households with less than six acres of land comprise 91%, 84% and 78%, respectively. (See Table 4.1.). In a baseline survey of Taita Taveta, 1986, only 2% of households had more than ten acres of land in a sample of 239. Population pressure on land reduces access to land. In 1983, the availability of good quality agricultural land per person revealed wide variations. High potential land per capita was estimated to be 0.18 hectares in Muranga, 0.10 in Taita Taveta and 0.33 in Siaya District, respectively. In 1987 this had declined by 22% in Muranga, 24% in Siaya and 30% in Taita Taveta. One would therefore expect food production in Siaya to have been better than in the other districts, although the quality of land needs to be taken into account. Inequality in landholding is closely related to access to other assets, for example, livestock. The total number of cattle owned by households does not necessarily increase proportionately with size of land holding for households with over two hectares.(see Table 4.2). Analysis of type of cattle owned by households show variation with size of holding. In Muranga where 91% of households have less than six acres of land, there is almost

Table 4.1: PERCENTAGE OF HOLDERS BY HOLDING SIZE

Holding Size in acres	Muranga	Taita Taveta	Siaya
upto 2	65	52	42
2.1-4	21	16	28
4.1-6	5	10	14
6.1-8	3	5	6
8.1-10	2	3	3
10.1-15	3	6	3
15-20	0	4	0
over 20	1	4	4

Source: Agriculture Production Survey, 1988.

Table 4.2:   PERCENTAGE OF HOLDERS WITH CATTLE BY HOLDING SIZE

Holding Area in (ha)	Muranga	Taita/ Taveta	Siaya
upto 0.4	35.24	34.43	29.31
0.5-0.9	47.62	53.75	54.05
1.0-1.9	52.83	56.41	50.60
2.0-2.9	35.71	41.67	75.86
3.0-3.9	75.00	53.85	76.92
4.0-4.9	37.50	45.45	66.67
5 and above	100.00	46.43	70.59
Total(mean)	44.09	47.27	52.52

Source: Agriculture Production Survey, 1988.

100% ownership of grade cattle. In Siaya 100% of households with less than six acres of land own Zebu cattle. Ownership of grade cattle in Siaya is limited to holding size of less than 0.4 hectares. There is a tendency for households to choose quality rather than total quantity of cattle as holding size diminishes in medium potential zones, such as Muranga. This is not the case with Siaya and Taita Taveta which are semi Arid. (See Table 4.3). There is also limited use of other inputs, for example, credit for farming. (See Table 4.4). Data available from Siaya district attributes little use of credit to ignorance and lack of security among others (see Table 4.5). Land is an important source of security for credit in Kenya. Lack of security may be attributed to lack of minimum land required for security. Lack of access to productive assets, such as land and credit seem to limit the capacity of households to benefit from macroeconomic reform policies. Generally households with individual titles to land have greater access to institutional credit,for example, Agricultural Finance Corporation which is the biggest source of credit to rural farmers, demands that farmers must have more than five acres of land to qualify for credit. Most households in the three ecological zones have less than five acres of land.

Table 4.3: PERCENTAGE OF HOLDERS BY TYPE OF CATTLE
AND HOLDING SIZE

Holding Area in (ha)	Zebu Cattle			Grade Cattle		
	Taita Taveta	Muranga	Siaya	Taita Taveta	Muranga	Siaya
upto0.4	71.69	5.41	100.00	50.20	94.59	22.33
0.5-0.9	85.42	8.12	100.00	68.95	91.90	0.00
1.0-1.9	77.16	0.00	100.00	52.37	100.00	0.00
2.0-2.9	100.00	0.00	100.00	50.00	100.00	5.37
3.0-3.9	83.33	0.00	100.00	33.33	100.00	0.00
4.0-4.9	100.00	16.67	100.00	0.00	83.33	0.00
5 and above	85.92	0.00	99.42	28.58	100.00	3.25
Total(mean)	82.28	4.07	99.89	47.23	95.33	3.33

Source: Agriculture Production Survey,1988.

Table 4.5: PERCENTAGE OF HOUSEHOLDS BY REASON FOR NON USE
         OF CREDIT

REASON	PERCENTAGE OF TOTAL
No security	29.6
Ignorance of source	41.6
Repayment condition unfavourable	5.8
Has outstanding loan	0.4
Delays in processing	3.6
Application unsuccessful	3.0
Use of own source	6.0
Not applied	8.8
Received loan	1.2

Source: Baseline Socio-economic Survey,Siaya,1985.

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Source: Baseline Socio-economic Survey,Siaya,1985.

4.1.2   Trends in Acreage Under Crops and Production

4.1.2.1   Export Crop Sector

The trends in area planted of the major export crops, coffee and tea, indicate stable trend over 1982/83 to 1986/87. Area under coffee and tea increased by 4% and 3.5% at the national level, respectively. The increase in area under tea was only between 1982/83 and 1983/84, remaining stagnant thereafter. (See Table 4.6). Production levels for coffee and tea, at the national level, show fluctuations with good years alternating with unfavorable years.   There was a record production of coffee of 119.9 thousand tons in 1986 and 155.9 thousand tons for tea in 1987. (See Table 4.7).Area under coffee has remained constant in all districts,however, production levels have shown a decline after 1983/84, (see Table 4.8 and Figures 2 and 3).

4.1.2.2   Acreage under Food Crops:

Given the limited access to land and the high rate of population growth estimated at 4% per annum. Acreage under food crops has shown no major expansion. A range of food crops is grown in limited land.   Cereals are the most important food crops followed by pulses and root crops. (see Table 4.9 and 4.10) In order to analyse the policy effects on production and area under crops, it is important to look at the trends in individual crops. Only five major staple

Table 4.8: AREA UNDER COFFEE AND TOTAL PRODUCTION BY DISTRICT
1982/83-1985/86

	1982/83	1983/84	1984/85	1985/86
Muranga				
Area(000ha)	12.6	12.6	12.9	12.9
Production				
(000tons)	11.3	19.2	13.3	12.3
Taita Taveta				
Area(ha)	450.0	562.0	562.0	562.0
Production				
(tons)	87.0	104.0	89.0	88.0
Siaya				
Area(ha)	123.0	140.0	140.0	140.0
Production				
(tons)	17.0	16.0	4.0	6.0

Source: Coffee Board of Kenya, various issues.

Table 4.9: PERCENTAGE OF TOTAL HOLDING UNDER
DIFFERENT FOOD CROPS

CROPS	Muranga	Taita/Taveta	Siaya
Wheat	0	0	0
Finger Millet	0	5	11
Sorghum	0	37	52
Beans	50	55	43
Cowpeas	60	28	35
Pigeon Peas	36	37	0
English Potatoes	19	5	2
Sweet Potatoes	16	39	17
Cassava	13	70	39

Note: Figures do not add upto 100 because they
are independent.
Source: Agriculture Production Survey,1988.

Table 4.10: PERCENTAGE OF TOTAL HOLDING AREA UNDER PURE
AND MIXED MAIZE BY HOLDING SIZE.

Holding Size(ha)	Taita Taveta		Muranga		Siaya	
	Pure	Mixed	Pure	Mixed	Pure	Mixed
upto 0.4	65	87	31	60	39	83
0.5–0.9	71	67	8	55	41	62
1.0–1.9	18	40	10	34	28	50
2.0–2.9	27	34	34	34	24	37
3.0–3.9	11	36	6	6	13	37
4.0–4.9	0	48	24	24	7	31
5.0 and above	6	30	1	21	9	15

Source: Agriculture Production Survey,1988.

Figure 2 : COFFEE ACREAGE

TAITA TAVETA AND SIAYA DISTRICT

Figure 3: COFFEE ACREAGE
NATIONAL AND MURANGA DISTRICT

| | 1982 83 | 1983 84 | 1984 85 | 1985 86 | 1986 87 |
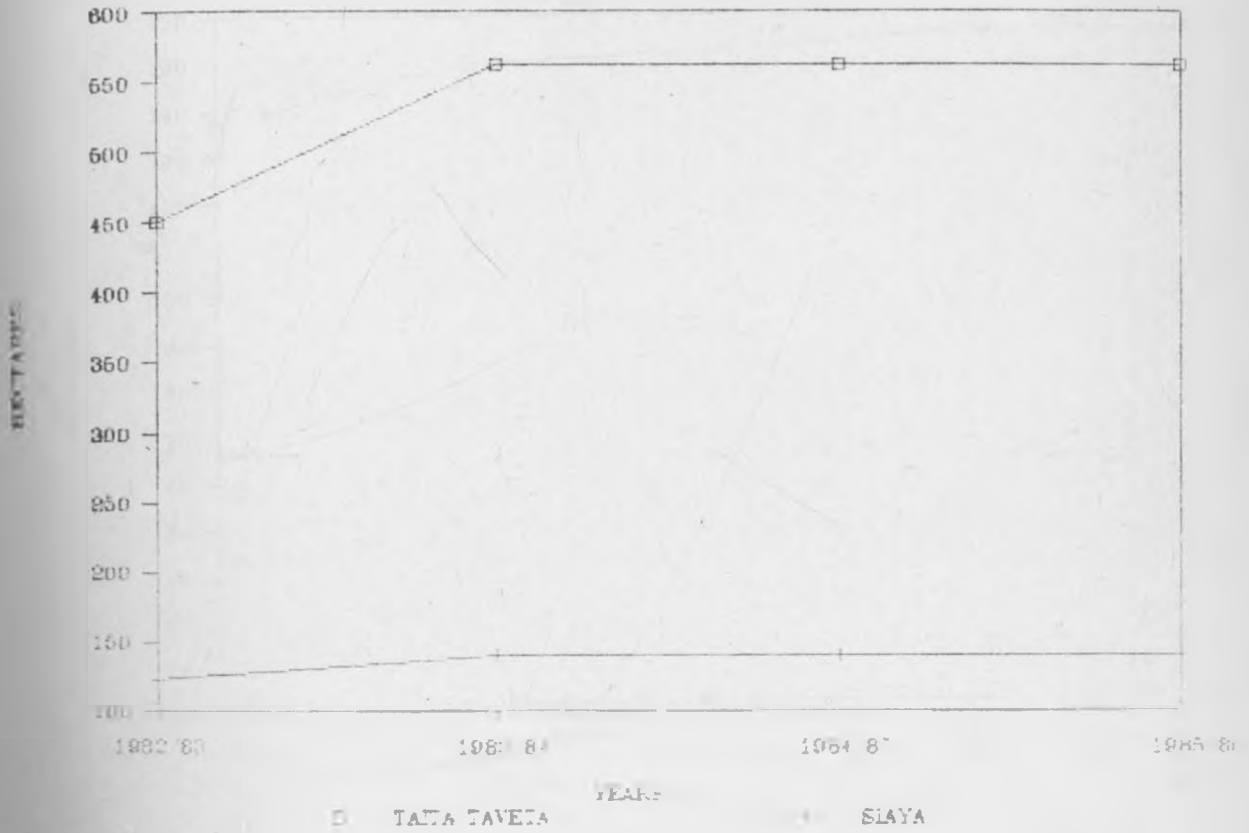
□ NATIONAL   + MURANGA DISTRICT
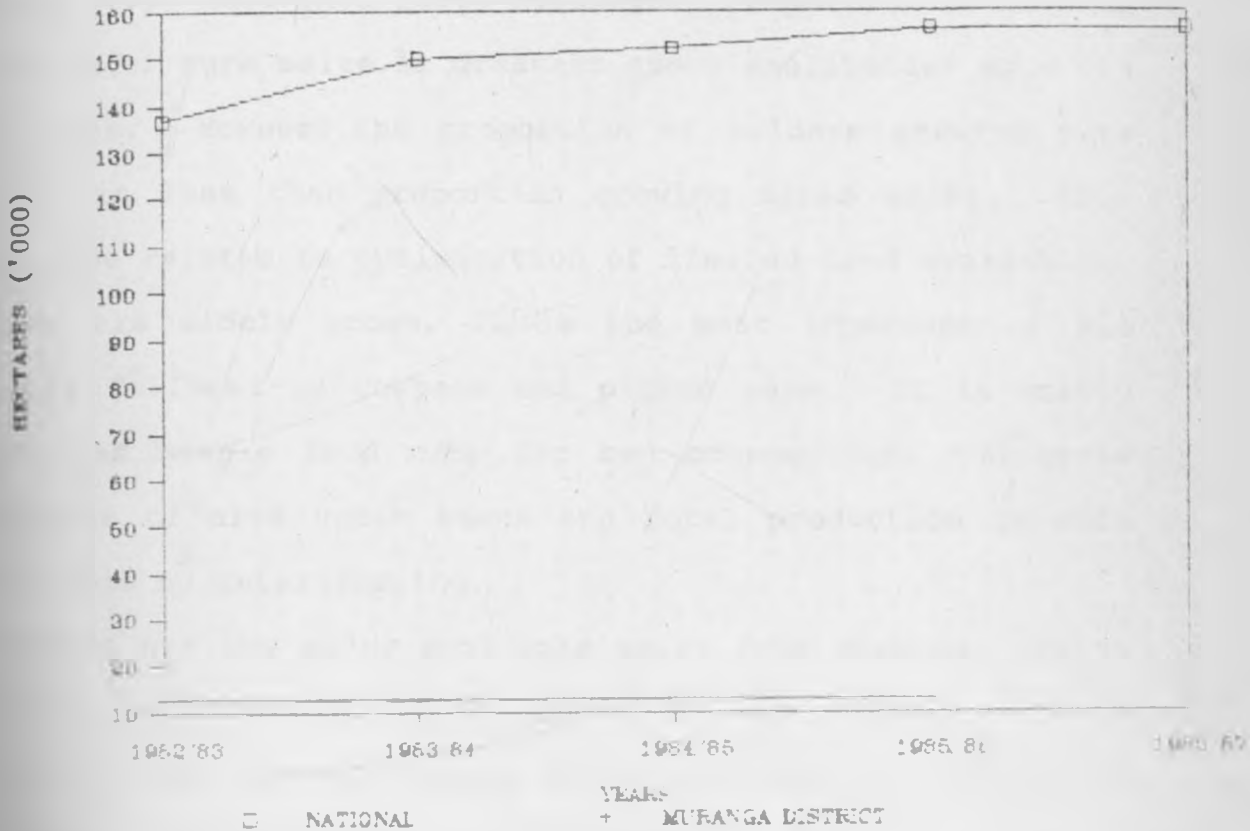
Figure 3: COFFEE ACREAGE
NATIONAL AND MURANGA DISTRICT
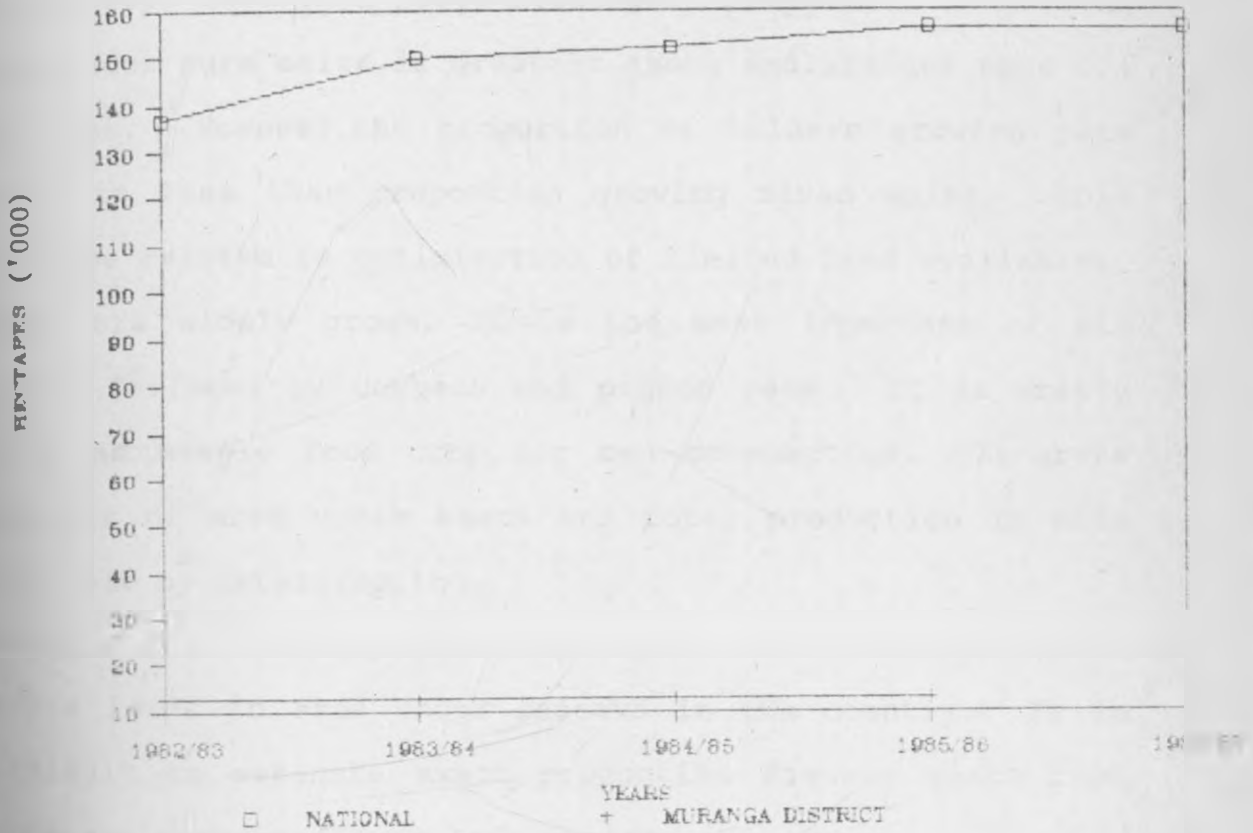
food crops are considered here; maize, beans, potatoes, sorghum and millet.

