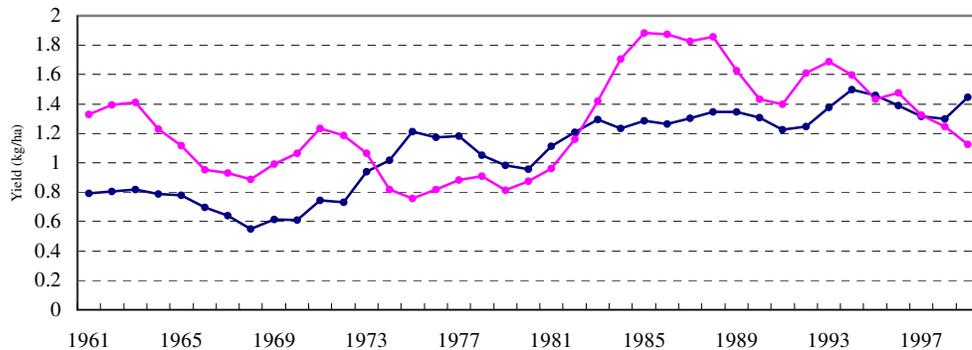


AFRICA IN TRANSITION MACRO STUDY TANZANIA



Final Research Report

Prepared by:

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LIST OF ABBREVIATIONS

ADT	-	Animal Drawn Technology
AIDS	-	Acquired Immune Deficiency Syndrome
ASU	-	Agricultural Statistics Unit
BACAS	-	Bureau of Agricultural Consultancy and Advisory Services
BSI	-	Basic Industries Strategy
CMEWU	-	Crop Monitoring and Early Warning Unit
ECA	-	Economic Commission for Africa
ESAP	-	Economic and Social Action Program
ERP	-	Economic Recovery Program
FAO	-	Food and Agriculture Organization
GDP	-	Gross Domestic Product
HIV	-	Human Immunodeficiency Virus
HRDS	-	Human Resources Development Survey
IAS	-	Integrated Agricultural Survey
HYV	-	High Yielding Varieties
IMF	-	International Monetary Fund
MAC	-	Ministry of Agriculture and Cooperatives
MAFS	-	Ministry of Agriculture and Foods Security
MDB	-	Marketing Development Bureau
NAFCO	-	National Agriculture and Food Company
NAPB	-	National Agricultural Product Board
NBS	-	National Bureau of Statistics
NESP	-	National Economic Survival Program
NEI	-	Netherlands Economic Institute
NMC	-	National Milling Cooperation
SAP	-	Structural Adjustment Program
TANROADS	-	Tanzania Roads
TANSEED	-	Tanzania Seed Company
TFA	-	Tanzania Farmers Association
TARO	-	Tanzania Agricultural Research Organization
TARILO	-	Tanzania Livestock Research Organization
URT	-	United Republic of Tanzania
USD	-	United States Dollar
VAT	-	Value Added Tax
WTO	-	World Trade Organization
WB	-	World Bank

AFRICA IN TRANSITION: A CASE STUDY FOR TANZANIA

(MACRO-STUDY)

1.0 BACKGROUND

1.1 Introduction

Food insecurity for significant proportions of the population remains a major challenge for many countries in Africa (MacCalla, 1999; Maxwell, 1999), and own production seems to be the most feasible option for addressing this problem in the short and medium run. The general trend of food production in African countries has been downwards and the future prognosis has often been presented as dismal (MacCalla, 1999). Indeed, some people have contended that the green revolution, which has been hailed as a success in Asia and Latin America bypassed Africa to a great extent or Africa barely felt a foot print of it (Eicher, 1988).

The green revolution in Asia among other things involved agricultural intensification through irrigation, use of improved high yielding varieties (HYV) of rice and wheat, use of inorganic inputs (fertilizer and pesticides) and enhanced agronomic practices. These were complemented by an enabling environment which was facilitated by respective state or regional strategies by way of improved infrastructure to facilitate marketing efficiency, investment in transport and communication infrastructure, irrigation, education, institutional innovation for credit schemes (Göran & Magnus, 2002; Bonnen, 1990). Crop production intensification has been a critical step for most countries that have crossed the food security hurdle. It also remains the most viable option for most African countries since they lack the financial means to import from surplus countries.

This case study presents the situation of food production and supply in Tanzania over a period of about 40 years from the 1961 up to the year 2001. During this period Tanzania went through many policy changes that had a direct bearing on the agricultural sector and food production in particular. Some of these policy changes include the Arusha

declaration in 1967, government decentralization in 1972, villagization in 1974-1975, dissolution of cooperatives in 1976 and structural adjustment during the 1980s. The structural adjustment programs (SAP) represent a major shift in the national vision from a socialist orientation towards a market economy

Although Tanzania has generally been self sufficient in food during most years, the situation of food has involved periods of inadequate food supply due to various reasons, as it will be explained within this report and summarized hereafter. The period after independence until 1966 is characterized by increasing food supply, as the post independence euphoria and nationalism was associated with expansion in the area under agricultural production for both food and export crops. The agricultural sector grew at about 6% per annum compared to a population growth rate of 3.2 % and 2% in the interval 1968-1978 and 1978 – 1988 respectively.

Available data indicate for example that the per capita production of maize, rice, sorghum and cassava increased between 1974 and 1977 and after 1981 (Figure 16). After 1967, improved food production is associated with two main factors (i) increased use of chemical fertilizer, which also coincided with expanding extension services and (ii) expansion of area under production. The mid 1970s (1973 – 1976) witnesses a decline in farm production, including that of food crops, mainly due to drought in (1973-1974) and massive displacement of rural people who were reallocated to new Ujamaa villages. External factors such as the oil embargo in 1973 also had an influence.

After 1975, a new set of factors came into play to influence the food situation in the country. These include subsidized input supply and pricing policies for food and cash crops. During some periods switched from export to food crops due to more favorable relative prices as well as less marketing restrictions. Although the government introduced subsidized agricultural input supply during this period, it has been argued by some scholars that in the government's quest to promote the industrial sector, through the Basic Industries Strategy of 1976, the agricultural sector became highly marginalized, despite being the engine of economic growth. Maize production figures for Iringa region

for example indicate a declining trend between 1978 and 1980 as well as between 1982 – 1985. Iringa region is one of the leading maize producing areas in the country.