Maize is the major staple food crop in the country. It is usually grown either pure or mixed with other crops. Households with small size of holding tend to mix maize with other crops more than large holdings. Proportion of holding area under pure maize is greatest among smallholder upto 0.4 hectares. However,the proportion of holders growing pure maize is less than proportion growing mixed maize. This could be related to optimization of limited land available. Beans are widely grown. It is the most important of all pulses followed by cowpeas and pigeon peas. It is mostly grown as staple food crop for own consumption. Accurate measures of area under beans and total production is made difficult by intercropping.

Potatoes are the major rootcrops apart from cassava. Taita Taveta leads in area under cassava in the country. It is difficult to estimate exact production figures since root crops are harvested over long periods.

Sorghum and millet are widely grown in Siaya followed by Taita Taveta and almost none in Muranga. Sorghum and millet are considered jointly in this study and in most cases by Ministry of Agriculture.(see Tables 4.11,4.12,4.13 and Figures 4, 5 and 6)

When individual crops are considered, food crops show no major increase in area under crop over the period

Table 4.11: TRENDS IN ACREAGE UNDER FOOD CROPS (HA).
Muranga District

Year	Maize	Beans	Potatoes	Sorghum/Millet
1982	38000	32117	3000	25
1983	43504	25007	5675	25
1984	38022	24575	6301	31
1985	47210	30475	8553	25
1986	47841	29710	8588	23
1987	45860	27707	8575	-

Source: Provincial Agriculture Annual Reports,
various issues.

Table 4.12: TRENDS IN ACREAGE UNDER FOOD CROPS (HA).
Taita Taveta District

Year	Maize	Beans	Potatoes	Sorghum/Millet
1982	8082	3634	240	202
1983	3870	1647	127	111
1984	3511	1706	113	573
1985	7198	1900	297	101
1986	7715	2239	359	40
1987	5187	2025	798	87

Source: Provincial Agriculture Annual Reports,
various issues.

Table 4.11: TRENDS IN ACREAGE UNDER FOOD CROPS (HA).
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1984	3511	1706	113	573
1985	7198	1900	297	101
1986	7715	2239	359	40
1987	5187	2025	798	87

Source: Provincial Agriculture Annual Reports,
various issues.

Table 4.13: TRENDS IN ACREAGE UNDER FOOD CROPS (HA).
           Siaya District

Year	Maize	Beans	Potatoes	Sorghum/ Millet
1982	42112	12121	2590	23212
1983	42222	8744	3788	15978
1984	36124	12767	3980	17055
1985	36847	13343	2664	26618
1986	44575	17032	2132	10285
1987	43574	19796	2132	18117

Source: Provincial Agriculture Annual Reports,
        various issues.

Figure 4: FOOD CROP ACREAGE
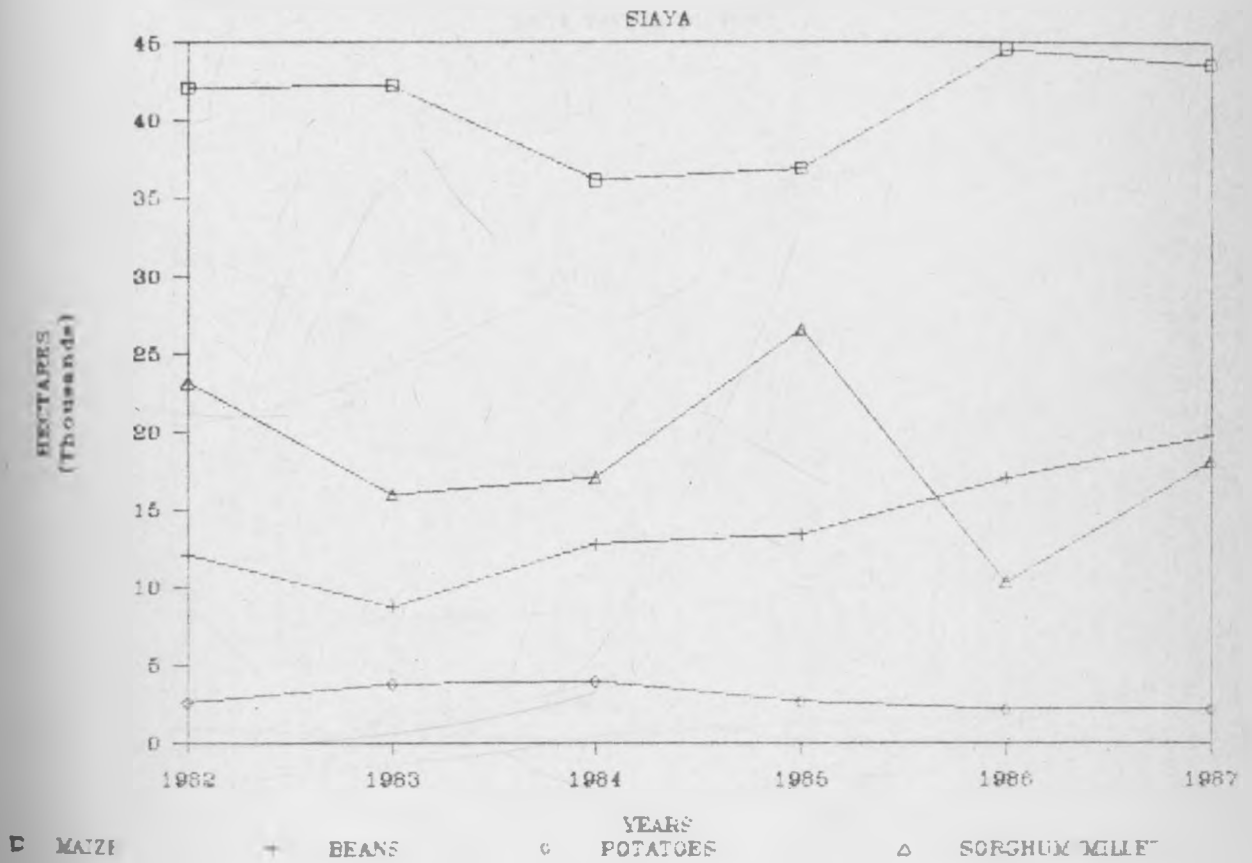
SIAYA

Figure 5: FOOD CROP ACREAGE
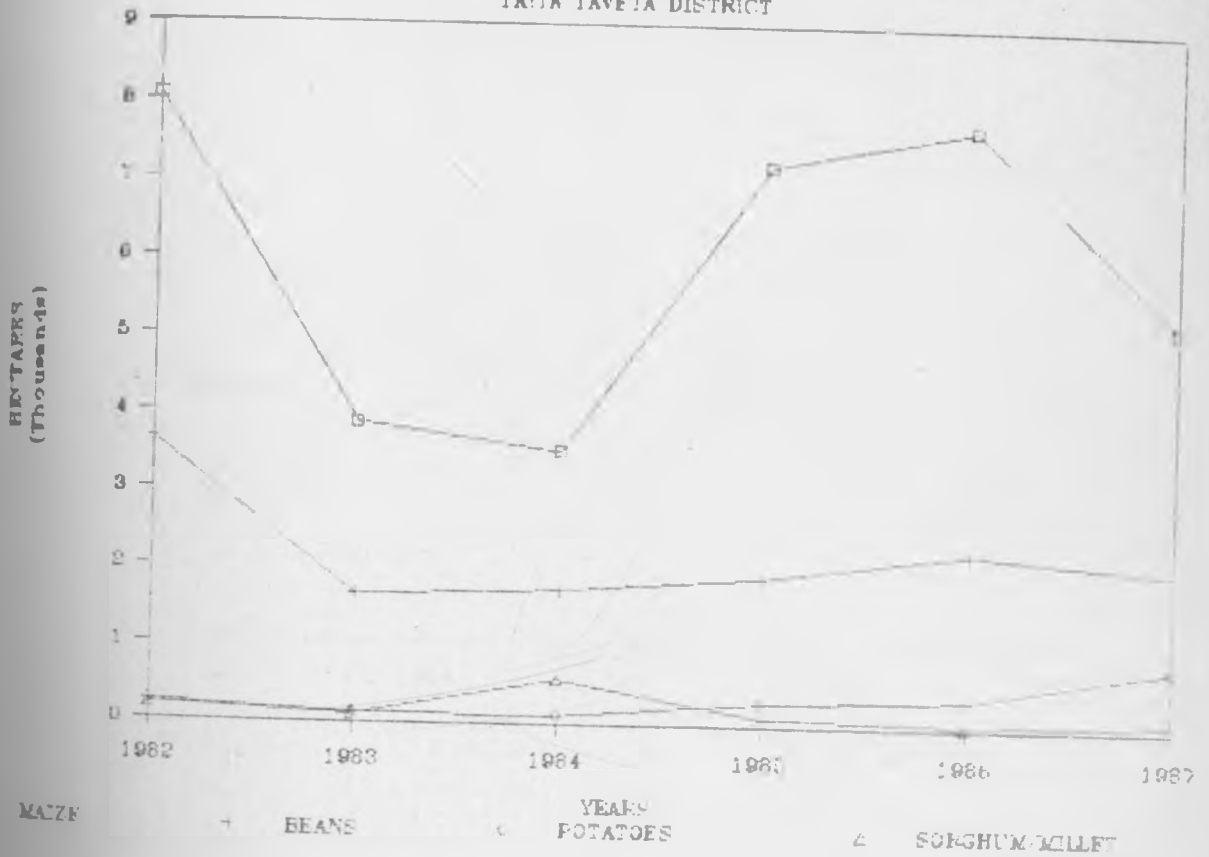
Figure 6:

FOOD CROP ACREAGE

MURANGA DISTRICT
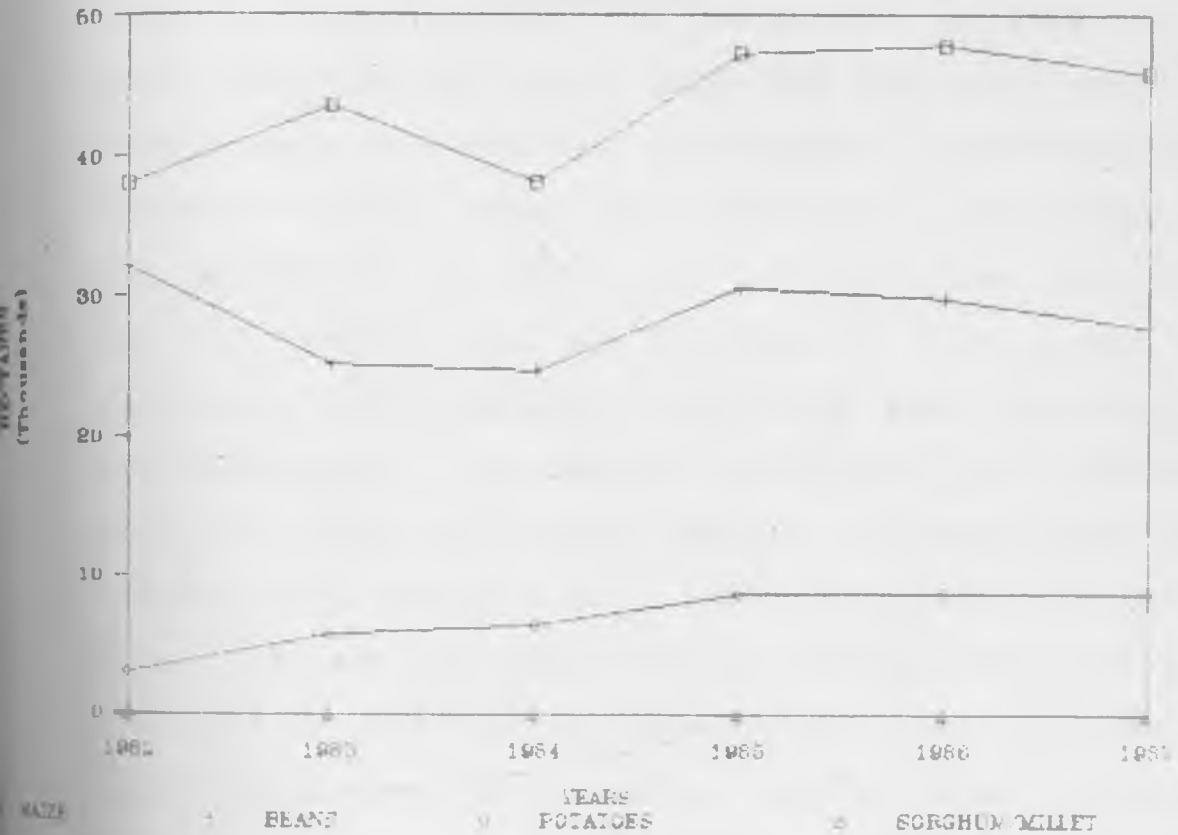
considered. However, beans have shown slight upward trend in Siaya while maize showed expansion in 1985/86 for all the districts.

In order to assess whether macroeconomic reform policies have made export crops more attractive than food crops, we shall compare the percentage increase in area under crops for both export crops and food crops (see Table 4.14). Area under food crop shows yearly fluctuating trends across districts. There was an increase in area under food crop production in 1984/85 and 1985/86. The other years depicted decline and an increase in area under some individual crops. Export crops have shown positive but declining trend. In 1985/86 which was a good production year, area under food crops expanded more than export crops despite a mini coffee boom in 1986. Comparison of two good years, 1982 and 1986 shows that in Muranga area under maize increased by 25.8% and in Siaya the increase was 5.8%. In Taita Taveta there was a decline. On the other hand, beans show an increase of 7.5% in Muranga, 0.4% in Taita Taveta, and 40.5% in Siaya. It is difficult to tell whether area under beans was because of more un used land being utilized or more beans being mixed with other crops. The conclusion that can be drawn here is that policies have not influenced area under crops to a large extent. This could also be because of limited land for expansion. Any increase in

Table 4.14: PERCENTAGE INCREASE IN AREA UNDER SELECTED CROPS
1982/83-1986/87

		1982/83	1983/84	1984/85	1985/86	1986/87
CROP	DISTRICT					
Maize:	Muranga	14.5	-12.6	24.2	1.30	-4.2
	Taita/Taveta	-52.1	-9.3	1.1	7.30	32.8
	Siaya	0.3	-14.4	2.0	20.90	-2.2
Beans:	Muranga	-22.1	-1.7	24.0	-2.50	-6.7
	Taita/Taveta	-54.6	3.6	11.4	17.80	9.6
	Siaya	-27.8	46.0	64.5	27.60	16.2
Coffee:	national	9.5	9.6	1.4	2.80	-
Tea	national	0.5	2.2	0.6	0.07	0.6

Source: Calculated from Table; 4.6; 4.11; 4.12; 4.13.

production would therefore be expected to have taken place through some other factors other than expansion of area.

4.1.2.3   Trends in Food Crop Production

Food crop production fluctuate a lot with good production years alternating with unfavourable years. In 1984/85 and 1985/86 food production for most individual crops showed an upward trend. 1983/84 and 1986/87 are years of declining or stable food production (See Table 4.15, 4.16 and 4.17). While the increase in food production can be attributed to macroeconomic policy reforms pursued during the period, e.g, increased producer prices, it is difficult to separate out effect of good policy from better weather or better price. In Figure 7,8 and 9, we see that food crop production follows rainfall patterns. The degree varies in different localities. Siaya does not seem to have been affected by drought of 1983/84 and can therefore, be used as control in this study. The average rainfall was stable over the whole period considered.

4.2   Per Capita availability of Major Staples

The virtually stable production levels alternating with slight decline in food production in some areas, combined with high rate of growth of population, estimated at 4% per annum, had implications for per capita food availability. Per capita availability of individual food crops follow the

Table 4.15: TRENDS IN FOOD CROP PRODUCTION (tons)
Muranga District

Year	Maize	Beans	Potatoes	Sorghum/Millet
1982	41040	14834	30000	38
1983	39153	11253	21102	50
1984	42143	17674	17601	62
1985	61373	24684	42906	6
1986	73197	29413	45656	3
1987	45401	9974	24408	-

Source: Provincial Agriculture Annual Reports,
various issues

Table 4.16: TRENDS IN FOOD CROP PRODUCTION (tons)
Taita Taveta District

Year	Maize	Beans	Potatoes	Sorghum/Millet
1982	14548	2907	2400	162
1983	6966	1318	1265	89
1984	7955	900	1130	1430
1985	13000	-	2970	1010
1986	12683	1299	3590	480
1987	7271	1418	7885	61

Source: Provincial Agriculture Annual Reports,
various issues.

Table 4.17:   TRENDS IN FOOD CROP PRODUCTION (tons)
Siaya District

Year	Maize	Beans	Potatoes	Sorghum/ Millet
1982	76567	5570	31080	20860
1983	82939	5100	22728	12709
1984	65023	5704	23800	17957
1985	66325	12009	15984	35800
1986	80235	15329	14924	11168
1987	58823	10690	8848	17330

Source: Provincial Agriculture Annual Reports,
various issues.

Figure 7: FOOD CROP PRODUCTION AND RAINFALL

MURANGA DISTRICT

PRODUCTION (TONS) AND RAINFALL (MM)
(Thousands)

YEARS

BEANS   POTATOES   SORGHUM MILLET

MAIZE   x   RAINFALL
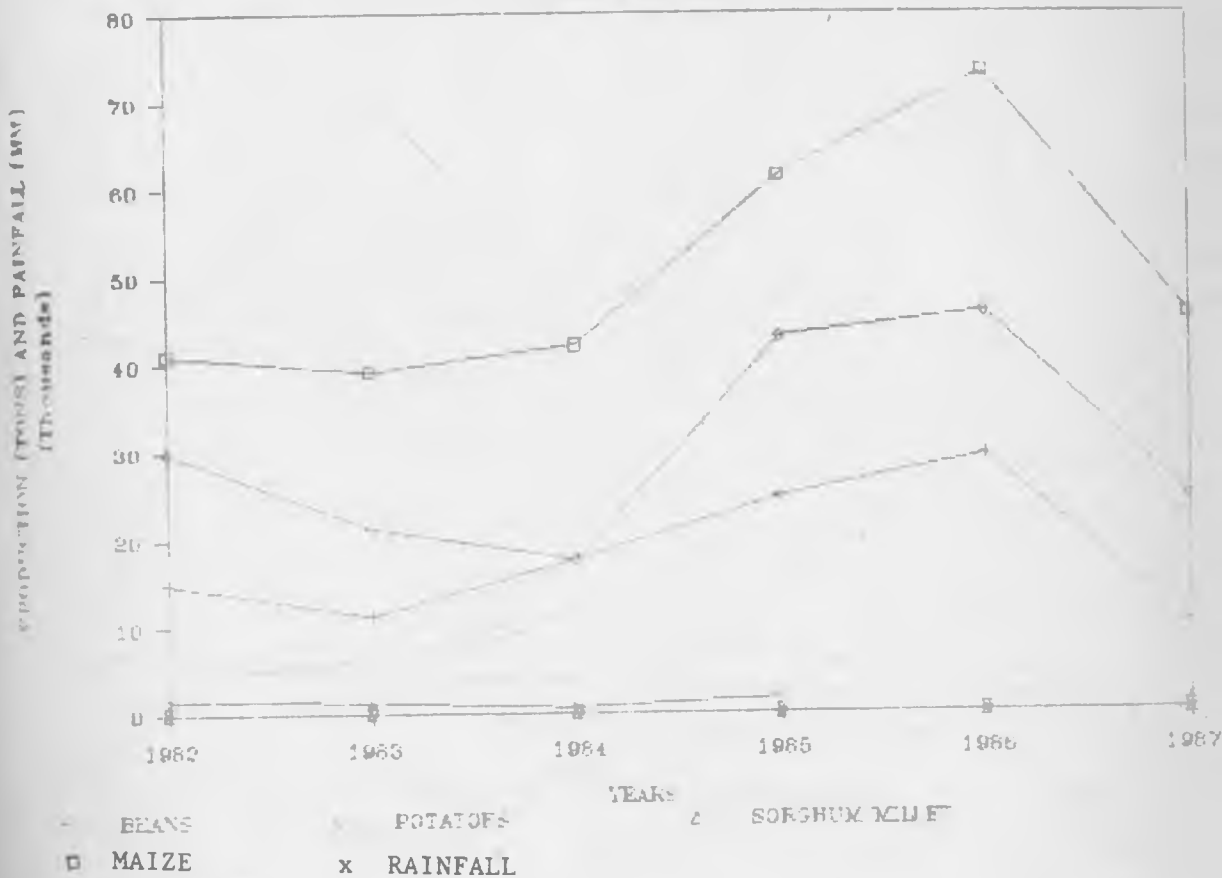
Figure 8: FOOD CROP PRODUCTION AND RAINFALL

TAITA TAVETA DISTRICT

+ BEANS   o POTATOES   △ SORGHUM/MILLET

□ MAIZE   x RAINFALL
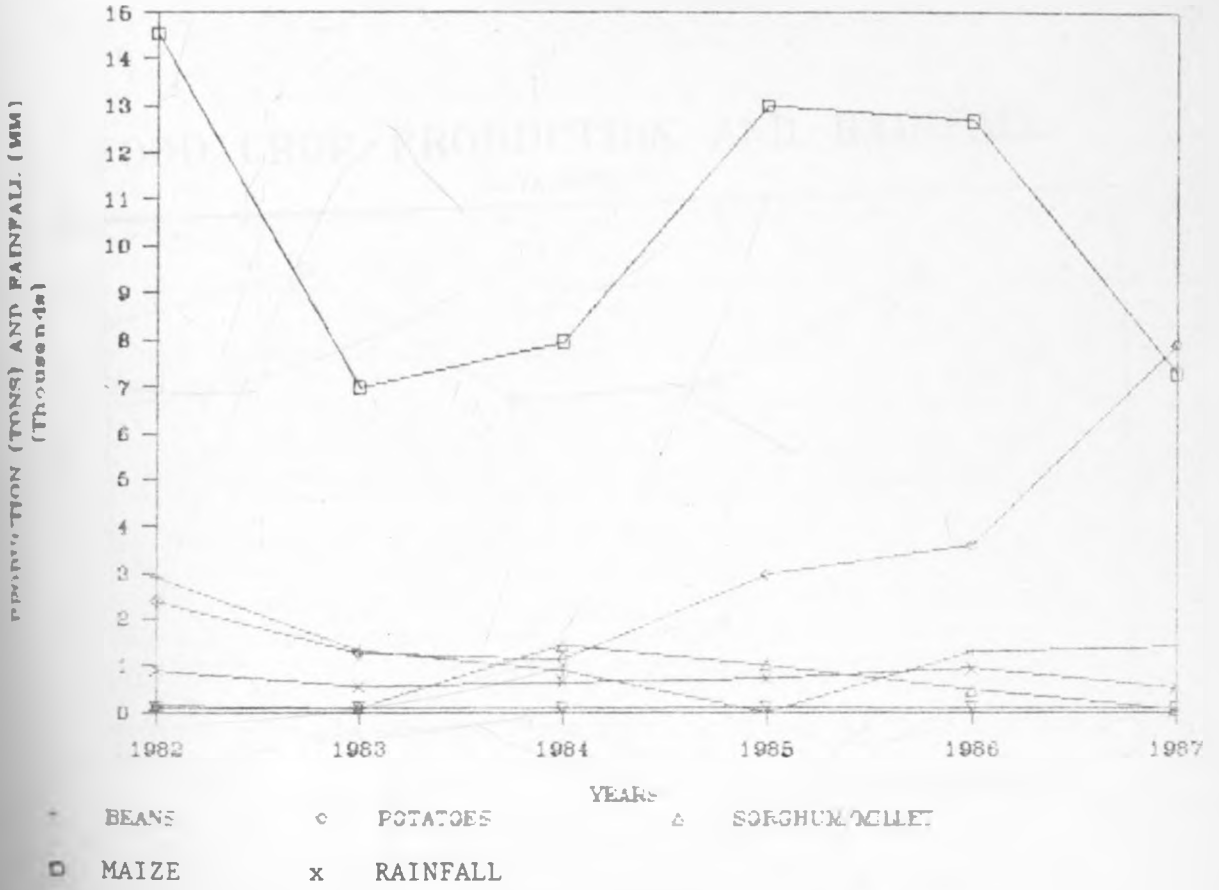
Figure 9: FOOD CROP PRODUCTION AND RAINFALL