In 1986 Tanzania embarked on economic transformation towards a market economy. This entailed a number of steps involving liberalization of commodity and financial markets as well as other institutional reforms. The strategy also involved an infusion of donor funds from the World Bank (WB), The International Monetary Fund (IMF) and other bilateral donors. Analysis of data indicates production gains in the immediate post liberalization period up to the early 1990s. However, such gains have not been sustained especially after 1994, when all subsidies for the agricultural sector, both explicit and implicit, were removed.

Improvement in food production after 1986 came from both area expansion in response to market incentives and increased yield resulting from improved input supply, especially inorganic fertilizer. In general yield gains through out the study period have not been consistent in one direction over time. Trends have been rather erratic (Figure 10 - 12) probably because the supply of agricultural inputs, especially inorganic fertilizer and improved seed, has been highly dependent on import grants and donor supported development projects. Nevertheless, a general upward trend of maize and paddy productivity can be observed (Figures 21 and 22)

Another dimension of food security concerns nutrition. In 1992 the National Nutrition Policy was launched to coordinate food and nutrition activities, which were undertaken by various sectors. These had been preceded by other policies that focused mainly on food security, including; the Agricultural Produce Act in 1962 and the Food Security Scheme of 1976, which aimed at reducing food imports that had been experienced in 1971/72. The government responded by organizing campaigns that exhorted farmer to work harder. These included *Kilimo cha kufa na kupona*¹ in 1971 and *Kilimo cha Uhai*² in 1972. The government also formed the National milling Corporation (NMC) in 1973,

¹ Translated to mean “Agriculture as a matter of life and death”

² Translated to mean “Agriculture is life”

as a monopoly parastatal for procurement of food crops, and storage of national grain reserve. The Strategic Grain Reserve was formed in 1983 under the NMC.

The first National Agricultural Policy of 1983 had as one of its objectives to advance food self-sufficiency and meet the nutritional requirement the population. Consequently, the National Food Strategy of 1984 aimed at increasing the production of food crops while improving the nutritional status of disadvantaged groups. In 1986 the Food Security Review Mission identified various factors, which caused food shortage and proposed remedial measures that included improvement in the delivery of agricultural services. In 1992 the government with assistance form the Food and Agriculture Organization (FAO) formulated a comprehensive Food Security Program. During the same year the National Food and Nutritional Policy was launched to coordinate food and nutrition activities that are undertaken by various sectors. The Special Program for Food Security of 1995 aimed at increasing productivity of major staples through improved agricultural extension services by working with farmers' groups. Currently (2003) the National Food Security Policy is under review.

The government has shown commitment to develop agriculture as an engine of economic growth. This is reiterated in a the policy documents, including the Vision 2025, which is the national guiding policy during the next 20 years, the Poverty Reduction Strategy Paper (PRSP) and the Rural Development Strategy (RDS), which emphasize the pivotal role of agriculture in transforming the economy. In accordance with the Vision 2025 and RPSP, the government formulated the Agricultural Sector Development Strategy (ASDS) for implementing the RDSP as well as the Agriculture and Livestock Policy of 1997. The objective of the ASDS is to transform the predominantly subsistence agricultural sector into a commercial, favorable agricultural system by providing an enabling environment that is conducive for improving agricultural productivity and profitability, thereby improving farm income and rural poverty, while ensuring food security.

While various factors interacted to impact on local food production and supply, this study aims to compare policy implications and impacts on local and national food production

before and after structural adjustment programs (Pre and Post SAP). The study will mainly address the production of food crops, focusing on maize and paddy (rice), which are the main staples, accounting for about 70% of the area under cereal production and 40% of the gross cultivated land (WB, 2000). However, reference will be made to the production of traditional cash crops and livestock where appropriate.

1.2 Methodology

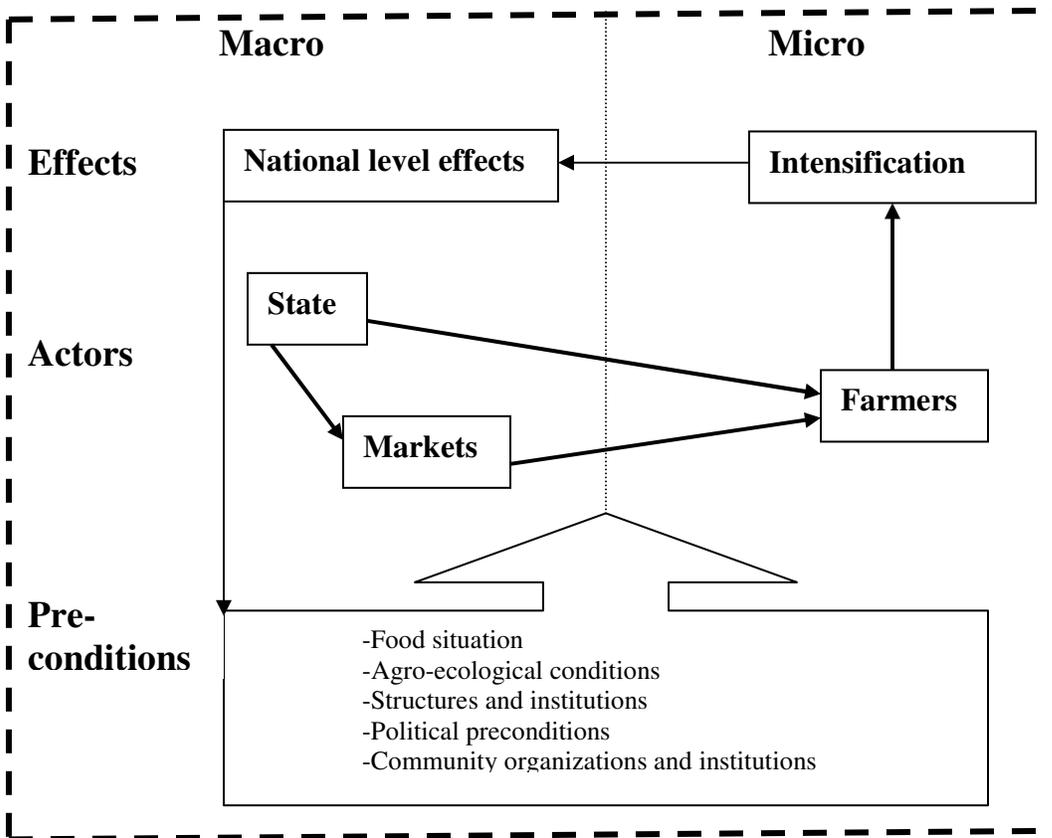
Tanzania comprises of the mainland and Zanzibar, which is administered separately, except for common matters that are handled by the Union government. This report is about mainland Tanzania, which covers 942,800 km² of land and 61,500 km² of inland lakes. Administratively mainland Tanzania was until recently divided into 20 regions (Annex 3). Manyara region has been added in 2001 as the 21st region. From the coast in the east, land gradually rises to a broad inland plateau between 750 – 1,500 meters above sea level. The climate ranges from warm and tropical around the Indian Ocean coast to moderately cool temperatures in the highland areas. The highlands, which have higher agricultural potential, account for less than one-fifth of the area in mainland Tanzania. The agricultural potential is mostly determined by moisture availability from rains since irrigation is minimal.