SIAYA DISTRICT
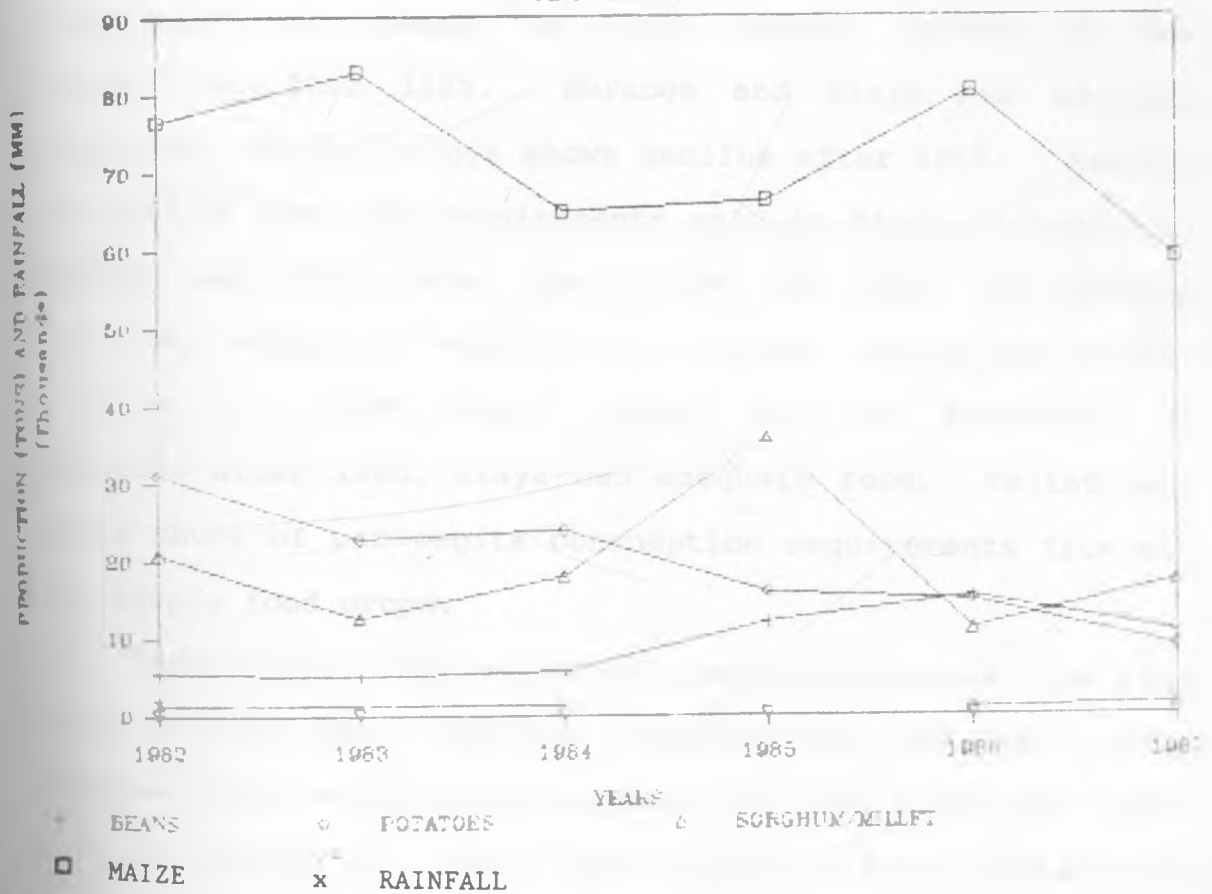
same trend as production levels (see Table 4.18). What is of importance in these trends is that the national consumption requirement estimates indicate that per capita availability of maize should be 100 kg per person per year, 7.7 kg of sorghum and millet; 13.2 kg of beans and 33.5 kg of potatoes (see Development Plan 1989-1993 P.110). Evidence from Table 4.19 reveal that only Siaya district had per capita availability of maize greater than requirements for all the years, except in 1987. Muranga meets the requirement for beans. In Siaya, beans seemed to have caught up after 1985. Muranga and Siaya had adequate potatoes, although Siaya shows decline after 1985. Sorghum and millet meet the requirements only in Siaya district. It should be noted here that Siaya did well in drought resistant crops of millet and sorghum which are hardly produced in other areas. Except for the shortfall in potatoes after 1985, Siaya had adequate food. TaitaTaveta falls short of per capita consumption requirements from all the staple food crops.

Index of per capita food availability from all the five major staples show a decline between 1982 and 1987. Only Muranga shows an increase between 1984 and 1986 (See Table 4.20 and figure 10). This index refers to food availability from district production. It does not include food imports and food aid and leaves out other food crops. Including

Table 4.18: PER CAPITA AVAILABILITY OF MAJOR STAPLES
(Kg/person/year)

YEAR	DISTRICT Muranga	CROPS				
		Maize	Beans	Potatoes	Sorghum/ Millet	Total
1982		54.8	20.0	39.6	0.050	114.450
1983		50.7	14.5	26.4	0.060	91.660
1984		52.4	22.0	22.3	0.070	96.770
1985		73.4	29.5	50.8	0.007	153.707
1986		84.0	33.7	52.8	0.003	170.503
1987		50.1	10.9	26.4	−	87.400
	Taita Taveta					
1982		87.4	17.4	14.2	0.9	119.9
1983		39.6	7.5	7.1	0.5	54.7
1984		44.7	4.9	6.1	8.0	63.7
1985		69.1	−	16.3	5.2	90.6
1986		66.0	6.7	18.3	2.5	93.5
1987		36.6	7.0	38.6	0.3	82.2
	Siaya					
1982		132.1	9.6	53.8	36.1	231.6
1983		138.1	8.5	38.6	21.1	206.3
1984		104.7	9.3	38.8	28.9	181.7
1985		103.6	18.8	24.4	55.9	202.7
1986		120.9	23.2	22.5	16.9	183.5
1987		86.4	15.5	13.2	25.2	115.1

Source: Calculated from Table,4.15;4.16;4.17 and appendix Table A1.

Table 4.19: PER CAPITA AVAILABILITY OF MAJOR STAPLES AS A
PERCENTAGE OF REQUIREMENTS

YEAR	DISTRICT Muranga		CROPS	
	Maize	Beans	Potatoes	Sorghum/millet
1982	54.8	151.5	118.2	0.60
1983	50.7	109.8	78.8	0.80
1984	52.4	166.7	66.6	0.90
1985	73.4	223.5	151.6	0.19
1986	84.0	255.3	157.6	-
1987	50.1	84.5	78.8	-
Taita Taveta				
1982	87.4	131.8	42.4	1.2
1983	39.6	56.8	21.2	0.6
1984	44.7	37.1	18.2	103.8
1985	69.1	-	48.6	67.5
1986	66.0	50.7	54.6	32.5
1987	36.6	53.0	115.2	3.9
Siaya				
1982	132.1	72.7	160.6	468.8
1983	138.1	64.4	115.2	274.0
1984	104.7	70.5	115.8	375.3
1985	103.6	142.4	72.8	725.9
1986	120.9	175.7	69.2	219.5
1987	86.4	117.4	39.4	327.3

Source: Calculated from Table 4.18 and requirement figures
given on page 77.

Table 4.20: INDEX OF PER CAPITA FOOD AVAILABILITY FROM
FIVE MAJOR FOOD STAPLES (1982=100).

Year	Muranga	Taita/ Taveta	Siaya
1982	100.0	100.0	100.0
1983	76.5	44.1	93.5
1984	109.5	52.3	82.2
1985	134.3	74.3	91.8
1986	122.4	76.7	81.6
1987	76.3	67.7	63.6

Source: Calculated from Table, 4.18, last column.

other food items available will show a more favourable picture. However including food aid may not reflect fluctuations in food availability.

4.3 Trends in Nutrient Availability

It is important to assess the adequacy of available staple food supplies in providing proteins and calories. Maize and beans are the major sources of calories in all the areas.   Sorghum and millet are also the major source of calories in Siaya.   Potatoes contribute less calories than the other food staples. The big fall in calorie availability in 1987 was due to a decline in production of maize (see Table 4.21).   Indices of daily per capita calorie availability with 1982 taken as 100 show no major improvement since 1982.   Muranga showed a major improvement in 1985 and 1986 due to increased production of maize and beans which have high calorie content (See Table 4.22 and Figure 10). While it appears that indices of per capita calorie availability have not done well since 1982, in Siaya, the five staple food crops together contributed more than 50% of FAO/WHO recommended average of 2362 Kcal.   In Muranga and Taita Taveta they contributed less than 50%t of the recommended average for all the years.

Trends in daily per capita protein availability have not performed any better than calories (See Table 4.23). In Siaya and Muranga per capita protein availability from

Table 4.21: TRENDS IN DAILY PER CAPITA CALORIE AVAILABILITY (KCals).

Muranga

Year	Maize	Beans	Potatoes	Sorghum Millet	Total	Total as % of minimm daily requirement
1982	517.9	175.3	10.0	0.500	703.700	29.8
1983	479.2	127.1	6.6	0.600	613.500	26.0
1984	495.3	192.9	5.6	0.700	694.500	29.4
1985	693.8	258.6	12.8	0.007	965.207	40.9
1986	793.9	295.5	13.3	0.003	1102.703	47.7
1987	473.5	95.6	6.7	_	575.800	24.4

Siaya

Year	Maize	Beans	Potatoes	Sorghum Millet	Total	Total as %
1982	1248.6	84.2	13.5	337.3	1683.6	71.3
1983	1305.3	74.5	9.7	198.0	1587.5	67.2
1984	989.6	81.5	9.7	269.9	1350.7	57.2
1985	979.2	164.8	6.2	522.2	1672.4	70.8
1986	1142.7	203.4	5.7	157.8	1509.6	64.0
1987	816.7	135.9	3.3	235.4	1191.3	50.4

Taita Taveta

Year	Maize	Beans	Potatoes	Sorghum Millet	Total	Total as %
1982	826.1	152.5	3.6	8.4	990.6	41.9
1983	374.3	65.8	1.8	4.7	446.6	18.9
1984	422.5	42.9	1.5	74.7	541.6	22.9
1985	653.1	-	4.1	48.5	705.7	29.8
1986	623.8	58.7	4.6	23.4	710.5	30.1
1987	345.9	61.4	9.7	2.8	419.8	17.8

Source: Calculated From Table, 4.18 and Nutrient Value
given in section 3.3.3

Table 4.22: INDICES OF DAILY PER CAPITA AVAILABILITY OF CALORIES
1982=100

	Muranga	Taita/ Taveta	Siaya
Year			
1982	100.0	100.0	100.0
1983	87.5	45.0	94.3
1984	87.2	54.6	80.2
1985	137.2	71.2	99.3
1986	156.7	71.6	89.6
1987	81.8	42.4	70.7

Source: Calculated from Table,4.21; column 6.

Table 4.23: TRENDS IN DAILY PER CAPITA PROTEIN AVAILABILITY (Grams).

Muranga

Year	Maize	Beans	Potatoes	Sorghum/ Millet	Total	Total as % of minimum daily requirement
1982	14.1	12.1	1.8	0.0150	28.0150	60.9
1983	13.1	8.7	1.2	0.0180	23.0180	50.0
1984	13.5	13.3	1.0	0.0200	27.8200	60.5
1985	18.9	17.8	2.3	0.0020	39.0020	84.8
1986	21.6	20.1	2.5	0.0009	44.2009	96.1
1987	12.9	6.6	1.2	-	20.7000	45.0

Siaya

Year	Maize	Beans	Potatoes	Sorghum/ Millet	Total	Total as % of minimum daily requirement
1982	34.0	5.8	2.3	10.8	52.9	115.0
1983	35.6	5.1	1.7	6.4	48.8	106.0
1984	26.9	5.6	1.7	8.7	42.9	93.3
1985	26.7	11.3	1.1	17.0	56.1	121.9
1986	31.1	13.9	0.9	5.0	50.9	110.6
1987	22.3	9.3	0.6	7.0	39.2	85.2

Taita Taveta

Year	Maize	Beans	Potatoes	Sorghum/ Millet	Total	Total as % of minimum daily requirement
1982	22.5	10.5	0.6	0.270	33.870	73.6
1983	10.2	4.5	0.3	0.015	15.015	97.8
1984	11.5	2.9	0.3	2.400	17.100	37.2
1985	17.8	-	0.7	1.600	20.100	43.7
1986	16.9	4.0	0.8	0.700	22.400	48.7
1987	9.4	4.2	1.7	0.090	15.390	33.5

Source: Calculated from Table, 4.18 and
        nutrient values given in section 3.3.3.

Figure 10: PER CAPITA AVAILABILITY
OF FOOD AND CALORIES

◇ SIAYA(F)	△ MURANGA(Kcals.)	× TAITA(Kcals.)
▽ SIAYA (Kcals)	▫ MURANGA (F)	✚ TAITA (F)
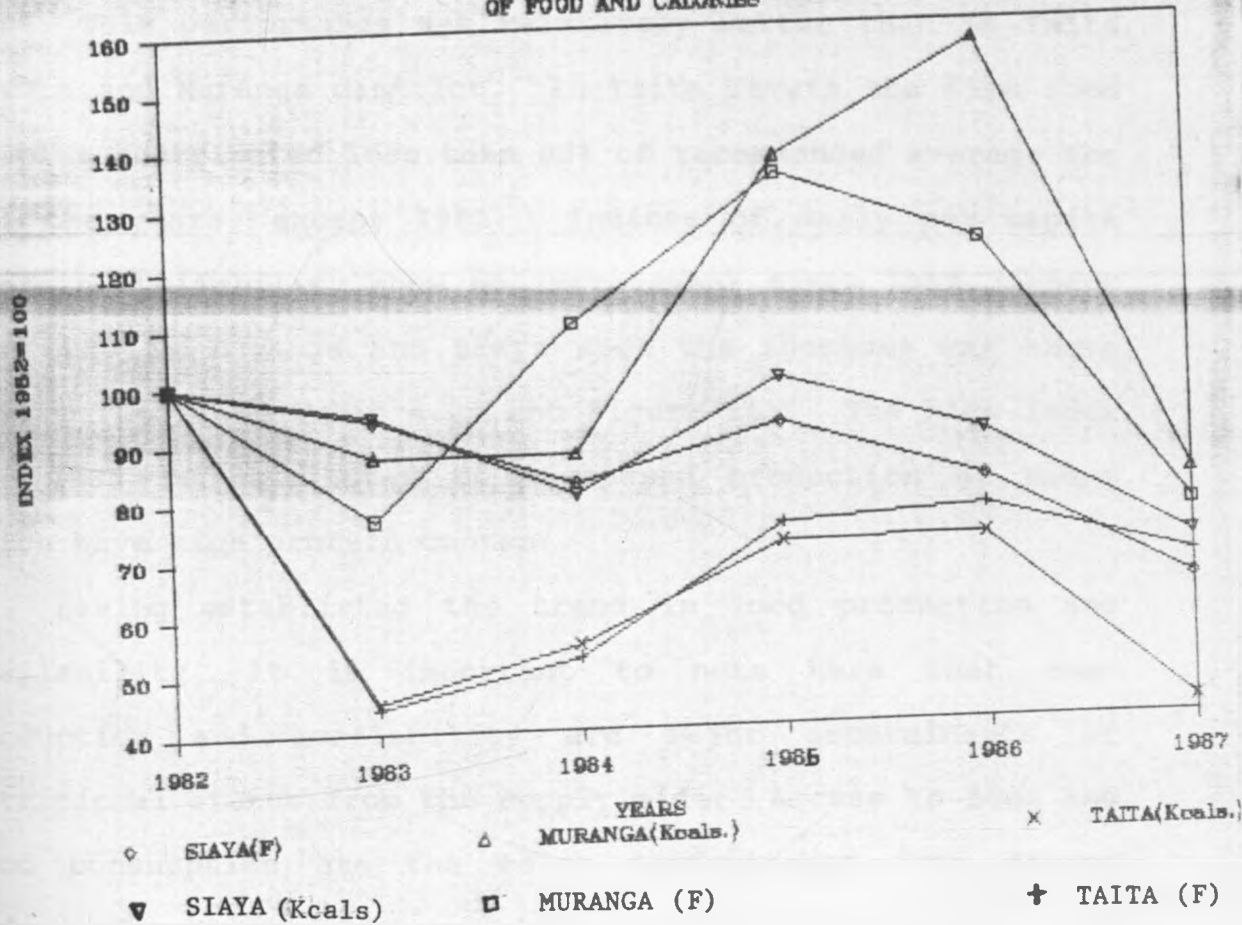
the five major staples contributed more than 50% of the
recommended average of 46g, except for the year 1987 when it
contributed less than 50% in Muranga. In Siaya the five food
staples contributed more than 100% of requirements, except
in 1984 and 1985 when it contributed over 80% but less than
100%. This performance was relatively better than in Taita
Taveta and Muranga district. In Taita Taveta the five food
staples contributed less than 50% of recommended average for
all the years, except 1982. Indices of daily per capita
protein availability show no improvement since 1982, except
for 1985 in Muranga and Siaya when the increase was above
base period (see Table 4.24 and Figure 11). The high index
for 1985 is attributed to increased production of beans
which have high protein content.

Having established the trend in food production and
availability, it is important to note here that food
production and availability are major determinants of
nutritional status from the supply side. Access to food and
food consumption are the major determinants from demand
side. Access to food is determined by food prices and
household income for households exposed to the market.
Disaggregated data at district level show ranging degrees of
production levels, per capita food availability and per
capita nutrient availability. This implies that per capita
availability of food and nutrients may be adequate but
malnutrition will still occur depending on access to the

Table 4.24: INDICES OF PER CAPITA PROTEIN AVAILABILITY
(1982=100)

Year	Muranga	Taita/ Taveta	Siaya
1982	100.0	100.0	100.0
1983	82.4	44.4	92.2
1984	99.6	50.6	81.1
1985	139.7	59.9	106.0
1986	158.4	66.3	96.2
1987	74.2	45.7	74.1

Source: Calculated from Table, 4.23; column 6.

Figure 11: **PER CAPITA AVAILABILITY**
OF FOOD AND PROTEIN

SIAYA(F)	△ MURANGA (PROTEIN)	↗ TAIA (PROTEIN)
▽ SIAYA (PROTEIN)	□ MURANGA (F)	+ TAITA (F)
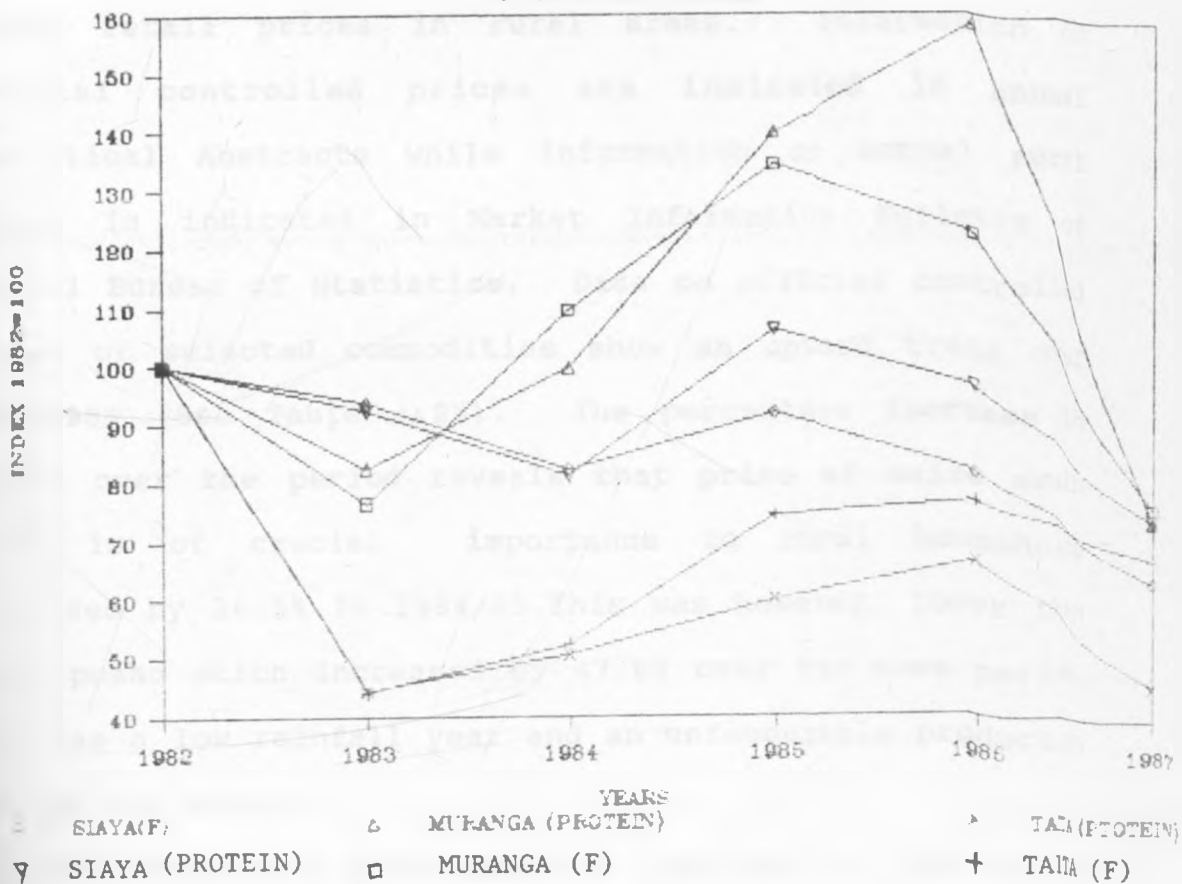
available food and nutrients. We shall explore food prices
and household income to determine access to food by
households.

4.4 Trends in Food Prices

A distinction is made here between official controlled and
actual retail prices in rural areas. Information on
official controlled prices are indicated in annual
Statistical Abstracts while information on actual rural
prices is indicated in Market Information Bulletin of
Central Bureau of Statistics. Data on official controlled
prices of selected commodities show an upward trend over
1982-1988 (See Table 4.25). The percentage increase in
prices over the period reveals that price of maize grain
which is of crucial importance to rural households
increased by 26.5% in 1984/85.This was however, lower than
maize posho which increased by 47.8% over the same period.
This was a low rainfall year and an unfavourable production
year in the country.

The percentage price increase from year to year of the
same food items show no definite pattern of increase (see
Table 4.26). Beans show negative increase for three
periods. Individual food items reveal variations in price
increase. Fluctuations in food availability have led to
fluctuations in actual rural market prices. Government has
no effective control over rural market prices. Prices vary

Table 4.25: OFFICIAL RETAIL PRICES OF SELECTED FOOD COMMODITIES
1982-1987 Ksh/Kg

	1982	1983	1984	1985	1986	1987
Maize(posho)	1.92	2.30	2.78	4.11	4.65	4.65
Maize(grain)	4.10	4.19	4.91	6.21	6.50	6.50
Milk(0.5litre) (Tetrapack)	1.95	2.13	2.45	2.75	2.98	3.00
Beans mixed	7.58	7.15	8.11	13.15	12.23	10.33
Sugar	5.75	6.30	6.90	7.20	7.38	8.10
Wheat flour	4.21	4.51	5.13	5.86	6.46	7.00

Source: Statistical Abstract,Various issues.

Table 4.26: AVERAGE YEARLY INCREASE OF OFFICIAL PRICES OF SELECTED
FOOD COMMODITIES (percentage).

Years Commodity	1982/83	1983/84	1984/85	1985/86	1986/87
Maize(posho)	19.8	20.9	47.8	13.1	0.0
Maize(grain)	2.2	17.2	26.5	4.7	0.0
Milk(0.5litre) (Tetrapack)	9.2	15.0	12.2	9.1	0.7
Beans mixed	-5.6	13.4	62.1	-6.9	-15.5
Sugar	9.6	9.5	4.3	2.5	9.7
Wheat flour	7.1	13.8	14.2	10.2	8.4

Source: Calculated From Table,4.25.

highly over the years and across different ecological zones. Information from the markets of Kandara in Muranga, Bondo in Siaya and Wundanyi in Taita Taveta districts show high fluctuations.   Information from Taita Taveta is not exhaustive enough for comparison (see Table 4.27).   Prices are not available for sorghum and millet in Muranga and Taita Taveta and for potatoes in Siaya. Maize and beans have prices for all the years in Muranga and Siaya districts. It is difficult to establish yearly trends in rural market prices due to high monthly fluctuations. However, low price years seem to alternate with high price years as shown by the average yearly increase in prices. (See Table 4.28).   In Kandara and Bondo average retail price of maize was highest in 1984.   Prices more than doubled during this year.   Prices of beans also doubled.   In Bondo prices of sorghum and millet doubled.   Prices of all foodstuffs move in the same direction.   This means that there is little   room for substitution within the major staples, even if this were nutritionally possible.   Retail prices of individual foodstuffs vary within markets.   Retail prices of maize range from Kshs.1.13 per kg, the lowest, recorded at Kandara in October, 1982 to Kshs. 5.18 per kg, the highest recorded at Kandara in . December 1984   (see Appendix Table A2). Retail price of beans range from Kshs.3.14 per kg, recorded at Kandara in July 1982 to Kshs. 15.00 per kg recorded at Bondo in June 1985.   Within individual markets, retail

Table 4.27: AVERAGE YEARLY RETAIL PRICES OF MAJOR FOODSTUFFS AT
KANDARA,BONDO AND WUNDANYI MARKETS

Kandara market in Muranga District

Year	Maize	Beans	Potatoes	Sorghum	Millet
1982	1.50	3.69	1.43	-	-
1983	1.82	3.85	1.72	-	-
1984	3.24	8.21	2.60	-	-
1985	2.55	7.88	2.37	-	-
1986	2.86	5.49	2.71	-	-
1987	2.49	5.74	2.34	-	-

Wundanyi market in Taita Taveta District

1982	-	-	-	-	-
1983	-	-	-	-	-
1984	-	-	-	-	-
1985	-	11.63	3.90	-	-
1986	9.40	9.67	4.12	-	-
1987	-	-	-	-	-

Bondo market in Siaya District

1982	1.64	4.78	-	1.80	3.95
1983	2.52	5.04	-	2.79	5.28
1984	2.97	7.52	-	4.28	7.77
1985	2.85	7.52	-	3.91	10.27
1986	2.67	7.30	-	3.03	8.27
1987	2.71	6.00	-	4.13	9.63

Source: Calculated from Appendix, Table A2.

Table 4.28: AVERAGE YEARLY INCREASE IN RETAIL PRICES OF
MAIZE AND BEANS AT KANDARA AND BONDO MARKET (%)

Year	MAIZE		BEANS	
	Kandara	Bondo	Kandara	Bondo
1982/83	21.3	53.6	4.30	5.4
1983/84	78.0	17.8	113.20	49.2
1984/85	-21.3	-4.0	-4.00	0.0
1985/86	12.2	-6.3	-30.30	2.9
1986/87	12.9	1.5	0.04	17.3

Note: The average is calculated from monthly totals for the year.
Source: Calculated from Table,4.27.

prices vary highly over the years. For example, in Bondo market, retail prices of maize, in 1984 showed fluctuations of Kshs. 2.50 per kg in January to kshs. 3.43 per kg in April, falling to Kshs. 1.69 per kg in September and rising again to Kshs. 3.44 per kg in December. These fluctuations in prices have important implications for food availability. Food availability in rural areas is determined by demand and supply forces. Fluctuations in food prices are indications of fluctuations in demand and supply of food at different markets. When prices of food rise, it raises the cost of access to the food depending on whether households depend on the market for food or on own produce.