This study is guided by a conceptual framework, which attempts to establish the inter-relationship between preconditions that influence the action and reactions of actors within the country with respect to food production and availability. The actions and reactions in turn determine whether or not production intensification will occur at the farm level and subsequent national level effects. The logical framework for the analysis is presented under Figure 1 below. Annex 4 presents the land resources zones.

Information and data for this case study were derived from secondary sources including various publications from the government publications, World Bank (WB), Food and Agricultural Organization (FAO) and research reports from other sources. A word of caution is necessary regarding the quality of data and therefore the inference made.

There are several institutions, which compile and disseminate agricultural data in Tanzania. They include the National Bureau of Statistics (NBS) under the Planning Commission, the Agricultural Statistics Unit (ASU), Crop Monitoring and Early Warning Unit (CMEWU) under the Ministry of Agriculture and Food Security. The Marketing Development Bureau (MDB), currently under the Ministry of Cooperatives and Marketing³, compiles data on prices. Due to variations between different sources of data, the World Bank (WB, 2000) recommended data from the ASU as being more accurate.

Figure 1: Logical Framework for Analysis of Micro and Macro level Effects on Food Crops Production of Food Crops



³ The Ministry responsible for Agriculture has undergone organizational changes several times. In 2000, what was the Ministry of Agriculture and Cooperatives (MAC) was split into three to form the Ministry of Agriculture and Food Security (MAFS), The Ministry of Water and Livestock Development (MWLD), and the Ministry of Cooperatives and Marketing (MCM)

Given the long duration for this study (40) years, data from various sources had to be combined, sometimes requiring reconciliation, since most of the data series from secondary sources cover 10 – 15 years. Thus data for area and production were compiled from FAO, World Bank, MDB and ASU statistics. Data on prices were obtained from MDB, irrigation data was compiled from FAO and ASU while other data were obtained from various sources including the ASU and Bank of Tanzania. Consequently, some of the tables and figure may differ slightly from similar information presented in other reports. Most of the data has been compiled from the Ministry of Agriculture and Food Security (MAFS). Therefore figures and tables using these data cite MAFS as the source. Other data the sources have been appropriately acknowledged when they are used.

The study is presented in four main parts. Section one presents background including the methodology, information about the agricultural sector in Tanzania and the evolution of food production prior to independence. Sections two and three present the Pre-SAP and the SAP and post SAP scenario with respect to food production and supply while also addressing issues of demand where appropriate. Under these sections the presentation focuses on the three aspects as given under the logical framework (Figure 1), namely the pre-conditions, actors and the effects on food production, both at the micro and the macro levels. Section four briefly discusses the effect of HIV/AIDS. The findings are summarized and discussed under section five, guided by a number of research questions that are relevant to this study.

1.3 The Agricultural Sector in Tanzania

Tanzania is listed as being among the poorest countries in the world, with a per capita income estimated at USD 210 by 1997 (WTO⁴, 1998). About 50% of the population is said to live below the poverty line of one dollar a day, while about a quarter of the rural population are basically poor and food insecure (URT^{5(b)}, 2001). Agriculture is the most dominant sector in the economy, contributing about 50% of the Gross Domestic Product (GDP), over 70% to foreign exchange earnings and over 80% of the population lives in

⁴ WTO stands for the World Trade Organization

⁵ URT stands for the United Republic of Tanzania

rural areas where agriculture is their mainstay. Women contribute above 60% of the agricultural workforce

For purposes of this discussion, the agricultural sector will in most cases include crops and livestock production but exclude fisheries and forestry as these are often counted under the natural resources sector. However, computation of GDP includes these sectors. Within agriculture, crop production dominates, accounting for about 35% of the GDP. Maize and paddy⁶ represent about 30% and 10%, of the value of crop production respectively, while all staple food account for about 60% of the same. Livestock production contributes only 10 - 15% of the agricultural GDP (WB, 1994; URT , 2001^b; Bank of Tanzania, 2000), even though Tanzania has the third largest cattle population in Africa, after Ethiopia and Sudan. The cattle herd is currently estimated to be close to 18 million (URT, 2001^c). Tanzania is considered to be a land surplus country, as the land frontier has not yet been reached in some parts of the country. More than 13% of the land is rendered not usable for crops or livestock production due to infestation by tsetse flies. The basic national statistics are presented under Tables 1 and 2.

Table 1: Contribution of Agriculture to the National Economy

	1970	1975	1980-62	1985-87	1990-92	1997-98	2000-2001
Agric share of GNP	45	45	45	46	45	50	45
Agric share in net export value ¹	na	na	90	85	67	51	48
Share of imports							
- Fertilizer	na	na	2	4	4	1	0.9
- Food	na	na	13	10	3	4	13
Agric share of labor force employment							
	90	88	86	85	84	82	na
Population in rural areas	93	90	85	82	79	75	na

¹ Agricultural exports are taken as the six main cash crops (cashew, coffee, cotton, sisal, tea and tobacco). Estimates that include fish, live animals, horticulture and other non-traditional exports raise the share in 1997/98 to 73%

Source: (WB, 2000; Bank of Tanzania, 2001)

⁶ In the context of Tanzania, paddy means un-milled rice. Most reports and data from the Ministry of Agriculture provide information on paddy.

Table 2: Selected Main Features of the Agricultural Sector

Land Resource	Million ha
Total land	95.5
Arable land	44.0
Range land	50.0
Land under livestock	24.0
Tsetse infested	26.0
Cultivated land	10.1
Area suitable for irrigation	1.0
Area under irrigation	0.2
Land under medium-large scale farms	1.5
<hr/>	
Per capita holdings (ha)	0.1 (ha)
<hr/>	
Livestock population (million)	
- Cattle	15.6
- Goats	10.7
- Sheep	3.5
- Poultry (chicken)	27.0

Source: WB, (2000 as quoted in URT, 2001^a)

The major food crops include maize, paddy, cassava, wheat, sorghum, bananas and millet, while cashew, coffee, cotton, sisal, tea and tobacco are the traditional export crops. Small-scale farmers cultivating on average 1 – 2 acres per household undertake about 90% of the farming (Development Cooperation, 1993). The hand hoe is the main farm implement, accounting for 70% of the cultivated land. Animal drawn implements (ADT) and tractors account for 20% and 10% respectively (WB, 1994). Similar estimates by Eriksson (1993) had given a distribution of 85%: 10%: 5%, implying that land under ADT had increased slightly.