To assess the effects of macroeconomic reforms on prices of food, we compare the average rate of increase over the years with the rate of inflation. (See Table 4.29). Maize grain which is a major diet of rural households was not protected against inflation compared to maize posho. However, average rural prices of beans in Siaya were lower than inflation . In Muranga they were higher than the rate of inflation . It should be noted here that seasonal fluctuations in prices are more important and realistic to rural households than yearly average prices.

The implication of these price trends is that, while food and nutrients may be adequate, food prices have increased faster than the average rate of inflation. In case of rural prices, monthly fluctuations are very

**Table 4.29: AVERAGE YEARLY PRICE CHANGE OF SELECTED COMMODITIES
AND AVERAGE YEARLY RATE OF INFLATION (1982-1987).**

Commodity	Average yearly price change (%)	Average yearly rate of inflation
Maize(posho)	25.4	
Maize(grain)	12.7	
Maize grain (rural)	12.5	11.2
Wheat flour	9.0	
Beans	7.8	

Note: Inflation rates used here is consumer price index in Nairobi.
Source: Statistical Abstract,1987;Economic Survey,Various issues,
        and Table 4.27.

important in reflecting instability in food supply over the year. Access to food determines nutritional status. When prices are too high nutritional status of households suffer due to inadequate food. This is not so with households who consume own produce. Moreover opportunities for substitution of low price calories is limited in an area like Muranga where an important sources of cereals-sorghum and millet are non existent.

4.5 Food Consumption and Expenditure Pattern.

4.5.1 Sources of household income.

In order to assess impact of macroeconomic reforms it is useful to divide income by source. Information on income is difficult to obtain and reliability is limited. However, data available from Rural Household Budget Survey by Central Bureau of Statistics identified sources of income as: Farm enterprise, non farm enterprise, salary and wages and other sources. In Muranga, the monthly average total income was Kshs.860.00. In Taita Taveta the monthly average income was Kshs.832.00 and Siaya had the lowest monthly average income of Kshs.379.00. The average rural income in the republic was Kshs.829.00. Rural households in Siaya spend almost all their income, with no saving, while in Muranga households consume about 70%t and save 30%. In Taita Taveta, households spend about 62%. and save the rest. The distribution of income by source is shown in Table 4.30. Income from farm

enterprise constitute the most important source of income. However this information does not disaggregate smallholder from large scale farmer. Income from farm enterprise contributes less than half of total income except for Siaya where it is 53% of total income. This is supported by a baseline survey in Taita undertaken by Central Bureau of Statistics in 1986 where, out of 239 households, only 5% of men and 3% of women derive income from sale of own produce. Income of households by source is closely related to size of holding. Income from farm enterprise and non farm enterprise increases with size of holding. This shows how important access to land is to rural households (See Table 4.31).

Although households derive greater percentage of income from farm enterprise, production levels have not increased much over the years and in some cases even declined. Income derived from farm produce may not have increased over the years. When incomes do not increase while prices are increasing, households command over food is reduced. For low income households who allocate greater percentage of expenditure on food, this trend was unfavorable.

4.5.2. Food Consumption and Expenditure on Food.

Information from Household Budget Survey reveal that food expenditure as a percentage of total consumption expenditure is high and varies from 67.9% for the average

Table 4.30: INCOME AND EXPENDITURE LEVELS   (Ksh/month)

District: Source	Muranga	Taita/ Taveta	Siaya	National average
Farm Enterprise	323	371	202	399
Non Farm Enterprise	186	141	69	109
Salary and wages	159	134	43	94
Other sources	192	186	64	120
Total	860	832	379	561
Total Expenditure	611	522	377	362
Saving	249	310	2	199

Source: Rural Household Budget Survey,1981/82.

Table 4.31: AVERAGE NET HOUSEHOLD MONTHLY INCOME(CASH AND KIND)
BY SOURCE AND SIZE OF HOLDING.

size of holding (acres)	Farm enterp/ rise	Non farm enterp/ rise	wages and salaries	Other source	Total
0.1-0.9	305	63	359	6	733
1.0-1.9	171	88	298	76	634
2.0-2.9	255	89	145	101	590
3.0-3.9	295	102	118	101	616
4.0-4.9	341	149	129	123	742
5.0-5.9	371	162	128	156	817
6.0-6.9	416	174	126	147	861
7.0-9.9	462	195	152	157	966
10.0-19.9	633	202	185	143	1162
20 and over	1100	265	219	185	1770
Average total	399	140	177	114	829

Source: Rural Household Burget Survey,1981/82.

low income rural household to 56.7% for the average 'high' income households. The average rural household monthly consumption expenditure including expenditure in kind was estimated to be Ksh. 526. Household expenditure was distributed among food and non food items with expenditure on food taking the biggest share. Findings show that as total expenditure increases, a decreasing proportion of total income is spent on food commodities. However, this was also true for non food items which compete with food items. Disaggregated data show the same pattern. In Siaya, Taita Taveta and Muranga, household consumption expenditure on food was 67.2%, 72.1% and 69.7%,respectively (See Table 4.32). Average total consumption expenditure was 522 for Taita Taveta, 611 for Muranga and 377 for Siaya.

Low income households have the lowest per capita expenditure on food. (See Table 4.33). For these households the behaviour of food prices over 1982 to 1987 was not very favourable. Inflation rose faster than prices of basic food items. Inflation erodes the monetary income of households but not in kind income, which consists of own produce consumed.

When we look at expenditure by earning quintile the first quintile have per capita expenditure of kshs.30 on food while households in fifth quintile have per capita expenditure of kshs. 55. Food prices and level of income determine food consumption patterns for households exposed

Table 4.32: PERCENT DISTRIBUTION OF HOUSEHOLD CONSUMPTION
EXPENDITURE BY ITEM AND DISTRICT

Item	Muranga	Taita/ Taveta	Siaya
Food and beverage	69.7	72.1	67.2
Alcohol and tobacco	1.5	2	2.2
Cloth and footwear	7.6	7.6	8.1
Household goods	11.4	10.9	14.3
Health	0.8	0.2	1.3
Transport and communication	3.2	2.5	2.5
Education and recreation	5.8	4.6	5.3

Source: Rural Household Budget Survey,1981/82.

Table 4.33: MONTHLY PER CAPITA CASH AND CREDIT EXPENDITURE (Ksh)
BY EXPENDITURE CATEGORY AND GROSS EARNINGS QUINTILE.

Expenditure category	Gross Monthly Earning Quintile				
	1	2	3	4	5
Food	30	47	42	50	55
Clothing, footwear	5	8	10	13	21
Fuel	2	4	3	4	7
Home furnishings	1	2	2	3	9
Transport	2	3	3	5	9
Non durable goods	4	6	5	6	7
Health and recreation	1	2	3	4	6
Farm equipment	-	-	1	1	3
House durables	-	1	1	2	3
Transport equipment	-	-	-	-	2
Insurances, licences, taxes	-	-	1	1	3
Rent utilities	-	-	-	1	2
Education	1	2	3	5	11
Agriculture inputs	1	1	1	2	5
Cash payments	2	3	4	7	16
Transfers out	2	3	5	11	41
Entreprenural costs	2	4	6	7	13
Livestock purchase	1	1	3	7	58
miscellaneous	1	2	2	4	7
Total	55	90	97	135	

Source: Rural Household Budget Survey, 1981/82.

to the market. For low income households the cost of
nutrients may have been prohibitive given the income level.
The average rural household in the three districts receive
nutrients from a range of foods with low production levels.
In a study by the Ministry of Planning, 1988. It was found
out that households in the three districts consume mostly
cereals followed by pulses (See Table 4.34).

In order to analyze effects of macroeconomic reform policies
on food consumption, we look at the value of foods consumed
and the source of food. Information available indicate
that households are exposed to the market for a number of
food items. Food crops dominate own produce consumed. More
than 50% of food consumed is from own production. Beans and
maize are largely consumed from own source. A big number of
food items are purchased probably by those who do not
produce own food, e.g. wage earners.

The source of food purchase is important as it
establishes, the extent to which households are exposed to
the official market and also what prices they are faced
with. For example, households purchasing from NCPB, the
official national Channel for food purchases and sales, are
faced with official controlled prices. However, household
budget survey found out that only 1.4% of rural households
purchase maize from NCPB. All other food items are
purchased from unofficial markets. This means that even if
official reserves go up through imports, it will increase

Table 4.34: PERCENTAGE OF HOUSEHOLDS CONSUMING
           VARIOUS TYPES OF FOOD

Type of food	Muranga	Taita Taveta	Siaya
Maize flour	98.25	100.00	97.62
Maize grain	96.55	100.00	95.45
Bread	91.23	96.87	88.10
Sorghum/Millet	61.82	45.16	97.62
Rice	87.72	96.97	57.14
Wheat flour	92.98	100.00	68.29
Potatoes	96.55	100.00	100.00
Cassava/roots	63.16	96.87	92.50
Beans/pulses	100.00	100.00	95.00
Vegetables	96.49	100.00	100.00
Milk/dairy product	100.00	100.00	97.50
Bananas	96.49	96.97	94.74
Fish	19.64	59.37	100.00
Fruits	85.96	96.87	90.00
Chicken	75.00	96.97	85.37
Meat	92.86	100.00	92.50

Source: Ministry of Planning and National Development,
Food and Nutrition Planning Unit,1988.

only urban supplies with very little trickle down into rural areas. Rural households, therefore, rely more on own produce for consumption. The value of food purchase by the households depends on prices of food and income level of households. In Siaya district the mean value of maize was kshs.18.20 compared to kshs.35.30 and 35.00 in Taita Taveta and Muranga. Cereals are more expensive in Muranga. Beans are also more expensive in Muranga. The value of own produce consumed of maize is twice the value of purchases in Siaya, and is the same as value of purchases in Muranga. In Taita Taveta households consume more from own produce than from purchases (See Tables 4.35, 4.36, and 4.37). A household in Siaya, whose basic diet is assumed to be composed of maize, beans and vegetables would spend on average Kshs.24.90 to purchase the items. This is less than in Taita where the same diet will cost Kshs.51.3 and Muranga it will cost Khs 58.1 per month. the capacity of the households to afford the diet depends on income levels. The value of the diet to the household will also be expected to fluctuate with households spending more on purchased food at some times of the year and consuming own produce at other times. Households are exposed to the market for food items they do not produce but also for food items they do not produce enough. The ratio between purchases and own produce consumed in greater than one in all cases. It is important to note here that households consume a range of foodstuffs

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Table 4.35: MEAN MONTHLY VALUE OF FOOD CONSUMPTION
AND EXPENDITURE: SIAYA DISTRICT.

Type of food	Cash or credit expend- iture	Own product- ion consumed	Gifts recei- ved	Total consumption
Bread	7.6	-	0.2	7.8
Maize	18.2	37.6	0.9	56.7
Cereals	7.9	16.9	0.6	25.3
Meat	27.2	7.6	1.6	36.4
Fish	21.1	0.3	1.2	22.7
Milk	5.0	8.5	0.3	13.8
Eggs	0.3	0.3	-	0.6
Mafuta	12.4	0.3	0.8	13.5
Fruits	1.4	2.1	0.1	3.6
Vegetables	5.2	13.6	0.3	19.0
Beans	1.5	4.9	0.2	6.6
Roots	2.2	7.0	0.3	9.5
Sugar	17.6	-	1.1	18.7
Tea,Coffee	2.5	-	0.2	2.7
Flavours	3.1	-	0.1	3.3
Beverages	3.2	0.1	0.4	3.7
Tobacco	2.0	0.1	-	2.2
Other	0.2	-	-	0.2
Total food	138.6	99.6	8.2	246.4

Source: Rural Household Budget Survey,1981/82.

Table 4.36: MEAN MONTHLY VALUE OF FOOD CONSUMPTION
AND EXPENDITURE: MURANGA DISTRICT

Type of food	Cash or credit expend- iture	own produc- tion consumed	Gifts recei- ved	Total consumption
Bread	8.2	0.1	0.7	8.9
Maize	35.0	32.0	2.7	69.8
Cereals	12.8	0.2	1.4	14.3
Meat	21.5	3.9	1.5	26.9
Fish	0.2	-	-	0.2
Milk	16.5	43.4	2.1	62.0
Eggs	1.6	4.3	0.1	6.0
Mafuta	22.5	0.2	1.4	24.1
Fruits	5.6	19.9	1.0	26.6
Vegetables	7.6	8.5	0.7	16.7
Beans	15.5	35.1	1.4	52.0
Roots	6.6	23.1	1.5	31.1
Sugar	27.2	0.2	1.2	28.7
Tea,Coffee	9.7	-	0.6	10.3
Flavours	3.8	-	0.1	3.9
Beverages	4.9	-	0.3	5.2
Tobacco	5.8	-	-	5.8
Other	1.3	0.1	0.1	1.4
Total food	206.3	170.9	16.8	394.0

Source: Rural Household Budget Survey,1981/82.

Table 4.37:   MEAN MONTHLY VALUE OF FOOD CONSUMPTION
AND EXPENDITURE:TAITA TAVETA DISTRICT

Type of food	Cash or credit expend- iture	Own produc tion consumed	Gifts recei- ved	Total consumption
Bread	3.5	-	0.7	4.2
Maize	35.3	54.0	1.4	90.7
Cereals	7.5	2.5	0.8	10.7
Meat	22.8	7.0	1.2	31.1
Fish	3.4	0.3	0.1	3.8
Milk	14.5	18.4	1.6	34.4
Eggs	0.6	1.2	-	1.8
Mafuta	18.6	0.9	0.6	20.1
Fruits	7.4	15.9	1.6	24.8
Vegetables	7.3	22.8	1.1	31.3
Beans	8.7	35.4	1.7	45.9
Roots	1.5	6.7	0.6	8.9
Sugar	29.1	0.5	0.4	30.0
Tea,Coffee	6.3	0.1	0.2	6.6
Flavours	2.7	0.1	0.1	2.8
Beverages	5.0	1.1	0.3	6.4
Tobacco	5.7	0.1	0.1	5.8
Other	0.8	-	0.1	0.9
Total food	180.7	167.0	12.7	361.0

Source: Rural Household Budget Survey,1981/82.

which are either purchased or from own produce and the degree differs by the ecological zones. The high value of maize in Muranga may be attributed to higher prices or low quantity produced relative to income levels.