Using biophysical and socio-economic data seven distinct agro-ecological zones have been described (World Bank, 1994). Zones with high potential for agriculture are characterized by high altitude, fertile soils, long and reliable growing periods and absence of tsetse infestation (NEI⁷, 1999). Based on this classification 66 farming systems have been defined and these fall within seven broader agro-ecological zones, which are based on variation in rainfall, altitude and commodity combination as indicated in Table 3.

⁷ NEI stands for the Netherlands Economic Institute

Table 3 Agro-Ecological Zones and Farming Systems in Tanzania

Agro-ecological Zone	Number of Farming System
1. Central zone	5
2. Eastern zone	9
3. Lake zone	11
4. Northern zone	11
5. Southern zone	6
6. Southern Highlands zone	19
7. Western Zone	7
Total	66

Source: NEI, (1999, Vol. 1)

Meanwhile, the Food Studies Group (1992) from the University of Oxford defined six distinct farming systems based on the importance and predominance of various farming enterprises, including the intensity of land use, the level of commercialization, technology, cropping pattern, production potential and grassland utilization. These are summarized in BACAS (1997) and reproduced here under Annex 2. They are comparable to similar classification by the World Bank (1994).

Only about 59% of the arable land is cultivated (URT, 2001^a). Besides soil fertility, rainfall is an important determinant of agricultural production, especially considering that only about 150,000 hectares are irrigated representing about 1.5% of the land under cultivation and 17 - 23% of the irrigation potential. Tanzania experiences two rainfall modes. There are parts of the country, which are unimodal receiving rains between November and May, while other parts of the country are bi-modal receiving short rains (vuli) between October and December, and the long rains (masika), which fall between March and May/June.

Rainfall is highly variable across the country. Highland areas, especially around the Western Lake zone (Bukoba), receive more rain where average annual rainfall is above 2,000 mm. Meanwhile, Dodoma receives less than 600 mm on average. Much of the country receives between 800 – 1000 mm per annum during most years. Rainfall seems to exhibit a cycle of 3 – 5 years, and the interval between consecutive dry or drought years seems to be getting shorter. Ngana (1990) also concluded that there was a five-year

cyclical phenomenon in the seasonal rainfall series of semi-arid central Tanzania. He further observed that in some areas, a two and a half cycle was superimposed in the five-year cycle. Prins and Loth (1988) analysed rainfall patterns in Northern Tanzania using sixteen stations within the area. They concluded that the amount of rainfall did not exhibit any cyclical trend for the individual stations. However, pooled data of different stations showed alternating series of wet and dry years.

In another analysis for East Africa, using Spectra analysis, Bertrando (1990) established that the time series associated with space component revealed peaks around five to six years that appear to be the major periodicity for East Africa. Years during which drought or excessive shortage of rainfall was experienced include; 1966, 1970, 1973 – 74, 1977, 1981-82, 1987, 1991 1998 and 2001. In 1997 there was excessive rain due to *El-nino*. Despite the widespread belief associating famine with occurrence of drought in some parts of the country, a study by Ngana (1983) and Ndorobo (1973) as cited in Mahoo *et al.* (1999) revealed that occurrences of famine in the semi-arid parts of Tanzania was not only related to drought, but also to other factors such as low acreage accomplished by each farmer and incidences of pests and diseases.

1.4 Evolution of Food Production in Tanzania Prior to Independence

Mainland Tanzania (formerly Tanganyika) attained independence in 1961. Prior to that it had been a German colony from 1891 until World War I. In 1922 Tanganyika became a British protectorate under the auspices of the United Nations. Traders to the East African coast had over the years introduced a number of food plants for cultivation. These include maize, cassava, sweet potatoes, mangoes, beans, cashew and groundnuts by the Portuguese, sugarcane by Persians and Oranges by Arabs (Fuggles-Couchman, 1964).

Europeans sought colonies as sources of cheap raw material, for export to supply industries in Europe. Thus, German rulers introduced plantation agriculture, which was further developed by the British. Plantations of sisal, coffee, and rubber were established on land that was alienated from natives to be owned by German companies under

freehold tenure. However, cotton and coffee were also introduced to small-scale local farmers. Local people were allowed to continue owning land under traditional tenure.

Table 4: Changes in Area and Crop Composition (%) at Household Level in Usukumaland, Lake Zone

Location/Crop	Year		
	1945	1962/63	1990/91
Old Mwanza			
Farm size (ha)	2.63	-	1.77
Dryland cereals (%)	47.1	-	33.9
Cotton (%)	15.2	-	11.3
Rice (%)	2.3	-	25.4
Tubers (%)	33.1	-	24.9
Others (%)	2.3	-	4.5
Old Kwimba			
Farm size (ha)	3.1	2.59	2.05
Dryland cereals (%)	74.2	23.9	23.4
Cotton (%)	11.0	45.9	7.8
Rice (%)	6.8	12.4	49.3
Tubers (%)	8.1	16.6	7.8
Others (%)	-	1.2	11.7
Old Maswa			
Farm size (ha)	2.4	3.1	2.49
Dryland cereals (%)	75.8	60.6	44.2
Cotton (%)	12.5	34.2	14.5
Rice (%)	0	-	15.7
Tubers (%)	4.6	-	7.2
Others (%)	6.7	-	18.5

Source: H. C. C. Meertens *et al.*, (1996)

The British continued the alienation of land under leasehold tenure for periods of up to 99 years, while recognizing freehold titles previously issued under German rule and upholding customary land tenure for Africans. Although European farmers came to play an important role in the economy, accounting for most of marketed surplus, they accounted for less than 1% of the land holdings (Krutz, 1978 cited in Hanak, 1986). With few exceptions they did not compete with African for land (Hanak, 1986). However, where pressure on land occurred it led to migration of local residents such as in the Lake zone or intensification in parts of the Northern and Southern Highlands (Fuggles-Couchman, 1964; Meertens *et al.*, 1996).

The composition of food changed over time as drought resistant grains (sorghum and bulrush millet) were substituted by more preferred grain staple, including maize, rice and

wheat. In some cases, bulrush millet has been replaced by higher yielding cassava as a drought tolerant alternative crop. Meertens *et al*, (1996) provide a detailed account on how cotton replaced dry land cereals within Sukumaland in the Lake Zone. The introduction of cotton, coupled with the introduction of oxen cultivation in 1934 led to more extensive production, followed by more intensive production as cotton has now been replaced by rice (Table 4).

This trend follows the development theory where farmers deal with pressure on land by increasing the productivity of labor and more intensive production methods when critical population densities are reached and fallow land becomes scarce (WB, 1994; Larson, 1996). Meertens *et a* (1996) argue further that, provided land degradation does not take on irreversible forms like serious gully erosion, an area can be regenerated through intensification, suggesting a critical population density of 100 inhabitants per km² for their study area. Likewise, Fuggles-Couchman (1964) observed that on average, between 1945 and 1961 area under millet per household decreased from 4.09 – 0.06 acres while maize and cotton increased from 0.22 – 0.65 acres and 1.01 – 2.73 acres respectively. These changes were driven by taste, production cost and relative prices, as well as less reliance on own production.

Some of the policies and programs adopted by the colonial government to promote agriculture and food crops in particular include the following;

- Soil erosion control was introduced in 1930, but it was resisted strongly especially in areas where pressure on land had not been felt.
- The ox-plough was introduced in 1934, it led to area expansion and extensive production in many parts on the country especially the Western, Northern, Lake and Southern Highlands regions.
- The introduction of tractors in 1945 increased acreage for a few farmers.
- Use of fertilizer was mostly confined to cash crops.
- Purchased seed (especially beans, wheat and maize) through the Tanganyika Farmers Association (TFA) rose between 1945 – 1960.
- The Water Development and Irrigation Department was formed in 1952 but focused more on providing irrigation for cash crops and water for livestock, therefore had little effect on food production.
- Government policy during the Second World War was to ensure stable prices staple food. Therefore control of marketing foodstuffs during and after the war was introduced, but targeted large scale farmers.

- The Department of grain storage was formed in 1949 to control marketing of major staple and provide storage of adequate reserve during famine years. But it was dissolved in 1957 following losses, as price support for maize in 1956 and 1957 was set above world market prices.
- Price control for all grain until 1955.
- Formation of cooperatives while targeting cash crops, strengthened the bargaining power of farmers.
- Import duty was imposed on rice to promote local production.
- Agricultural research was first introduced in 1932, but mostly for cash crops and to meet the needs of large-scale plantation farmers.
- Training of Agricultural instructors and Field Assistants began in 1945. This was the precursor of Extension Services.
- In 1955 the Extension Services sought to divorce the policing role of agricultural advisors towards an educational role.
- In 1956 the government introduced the Focal Approach where efforts and resources would be concentrated on a few high potential areas but this was abandoned in 1958.
- A number of development schemes were established. By 1957 140 development schemes were submitted by Native Authorities of which 29 were selected for implementation but most of them covered cash crops. The few which addressed agricultural development in general or food crop production included the Sukumaland development scheme, Mountain agriculture in Uluguru, Usambara and Pare), wheat in Mbulu, rice production in Kilombero valley. The scheme in Uluguru and Usambara failed to take off because of using the wrong approach, amid a changing political climate, while the rice production project in Kilombero valley was discontinued due to poor quality of rice and inability to control annual floods.

While some of these programs did not target African farmers *per se*, Fuggles-Couchman notes that the contribution of African production rose steadily between 1945 and 1960 as indicated by increasing sale of maize. His conclusion best summarizes the state of the agriculture sector, which was inherited by the independent government in 1961;

The period 1945 – 1960 has seen significant development of Tanganyika's agricultural industry, remarkable growth of the contribution of African farmers to overall output, which is derived from both small increase in area farmed by individual and a slow growing willingness to apply better techniques of production in the field. It has been encouraged by many factors, including the emergence of new attitudes towards cash economy, the expansion of cooperative marketing, extension efforts, research, and price and marketing policies.... Plantation and estate agriculture has been invaluable in providing rapid development of large areas of previously unproductive land, in demonstrating the value of

modern production methods....in meeting the increasing demands of staple foodstuffs..... But remarkable as the rise in total smallholder output has been, it is small in relation to the potential output. The use of fertilizer is almost negligible, methods of land preparation and crop husbandry remain largely primitive....and land use methods are largely destructive. To release these brakes on production and preserve the land calls for a vastly expanded extension service, staffed by well trained men, but above all, for a revolution in outlook of the African farmer himself and in the organization of smallholder production... which will require firm and progressive policy on the part of the government, backed by large financial resources and world conditions conducive for expansion (pp. 96 – 97).

1.5 Summary

This chapter presents the food situation, which prevailed before the independence of Tanyanyika or mainland Tanzania. Even though promotion of food crops and livestock among smallholder farmers was not the main focus of the colonial government, there is evidence of improvement in the supply of food, which resulted from increasing participation of smallholder farmers coupled with some spillover effects of technologies that were primarily promoted among large and medium scale farmers.

Evidence of crop intensification during this period is cited in the cotton growing area around Mwanza, which is largely attributed to population pressure. Other examples of agricultural policies and strategies of the colonial government that were intended to have an impact on food production and supply are summarized at the end of the chapter. In general at independence the food situation was stable except for sporadic droughts and pest damage on crops.

2.0 PRE-SAP PERIOD (1961 – 1986)

Tanzania's first attempt at structural adjustment came in 1981 using home grown strategies that had limited success (WB, 2000; Missien & Lindert nd). The first externally financed adjustment program was introduced in 1986. For this discussion the period preceding structural adjustment extends from independence in 1961 up to 1986. This period can however be divided further into three distinct policy regimes as follows: (i) a brief market oriented period following independence (1961 – 1966), (ii) a state socialist regime with monopoly and government interference in markets (1966 – 1980) and (iii) a period of locally initiated structural adjustment strategies (1980 – 1985).

2.1 Immediate Post-independence Period: 1961 – 1966)

During the first six years after independence, Tanzania was classified as a market economy, where market forces played an important role in resource allocation. Rapid economic growth, which has been estimated at 6% annually during the post World War II period, continued until the late 1960s (Hanak, 1986). Meanwhile, the value of agricultural production grew at about 6% per annum in nominal terms within the period 1960 - 1970 and by 3.5% in real terms between 1964 and 1970 (World Bank, 1994).