4.6.   Other factors affecting Nutrition

While this study has focused mainly in agriculture sector, it is worth noting here that changes in agricultural sector are not the only important changes affecting nutritional status.   The ability of households to take preventive and curative health actions for themselves play an important role in determining nutritional status.   This depends on availability of health services. Health services in Kenya as elsewhere are generally provided, but not exclusively, by the Government.   In order to assess the effect of reform policies on access to health services, it is important to look at the trend in Government expenditure over the period considered, particularly expenditure on primary health care   (See Table 4.38). Primary health expenditure as percentage of total has shown upward trend compared to curative health.   Data is not provided at disaggregated level.   What is of importance is access by households to services such as health centres   (See Table 4.39) Access to basic health services can be viewed as the outcome of a chain of events linking macroeconomic reforms to basic services.   Data available for 1988 show that

Table 4.3B: PUBLIC EXPENDITURE ON HEALTH BY MAJOR
FUNCTIONAL CATEGORIES,AS PERCENTAGE OF TOTAL.1981/82-1986/87

	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87
Reccurrent/						
Expenditure						
Curative Health	73	72	73	67	71	66
Primary Health	14	15	11	10	14	18
Health Training	7	7	6	5	5	6
Medical Research	-	-	-	3	4	3
Medical Supplies	3	-	-	10	1	1
Development/						
Expenditure						
Curative Health	82	86	45	45	43	35
Primary Health	18	14	36	36	43	46
Health Training	-	-	-	-	-	4
Medical Research	-	-	-	-	-	11
Medical Supplies	-	-	-	18	14	-

Source: Republic of Kenya, Appropriation Accounts,Various years.

Table 4.39:   DISTANCE TO HEALTH CENTRE BY HOUSEHOLDS   (%)

	Less than 10 mins.	10- 30mins	30mins- 1 hr	1-2 hr	over 2 hr
District					
Muranga	23.08	44.62	30.77	-	1.54
Taita/ Taveta	11.63	41.86	22.09	23.26	1.16
Siaya	4.17	19.44	26.39	47.22	2.78

Source: Ministry of Planning and National Development,1988.

households are within adequate reach of health centres. However, households in Siaya are comparatively less served by health services. More than 50% of households are more than 1 hour away from health centre. Taita Taveta and Muranga are comparatively better with more than 50% of households within 30 minutes distance to health centre.However, the quality of services offered by the health centres need to be taken into account. Malnutrition was found to be closely related to disease in Nutrition Survey (III), carried out by Central Bureau of Statistics.

4.7 Nutritional Status of Children

Anthropometric measures based on height for age of children show that protein calorie malnutrition was the most prevalent in Kenya in 1982. At the national level 24% of children aged three to six months were stunted with a median height for age less than 90%. A child's height is an indicator of its long term nutritional status. Stunting implies that a child has suffered from long term undernutrition. Disaggregated data provide closer identification of the at risk areas. Central Bureau of Statistics undertook a study disaggregated by district in 1982. Siaya had prevalence of malnutrition above the national average, i.e. 36.6%. Muranga had 24.8% of children stunted. This figure was close to the national average. Taita Taveta had the least number of stunted children. It

ranked third in the republic with least number of 14.7% stunted. The three districts therefore provide good comparison of nutritional status in the republic.[1] Recent information collected by Ministry of Planning and National Development show that over the period 1982 to 1988 malnutrition in children has been reduced by 28.9% in Siaya; 11.6% in Muranga; and 2.2% in Taita Taveta (See Tables 4.40). Available data shows an improvement in nutritional status over the period considered. Siaya district showed a large improvement. The results may have been influenced by small sample size in 1988 survey. In 1982 the sample size was 71, 309 and 103 for Taita Taveta, Muranga and Siaya respectively. In 1988 a sample of 48,38 and 39 was taken for the respective districts. The sample size, however, should not be taken as having big influence because in 1985 a baseline survey in Siaya found out that out of 100 children sampled nutritional status of children had improved by 12.9% in a period of only three years.[2] Since the factors constructing to this improvement (e.g, increased food production) had continued over 1985-1988 period, an improvement of 7.7% is realistic. The influence of sample size will become clear when the results of the fourth nutrition Survey published.[3] What is of importance here is that nutritional status of children has improved over the period considered. While Taita Taveta is still better than Muranga in the second period, performance in Taita Taveta

Table 4.40: PERCENTAGE OF CHILDREN STUNTED AND
MEAN HEIGHT FOR AGE BY DISTRICT

| DISTRICTS | 1982 | | | 1988 | | | percentage change in nutritional status |
	Percent less than 90	mean		Percent less than 90	mean		
Taita Taveta	14.7	95.8		12.5	96.9		2.2
Muranga	24.8	94.3		13.2	96.2		11.6
Siaya	36.6	93.3		7.7	96.6		28.9

Source: Ministry of Planning and National Development,1982 and 1988.

was comparatively low. Muranga which was close to the national average in terms of nutritional status, showed great improvement. One may conclude that there is an improvement in the republic from the available information.

An important aspect to note here is that the 1982 survey covered children aged three to sixty months, while 1988 data included children aged six to sixty months. The 1985 baseline Survey data from Siaya, covered children aged three to sixty months. However, the proportion of children aged less than six months was too small to influence the results. In 1982 survey, the proportion was 0.04 for Taita Taveta, 0.03 for Siaya and 0.02 for Muranga. The means of height for age follow the same trend as percentage changes in 1982. However, in 1988 the means do not follow the same trend as percentages. Siaya with the best percentage changes in height for age showed a mean of 96.6 and Muranga with comparatively worse off percentage change, showed the least mean. It is important to test the significance of the change in nutritional status by testing the difference between the means over the period. We wish to establish whether the difference between these means in significant or it can be attributed to chance. We assume that the samples are drawn from three populations which have a normal distribution with means u_1, u_2 and u_3 and equal standard deviation σ

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We want to test the null hypothesis

$$H_O: u^1 = u^2 = u^3$$

against the alternative hypothesis

$$H_1: uj \text{ not all equal}$$

Based on the formula in section 3.3.1 the estimate for ∂^2 is:

$$= \frac{71(95.8 - 94.4)^2 + 309(94.3 - 94.4)^2 + 103(93.2 - 94.4)^2}{3 - 1}$$

$$= \frac{139.2 + 3.09 + 148.3}{2} = 145.295$$

In order to test the difference between the means we compute

$\hat{\sigma}^2$ using 1988 data. We denote this by $\hat{\partial}^2$

but use the same formula.

$$\hat{\sigma}^2 = \frac{48(96.9 - 96.7)^2 + 38(96.2 - 96.7)^2 + 39(96.6 \ 0 \ 96.7)^2}{2}$$

$$= \frac{1.92 + 9.5 + 0.39}{2} = 5.905$$

The observed variance ratio using F test is:

$$F\star = \frac{\hat{\partial}^2}{\hat{\sigma}^2} = \frac{145.295}{5.905} = 24.42$$

The theoretical value of F at 5% level of significance with

degrees of freedom equal to 2 in each case is:

$$F_{0.05} = 19.00$$

Since F* is greater than fo.o₅ we reject the null hypothesis

i.e. we accept that there is a significant difference in the average height-for-age of children in the two periods considered.

Therefore, based upon our limited data, it appears that there was a significant improvement in nutritional status over the period considered.

END NOTES

1. For details on level of stunting for all districts- see Nutrition Survey Report,1982 by Central Bureau of Statistics.

2. For details see Baseline Socio-economic Survey Report for Siaya District, by Central Bureau of Statistics.

3. Central Bureau of Statistics undertook a National Survey on nutrition in 1987.The results are not yet published.

CHAPTER 5

SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

5.1 Summary and Conclusions

This study set out to explore the effects of macroeconomic reform policies on nutritional status of children through changes occurring in household activities. The analysis traced the effects of the policies through agricultural production which is closely related to protein - calorie malnutrition. It was assumed that household activities are aimed at maximising nutritional status of their children.

The effect of policies on nutritional status was analysed through impacts on area under crops, crop production, per capita availability of food and nutrients, and the capacity of households to benefit from the policies. The effects of these variables on food consumption, food prices and household income and expenditure levels, was found to be important in determining nutritional status.

The data used in the study was however scanty and derived from secondary sources. Data was disaggregated by district to capture the different effects on different groups. There was a dearth of information in the areas of food consumption and expenditure patterns, and income levels. The analytical approach adopted in this study was comparative analysis and intuitive derivation of effects on nutritional status. The significance of the change in

nutritional status was determined by testing the difference between the means over the period 1982 and 1988.

Based on the limited data available, the study concludes that there was a significant improvement in nutritional status of children in all the districts considered. Malnutrition was reduced by 28.9% in Siaya; 11.6% in Muranga and 2.2% in Taita Taveta districts. Muranga district had rates of stunting approximately equal to the national level rates in 1982. The three districts were representative of the whole country. It is therefore concluded that there was a significant improvement in nutritional status of children at the national level, over the period 1982 and 1988.

Based on limited data available for the variables closely linked to nutritional status, the study found out that food consumption, food prices and household income are important variables in determining nutritional status. However, these variables are not directly linked to macroeconomic policies.

Percentage rural price increase from year to year show no definate pattern of increase. There are high fluctuations in prices within a year and over the years. Prices of all foodstuffs move in the same direction. This means that there is little room for substitution within the major food staples, even if this were nutritionally possible. Seasonal fluctuations in prices were found to be

more important for rural households than average yearly increase in prices. It was noted that price of maize grain which is of crucial importance to rural households was not protected against inflation. Food prices have increased faster than the average rate of inflation. Macroeconomic reform policies aimed at controlling rate of inflation have had adverse effects on controlled prices of basic foodstuffs. In Muranga where prices of food are relatively high opportunities for substitution of low price calories is limited by absence of substitutes such as sorghum and millet. However, incomes are found to be relatively higher in Muranga. Low income households tend to allocate greater percentage of expenditure on food. It was found out that as total expenditure increases, a decreasing proportion of total income is spent on food commodities. In Siaya, Taita Taveta and Muranga, household consumption expenditure on food was 67.2%, 72.1% and 69.7% respectively. More than 50% of food consumed is from own production. However, households are exposed to the market for a number of food items. Nutritional status of children seemed to follow the same pattern as source of food consumed. In Siaya where households consumption of own produce is more than double the food from purchases, nutritional status showed the greatest decline in stunting. This was followed by Muranga and Taita Taveta where more than 50% of food consumed is also from own produce. It can therefore as be concluded

that own produce as source of consumption is not eroded by inflation. It can further be concluded that households producing own produce for consumption were not affected by macroeconomic reform policies. Since majority of households in this study produce greater percentage of food for own consumption nutritional status was found to have improved in all the districts.

The households in the three districts seem to be limited in their capacity to benefit from the policies. Land is the major constraint. Most households in the three district have less than six acres of land.

The study note that expansion in area under crops has been limited. Area under food crops has performed better than area under export crops (e.g. coffee). This is important for nutritional status because low income households in the three districts are better off nutritionally,partly as a result of a small expansion in area under food crops relaive to export crops. An important conclusion to be derived from this finding is that, macroeconomic reform policies, e.g. devaluation do not seem to have caused a major substitution of export crops for food crops or vice versa.

Food crop production shows fluctuations over the period considered. Good production years are found to alternate with unfavourable production years. Per capita availability of food from the five major staple food crops follow same

trend as food production. Different districts reveal variation in availability of food for recommended consumption requirements. Taita Taveta is found to be below requirements from all the five major staple food crops. Indices of per capita availability of food, calories and protein indicate that, except for some years in Muranga district, the three districts did not perform better than 1982. An important conclusion derived from these findings is that, although nutritional status improved in all the districts, food production did not increase proportionately. However, indices of per capita availability of nutrients was higher than per capita availability of food. This was found to be partly because households in the three districts were consuming food with high calorie and protein value. Siaya district was better off in availability of high calorie substitute food.

We can conclude that, while macroeconomic reform policies have been aimed at increasing food production, performance has not been any better than 1982. This was found to be so because of the influence of non policy variables which affect food production. Rainfall pattern is an important non policy variable affecting food production. Low rainfall years are unfavourable and lower food production. However, it was difficult to separate out effect of good rainfall years from better policy and better prices. The improvement in nutrition is not attributed to

food production alone. Access to health services was found to be adequate in all the districts and this also influenced nutritional status. Public expenditure on primary health care had increased over the period. Macroeconomic reform policies did not lead to a decrease in this expenditure which benefits the low income households.

While we can attribute the improvement in nutritional status to some of the policies pursued, for example, producer price increases which contributed to increased food production, the improvement on nutritional status was also influenced by other factors not necessarily influencing agricultural sector and also non policy variables. The improvement resulting from increased food production was due to greater consumption of own produce which is hardly affected by macroeconomic reform policies.

Policy Recommendations

Policy recommendations from this study is based on an important aspect that, although nutritional status of children improved significantly, food production did not increase proportionately. There are children still considerably malnourished. Policies should focus on eradicating malnutrition, especially protein energy malnutrition.

The food situation differs in different areas, as do income levels and food prices. A generalised policy for the whole country may not be the best approach to improve nutritional status. Policies will have to look at each district as separate entity. An important priority area for policies is to increase food production. There is a need to diversify production of food crops other than relying on one or two food crops. This is particularly necessary in Muranga and Taita Taveta and other districts with similar problem. This will increase possibility of substitution within the basket of goods particularly during periods of low rainfall. Sorghum and millet are drought resistant, have high calorie and protein content and can be substituted with maize. Muranga and Taita Taveta districts need to expand production of these two crops. In line with increasing food production, policies should aim at improving the productive capacity of households. More emphasis should be given to enhancing access to productive assets.

Increasing access to productive assets can be an affective strategy in increasing food production. The choice of which asset to distribute will depend on specific districts. There is an urgent need to look into alternative sources of collateral since access to land is clearly limited in most areas. In areas where land can be redistributed, this should be pursued. Cattle could be one alternative to land as a collateral.

Policies should aim at increasing incomes of low income households. There is a need to focus programmes on income generating activities such as increased marketed food production from a variety of crops. Apart from earning income, these sources provide nutrients to boost own source of consumption.

Policies need to focus on stabilising prices in the rural areas or at least reducing the high fluctuations within a year. This will ensure stable food availability and food security. More emphasis should be given to prices of food crops that are of vital importance to the low income households, for example, maize grain. This is particularly necessary when incomes are not rising.

Finally, the Government should introduce programmes that take into consideration nutritional aspects. International lending institutions should also give loans for programmes that aim at expanding or complementing nutritional considerations.

5.3. Limitations of the Study and Recommendations for Further Research.

In order to achieve the objectives of policies identified above, planners will have to target programmes to specific groups identified to be at risk of being malnourished. Research will focus on identifying such groups, for example children of different age groups or cohorts.

Given the time and data constraint, it was not possible to estimate the effects of specific policies on nutrition with any reasonable degree of accuracy. Data on nutritional status was available for only two periods. Considering the high fluctuations on food prices and food availability, any further research should aim at improving the data base on nutrition to capture the fluctuations. It is possible that children will show improvement on nutritional status depending on whether data is collected at peak food availability or low period of food availability.

Priority in improving nutritional status would therefore depend on improving the current understanding in the complex causal link. Such improvement will require improved data base on household income and expenditure levels, distribution and sources by income group, with special information on food expenditure at household level. Although Central Bureau of Statistics has done well in data

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base for food prices, there should be consistency so that trend values are available for all the important food crops. This will ease comparison over the years and across regions. This study had access to data on food consumption and household income and expenditure pattern at only one point in time. It was therefore, not possible to estimate the change in these important variables over the years. Improved data base on these variables will require a well developed system of continous monitoring.

Further research need to focus on possibility of expanding production of sorghum and millet in Muranga and Taita Taveta districts. This will also entail identifying the limitations of such expansion. Research will take into account the limited access to productive assets and identify alternatives to expanding food production with such limitations. For example, what is the alternative to increase food production when households are not able to expand area under food crops?

Although this study focused so much on food production and availability, factors affecting nutrition cut across many sectors and non-policy variables need to be considered. Future studies should focus on and be able to separate out effects of drought. Due to time and financial constraints, it was not possible to cover the whole country. National coverage may give better results.

Future research should address itself to the analytical approach to be adopted in the analysis. The approach should be able to take into account all the limitations mentioned above. A computable General Equilibrium model could be a possible approach if the data constraint is removed and if the model can be adapted to the Kenyan Situation.

Table A1: POPULATION BY YEAR AND DISTRICT

YEAR	DISTRICT	Siaya	Muranga	Taita/ Taveta
1982		587292	753521	169611
1983		607637	784354	175898
1984		628717	816504	182430
1985		650646	850147	189242
1986		673338	885194	196312
1987		696900	921811	203672
1988		721369	960077	211336

Source: Population Projection,1982.

Table A2: PRICES OF MAJOR FOODSTUFFS AT KANDARA MARKET IN
   MURANGA DISTRICT (KSH/KG)

MONTH	1982	1983	1984	1985	1986	1987
			MAIZE			
January	1.50	1.49	2.84	4.59	3.30	2.88
February	1.56	1.30	2.70	3.13	3.06	-
March	1.59	1.36	2.06	2.07	2.25	-
April	1.69	1.32	1.78	2.08	2.78	-
May	1.56	-	2.22	1.95	3.05	3.00
June	1.62	-	3.07	1.84	3.50	-
July	1.71	-	3.23	1.81	3.86	-
August	1.40	1.87	3.00	1.90	2.34	-
September	1.24	1.90	4.01	2.09	2.31	2.14
October	1.13	2.07	4.06	2.61	2.45	2.06
November	1.54	2.24	4.76	3.27	2.74	2.36
December	1.51	2.85	5.18	3.29	2.78	2.36
			BEANS			
January	4.43	3.22	4.43	7.32	5.23	5.47
February	3.69	3.24	5.12	8.42	4.95	-
March	3.91	3.41	4.85	9.45	5.79	-
April	4.31	3.45	4.59	9.42	5.66	-
May	3.97	-	5.22	9.57	5.83	6.00
June	3.84	-	6.19	9.22	5.71	-
July	3.14	-	11.53	7.68	5.54	-
August	3.01	4.14	11.03	6.82	5.47	-
September	3.44	4.38	10.60	7.14	5.45	5.75
October	3.56	4.25	11.86	7.14	5.51	5.59
November	3.58	4.15	12.44	6.36	5.26	5.91
December	3.50	4.45	10.70	6.01	5.56	5.91

Table A2 (cont..): PRICES OF MAJOR FOODSTUFFS AT KANDARA MARKET IN MURANGA
DISTRICT(KSH/KG)

MONTH	1982	1983	1984	1985	1986	1987
			POTATOES			
January	1.04	1.34		2.44	2.27	3.49
February	1.16	1.44		2.88	2.22	-
March	1.16	2.42		3.31	2.05	-
April	1.27	2.05		2.99	2.14	2.00
May	2.30	-		2.79	2.44	2.00
June	1.58	-		2.47	2.58	-
July	1.21	-		2.39	3.23	-
August	1.20	1.78		2.04	2.17	-
September	1.22	1.40		2.48	2.20	-
October	1.61	1.83		2.48	2.24	2.64
November	1.42	1.74		2.64	2.27	2.82
December	2.03	1.45		2.31	2.70	3.34

Source: Market Information Bulletin,Various issues.

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Table A2 (cont..): PRICES OF MAJOR FOODSTUFFS AT KANDARA MARKET IN MURANGA
DISTRICT(KSH/KG)

MONTH	1982	1983	1984	1985	1986	1987
			POTATOES			
January	1.04	1.34		2.44	2.27	3.49
February	1.16	1.44		2.88	2.22	-
March	1.16	2.42		3.31	2.05	-
April	1.27	2.05		2.99	2.14	2.00
May	2.30	-		2.79	2.44	2.00
June	1.58	-		2.47	2.58	-
July	1.21	-		2.39	3.23	-
August	1.20	1.78		2.04	2.17	-
September	1.22	1.40		2.48	2.20	-
October	1.61	1.83		2.48	2.24	2.64
November	1.42	1.74		2.64	2.27	2.82
December	2.03	1.45		2.31	2.70	3.34

Source: Market Information Bulletin,Various issues.

Table A2 (cont..): RETAIL PRICE OF MAJOR FOODSTUFFS AT
             BONDO IN SIAYA DISTRICT (KSH/KG)

MONTH	1982	1983	1984	1985	1986	1987
			MAIZE			
January	1.89	1.95	2.50	3.21	3.22	2.80
February	1.79	2.32	2.75	3.29	3.20	-
March	1.83	2.63	3.29	3.44	3.16	-
April	2.30	2.39	3.43	3.46	3.17	-
May	2.61	2.70	3.00	3.25	3.33	2.56
June	2.57	2.70	3.05	3.31	3.10	3.00
July	1.80	2.65	3.63	2.14	2.19	2.66
August	1.23	2.51	2.55	1.87	1.89	-
September	1.42	2.50	1.69	1.93	1.97	-
October	1.43	2.63	2.95	2.50	2.21	-
November	-	2.75	3.33	2.79	2.24	2.56
December	1.79	2.60	3.44	3.05	2.40	2.67
			BEANS			
January	6.62	4.93	5.00	9.80	9.36	-
February	6.31	4.90	6.23	10.30	-	-
March	6.20	4.00	7.12	13.06	9.73	4.70
April	6.85	6.15	5.88	14.89	9.12	7.50
May	7.17	5.51	9.69	14.76	9.43	5.66
June	5.26	5.13	7.38	15.00	6.16	-
July	3.45	5.05	6.61	8.64	4.06	-
August	3.83	4.97	6.81	6.13	6.08	-
September	4.63	5.83	9.33	9.46	5.45	-
October	4.96	5.00	7.02	9.34	7.16	-
November	4.93	4.60	9.42	9.19	7.50	7.34
December	4.10	4.50	9.69	8.40	6.27	-
			SORGHUM			
January	1.76	1.80	3.75	4.22	3.49	3.37
February	1.80	1.73	3.90	4.57	-	-
March	1.88	2.49	4.98	5.00	3.95	-
April	2.42	2.57	4.29	4.67	4.20	-
May	2.25	2.60	5.94	5.01	4.19	-
June	2.62	3.24	6.98	6.21	3.89	-
July	1.93	2.85	5.98	3.65	2.14	3.33
August	1.52	2.97	2.83	2.36	1.99	-
September	1.24	2.60	3.05	2.42	2.12	-
October	1.24	3.68	3.26	2.63	2.18	-
November	1.24	3.50	3.19	2.85	2.46	-
December	1.64	3.44	3.24	3.33	2.61	2.44

Table A2 (cont..) : PRICE OF MAJOR FOODSTUFFS AT BONDO IN
                    SIAYA DISTRICT (KSH/KG)

MONTH	1982	1983	1984	1985	1986	1987
			MILLET			
January	4.36	3.63	8.33	10.50	8.19	12.23
February	3.75	3.99	7.47	10.85	-	13.67
March	3.95	4.09	7.64	11.41	8.44	11.11
April	5.36	4.90	7.64	11.34	8.05	-
May	5.56	5.15	8.00	11.11	8.33	11.39
June	5.40	5.56	6.95	11.11	6.24	6.66
July	4.51	6.07	10.14	8.89	4.93	-
August	2.56	5.45	7.24	7.72	5.39	-
September	2.73	5.84	7.70	11.00	8.10	-
October	2.77	6.39	6.48	9.83	8.33	-
November	2.46	6.25	6.83	9.26	8.33	7.34
December	2.78	6.11	8.87	-	8.33	5.03

Source: Market Information Bulletin,Various issues.

Table A2 (cont..): RETAIL PRICE OF MAJOR FOODSTUFFS AT WUNDAYI MARKET
IN TAITA TAVETA DISTRICT (KSH/KG)

| MONTH | MAIZE | | BEANS | | | | POTATOES |
	1985	1986	1985	1986	1987	1985	1986
January	-	10.00	-	10.00	-	-	3.87
February	-	10.00	-	10.00	-	3.44	3.77
March	-	8.18	12.24	8.18	-	3.71	2.77
April	-	10.00	12.50	10.00	-	4.70	3.88
May	-	8.33	13.00	8.33	10.00	4.49	3.67
June	-	10.00	12.00	10.00	11.33	4.36	4.33
July	-	-	10.66	10.00	-	3.86	4.56
August	-	-	12.00	10.00	10.00	3.55	5.20
September	-	-	11.75	10.00	11.00	3.68	5.34
October	-	-	11.75	10.00	-	3.44	4.00
November	-	-	10.42	10.00	10.00	4.07	4.00
December	-	-	9.97	-	-	3.72	-

Source: Market Information Bulletin,Various issues.

Table A3 : RAINFALL PATTERNS IN SIAYA DISTRICT (AVERAGES IN mm).

MONTH YEAR	1982	1983	1984	1985	1986	1987
January	62.4	37.5	35.9	-	21.7	49.5
February	29.3	50.1	20.5	-	25.6	95.5
March	64.8	54.6	100.7	▪	190.8	186.7
April	160.6	219.3	197.4	-	202.9	215.5
May	223.6	153.9	124.3	-	127.9	166.7
June	125.2	51.1	104.2	-	48.5	123.3
July	57.7	11.0	106.8	-	24.5	50.7
August	126.7	139.4	134.7	-	38.3	65.7
September	122.5	147.2	86.7	-	46.2	69.7
October	214.2	169.4	149.5	-	86.7	59.7
November	255.7	109.0	96.9	-	80.5	108.3
December	45.1	57.7	46.4	-	108.2	65.5
Total/ average	1487.8	1200.2	1204.0	-	1001.8	1256.8

Source: Provincial Agriculture Annual Reports,Various issues.

Table A3 (cont..): RAINFALL PATTERNS IN TAITA TAVETA DISTRICT
(AVERAGES IN mm).

MONTH YEAR	1982	1983	1984	1985	1986	1987
January	8.8	38.3	27.8	35.8	62.5	50.1
February	30.0	80.0	10.3	79.9	0.5	12.4
March	45.5	62.1	36.6	46.6	77.3	26.1
April	114.1	44.9	77.8	75.8	140.1	136.9
May	96.6	75.3	25.7	83.3	129.2	109.6
June	24.1	18.2	24.8	17.5	15.8	9.2
July	27.5	15.5	23.8	18.2	14.1	23.2
August	12.8	15.0	3.2	11.4	15.4	59.1
September	67.4	20.1	14.2	37.8	7.8	1.6
October	153.9	11.2	101.6	45.4	38.3	10.7
November	178.7	55.0	153.4	159.4	272.3	86.8
December	141.1	111.8	141.5	114.8	174.1	8.0
Total/ average	900.5	547.4	640.7	725.9	947.4	533.5

Source: Provincial Agriculture Annual Reports,Various issues.

Table A3 (cont..): RAINFALL PATTERNS IN MURANGA DISTRICT (AVERAGES IN mm).

MONTH YEAR	1982	1983	1984	1985	1986	1987
January	26.3	87.0	9.1	18.7	-	56.3
February	15.7	131.5	-	96.5	-	21.2
March	59.2	63.9	29.5	145.1	-	54.2
April	322.5	40.1	123.7	499.5	-	365.6
May	360.9	46.1	33.6	303.4	-	254.5
June	98.2	66.4	14.3	69.7	-	82.5
July	34.5	72.9	39.1	63.4	-	18.6
August	46.0	292.3	14.7	49.7	-	127.8
September	35.3	298.4	31.0	54.2	-	13.6
October	249.2	14.9	291.3	183.0	-	13.3
November	143.5	58.5	221.1	218.2	-	151.5
December	133.8	11.3	54.1	51.6	-	124.9
Total/ average	1525.1	1183.3	640.4	1753.0	-	1284.0

Source: Provincial Agriculture Annual Reports,Various issues.

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