Following independence, the government of Tanganyika declared its intention to promote agricultural based rural transformation. The aspiration of the new government was articulated in the first three year development plan (1961 – 1963) and the first five year development plan (1964 – 1969), which emphasized rural development over industry, based on advice from the World Bank. Consequently the transformation approach was pursued. It was to be achieved through modernization of agriculture via capital-intensive settlement schemes. Transformation of smallholder farmers was to be realized through an expanded extension service (Mattee, 1978) and agricultural research (Isinika, 1995). However, settlement schemes, which were an important component of the transformation approach had to be abandoned by 1966 due to overcapitalization (WB, 1994; Hanak, 1986).

Thus the immediate post-independence development strategy intended to be pro-smallholder and pro-food crops. Little attention was paid to promote large-scale estate production. In fact, in 1963, the government converted all freehold titles to leasehold of up to 99 years, which sent negative signals to European farmers and many of them left. Those who remained continued to be marginalized. This change in land policy had no impact on food production since it upheld customary tenure, where most of the food production occurred. However, the post-independence government has been criticized for continued alienation of land into national parks, forest and game reserves. About 42% of the land in Tanzania currently falls under this category of land use (Table 5), most of which were established after independence.

Table 5. Tanzania Protected Areas

Category of land use	1961		1998	
	Number	Number	Number	% of Land
National Parks	3	12		4
Game Reserves	9	31		15
Game Controlled Areas	-	38		8
Ngorongoro Conservation Area	1	1		1
Forest Reserves ^(a)	572	871		15 ^(b)
Total				42

^(a) Personal Communication with Survey & Inventory Section, Forest and Beekeeping Division

^(b) About 3 of forest reserves coincide with wildlife-protected areas

Source: URT, (1998)

Even during this time of relative freedom of markets (1961 – 1966), the government began to institute policies that were consistent with independence aspirations. In 1965, Tanzania became a one party state, which made it easier for the government to institute policies that may have been opposed through democratic institutions. The Agricultural Product Act was introduced in 1962 for control of prices and marketing, which led to formation of the National Agricultural Product Board (NAPB). The Board had monopoly power for the marketing of grains, under a three tier marketing system, involving the NAPB, Cooperative Unions, as agents of the NAPB, and Primary societies. In 1973 the NAPB was transformed into the National Milling Corporation (NMC) whose mandate was procurement of grains plus other food crops and maintenance of a grain reserve

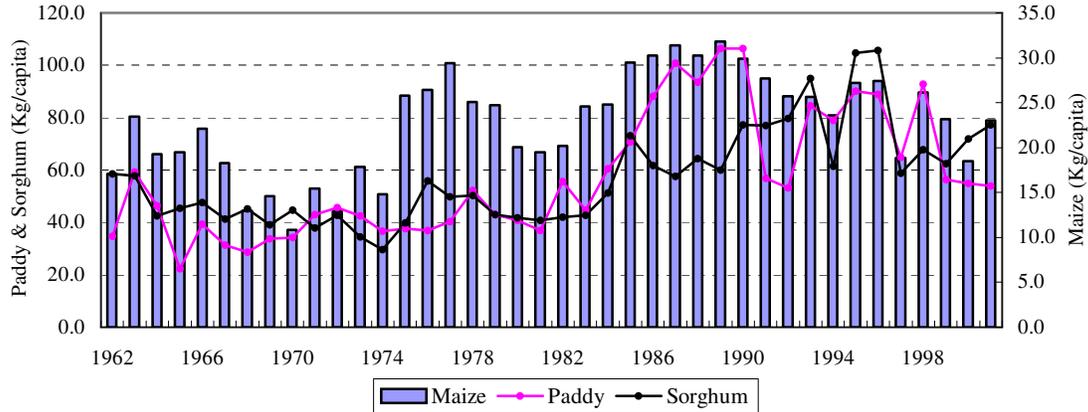
enough for four months (FAO, 1986). In 1976, the government introduced the Food Security Scheme, whose primary objective was to reduce food imports, without much success (Figure 9).

Cooperatives were promoted in order to replace Asian middlemen out of crop trading. The government therefore pushed to establish cooperatives with monopoly buying power, encouraging them even in areas where there was neither the economic base nor adequate local skills (Hanak, 1986). The expansion of cooperatives was already having problems by the mid 1960s. In 1966 a Presidential Commission was established to probe into complaints regarding Cooperatives abuse and inefficiency, especially where they had been politically imposed. Eventually cooperatives were abolished in 1976 and the marketing system became two-tier (Mlay 1988).

The government policy, which was pro-poor and pro-food crops, has been criticized from different perspectives. It has been argued for instance that the expanded extension cadre constituted mostly of unskilled staff, and some of the recommendations they promoted to farmers were economically unsound (Iliffe, 1979 as quoted in Hanak, 1986). While the expansion of research services was possible through donor-funded capital, expansion of the government in general put a strain on the recurrent budget. The public sector growth was estimated at 15% per annum, which reduced availability of operational funds, and therefore the quality of services. Meanwhile, neglect of cash crops undermined the most important source of foreign exchange. Although institutional changes, which were backed by the state, aimed at promoting more intensive agricultural production, they were applied in isolation and sub-optimal levels (Mlay, 1988).

Despite these emerging problems, production of food and other crops continued to grow until 1970. Hanak, quotes a report by the FAO and the Economic Commission for Africa (ECA), which indicated that Tanzania was the only African State, that consistently maintained growth trends in food production higher than the population growth rate from 1954 – 1960 (Hanak, 1986). However, per capita production for main staples does not show any increasing trend in the immediate post independence period (Figure 2).

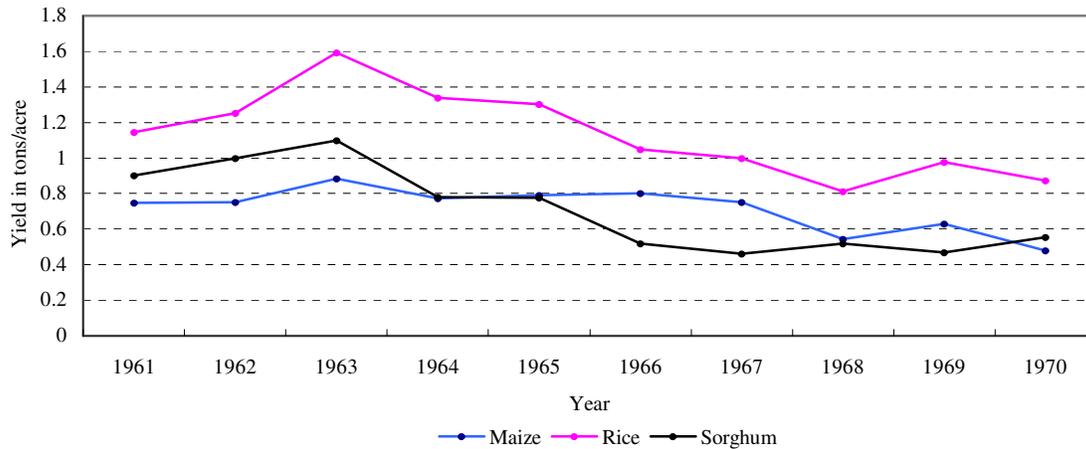
Figure 2: Per Capita Production Main Staples



The increasing trend of food production during this time has been attributed to many factors including a healthy food situation at independence, subsequent good weather and the post independence enthusiasm towards nation building. Political slogans such as “play your part, it can be done,” were used by political leaders to exhort higher productivity of labor through working hard. It has been noted however that less preferred staple such as sorghum and cassava expanded at a faster rate, which lead to an inappropriate crop mix in relation to the structure of urban demand. By 1966, data on official food purchases were already indicating an increasing trend towards importation of preferred staple (maize, rice and wheat), to meet growing urban demand (Lipumba, 1984),

Production data during this period indicates that most of the growth in food production came from more extensive production. Yield data show no indication of intensification. Following a brief rising trend up to 1963, the yield of all three main cereal staple reflect a declining trend (Figure 3). However, the yield of cassava increased gradually until 1967, after which it began to decline. In the case of maize changes in area were almost proportional to production, but for paddy and sorghum the area increased faster than total production, while the opposite was true for cassava (Table 6). Respondents of the household survey indicated that they currently grow more of the preferred staple (maize and rice) compared to when their households were formed, at which time they cultivated more of the reserve crops (sorghum and cassava).

Figure 3: Yield Trend of Main Cereal Staples: 1961 - 1970



Source: MAFS Data

Table 6: Average Annual % Change in Area and Production of Main Staples: 1961– 1967

Crop	% Change in Area	% Change in output
Maize	5.1	5.8
Paddy	16.6	13.6
Sorghum	9.9	-2.9
Cassava	1.5	3.8

Source: MAFS Data

2.2 Period of Increasing Government Control: 1967 - 1985

This period has been most extensively analyzed, attracting scholars from the left and the right. Factors that affect the production of food crops or agricultural production in general include policies and strategies that influence land tenure, institutions and organizational aspects, prices, trade, wages and income, and exchange rate. These will form the basis for analyzing the action and reaction of the state, farmers and markets, particularly as they relate to the production of food crops and intensification.

2.2.1 Development policies and strategies

The Arusha Declaration was announced in February 1967, marking a turning point in the development philosophy of Tanzania. The nation was to develop into an egalitarian society through socialism (Nyerere, 1973⁸). During the following year two policy instruments were also announced; (i) Education for self-reliance and socialism and (ii) Rural Development. Emphasis on rural development and the agricultural sector in particular was reiterated as the cornerstone of realizing objectives of the Arusha declaration as reflected in one of President's Nyerere's many statements on this topic:

“We have to build our economy by concentrating first on agricultural development. That is the industry we have, and which can be expanded with our existing capital and manpower.”⁹

Under the Arusha Declaration, all major means of production were nationalized, including banks, insurance, transport facilities, real estate, agricultural estates, plantations and processing plants. At the smallholder level, farmers were enticed to voluntarily move to *Ujamaa*¹⁰ villages, where they would undertake production and marketing activities collectively in order to enhance the pace of agricultural transformation from the hand hoe to oxinization or tractorization. President Nyerere strongly advocated for increased use of oxen, following the dismal failure of capital-intensive settlement schemes. It was hoped that consolidating smallholdings into large farms and using better technology would attain higher productivity of land and labor. In order to achieve these ends the expansion of agricultural institutions for research, training of technical staff and farmers, which had began during the sixties continued. By 1971 the Ministry of Agriculture had added 7 Agricultural training centers for technical staff, 17 farmers training centers for members of *Ujamaa* villages, 21 ox-training centers and one Faculty of Agriculture under the University of Dar-es-Salaam (Nyerere, 1973¹¹).

⁸ In a speech by Nyerere “Arusha Declaration Parliament” addressing the 1965 – 1970 Parliament on 6th July 1970

⁹ Excerpt from a speech, “Rice Means Socialism” given by President Nyerere while on a state visit in North Korea in 1968.

¹⁰ A Kiswahili word which is interpreted to mean communalism

¹¹ From a speech by Nyerere on “Ten years after independence” delivered at the National TANU conference in 1971

Ten Years after independence, President Nyerere pointed out substantial growth, which had been achieved for most cash crops, whose production increased by two up to over four fold. On self-reliance Nyerere noted that 65% of the Central government expenses were financed from local sources, while 70% of investment came from within Tanzania. This achievement however did not last long, if at all. In fact, these figures do not tell the whole story. Hanak (1986) reports that aid as a share of capital expenditure amounted to 70% for education and public works, 65% for water, energy and minerals, and about 40% for communication and transportation. Donor financing amounted to roughly 50% of the investment budget, as the economy had difficulty attracting private capital.

Even though President Nyerere was proud of the achievement, which was made since independence, he lamented however that no revolution had occurred in production methods as most of the production growth had come from expansion of area under cultivation from 29 – 39 million acres between 1964 and 1970. Growth in food production was not impressive as there was no technical change in agricultural production and the yield of main staples was declining (Figure 3). Thus, the goal of producing sufficient and better food, which is stipulated as the first priority under the Arusha declaration, was falling behind schedule.

2.2.2 Increasing Government Intervention

Based on Nyerere's statements and speeches, The Arusha declaration was partly triggered by the government's disappointment at the level of achievement under the first five-year development plan, whose main strategy (settlement schemes), was abandoned in 1966. Meanwhile, financing the development program, and an expanding public sector was becoming an increasing challenge to the government, especially after the slump of sisal prices in the World Market from 1966 (Nyerere, 1973¹²; Hanak, 1986). Impatient with the pace at which development was taking place, the government instituted a number of strategies in order to expedite transformation towards an egalitarian society, with better standards of living, while also attaining broad-based national development.

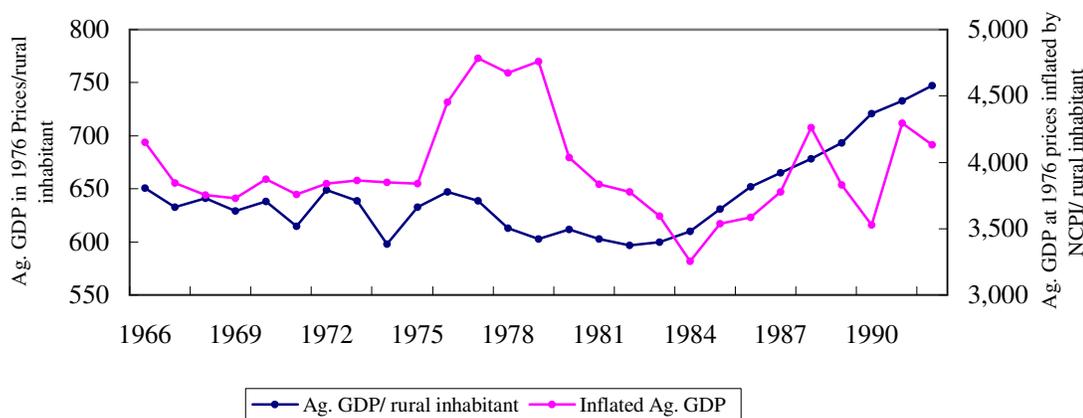
¹² From a speech by Nyerere titled "To plan in to choose" delivered at the National Conference of TANU in 1969

Table 7: Government Expenditure on Agriculture: 1973 – 1991

Year	Agricultural Spending		Year	Agricultural Spending	
	As % Share of GDP	As % Share of Ag. GDP		As % Share of GDP	As % Share of Ag. GDP
1973	2.8	7.1	1987	1.6	2.7
1974	3.7	9.5	1988	1.4	2.2
1975	5.6	13.3	1989	1.8	2.9
1976	3.9	9.3	1990	1.8	3
1977	3.6	8.3	1991	2.1	3.3
1978	3.1	7.1	1992	-	-
1979	2.9	6.3	1993	-	-
1980	3.5	7.9	1994	-	-
1981	2.9	6.2	1995	-	-
1982	2.4	4.8	1996	0.4	0.8
1983	2	3.8	1997	0.6	1.2
1984	2	3.8	1998	0.8	1.8
1985	1.5	2.7	1999	0.75	1.6
1986	1.5	2.3	2000	-	-

Source: World Bank (1994)

Figure 4: Rural Productivity 1966 - 1992



Source: World Bank (1994)

Under the third Five-year development plan (1975 –1980), Tanzania adopted the Basic Industries Strategy (BIS), to enable the country to develop a capital-intensive industry within 10 – 15 years (Rweyemamu, 1973). This however, led to industrial expansion at the expense of the agricultural sector and rural development. The state has often been accused of paying lip service to rural development, since real capital expenditure on

agriculture continued to fall throughout this period (Table 7), and agriculture was starved of foreign currency (WB, 1994; Hanak, 1986). Productivity of the agricultural sector during this period may also be inferred from Figure 4, which presents rural productivity expressed as Agricultural GDP in 1976 prices per rural inhabitant. The data indicate that a sustained general upward trend is observed only after 1982. The Agricultural GDP at constant prices, inflated by the National Consumer Price Index (NCPI) per rural inhabitant was almost constant between 1967 until 1975. This parameter improved significantly until 1980 when a downward trend began until 1984. Gains that were made after 1984 were lost again after 1989. Frequent intervention by the government had far reaching effects in different areas as discussed below.

(i) *Institutional and Organizational Changes*

State leaders felt that Local Governments were not adequately directing their efforts at facilitating development, due to their limited capacity, intrigue and mismanagement (Nyerere, 1973¹³). Decentralized planning of the government was introduced in 1972 whereby Local Governments were abolished, replacing them with an administrative structure, which was centralized at the regional level and usurped most of the previous powers of Local Governments. It has been argued that decentralization disrupted democratic institutions. In addition regional and district institutions became more bureaucratic and less efficient, which negatively impacted the quality of services to the agricultural sector in general.

Decentralization also drew a large number of top and middle level managers from the Ministry of Agriculture to take over positions in the newly established Regional and District Development Directorates. At the same time, agricultural extension services came under the supervision of the Prime Minister's Office, where agricultural extension staff had little technical coordination from the Ministry of Agriculture. Reduction of agricultural personnel was repeated in 1980 when lower ranking extension staff were reallocated to become Village Managers in about 8,000 villages across the country.

¹³ In a speech by Nyerere titled "Things we must correct" delivered to the nation on 9th December 1968 to celebrate seventy years of independence

Facing limited or no operational funds and facilities, the staff became highly demoralized and ineffective (Isinika, 1995).

Since 1967 movement to *ujamaa* villages had been voluntary, but the pace was very slow. By 1973 only 15% of the population (2 million people) were living in such villages. This pace was considered to be too slow. Thus, the government approach of inducement changed when it resolved to move rural residents to *ujamaa* villages for their “own good.” The government aspired to ensure better services in terms of water, schools and health services to the majority of Tanzanians. Between 1974 and 1976, there was massive movement of about 13 million people to *ujamaa* villages, under the ill-fated villagization program. In a similar move the government dissolved cooperatives in 1976 due to growing abuse and inefficiency and exploitation of farmers. To fill the gap Village governments were formalized in 1976 under the *Ujamaa* and Village Act, which established them as productive and administrative units, which provided the legal basis for production and marketing cooperatives (Mlay, 1988).

Within *ujamaa* villages, communal production and marketing were expected to gain prominence over time. Agricultural production was expected to take place in block or *ujamaa* farms, which were considered to be a prelude to mechanization (Hanak, 1986). Individual holdings and activities were discouraged and they were expected to become less important over time. However, communal production has never accounted for more than 0.5% of all cultivated land (Amani *et al.* 1987 as cited by Mlay, 1988). In general, the government adopted an anti-free market and anti-private sector stance. For example in 1968 a government directive prohibited employment of labour in private estates (Hanak, 1986). Also, individual access to credit was severely limited (Mlay, 1988).

Critics have charged that villagization and other government policies amounted to “development by coercion” (Hanak, 1986). The movement of people has been blamed for disrupting production of food and cash crops, especially cashew nuts (Kilango *et al.* 2000), exacerbating the effect famine, which was caused by drought for two consecutive years, 1973 - 1975 (WB, 1994; FAO, 1986). Land became scarce around overcrowded

village nuclei, but leaders were reluctant to allow villagers to spread out to take advantage of fertile soils until 1984. Production of cash crops began a downward trend, but that of food crops exhibited a gradual upward trend until 1980 (Isinika, 1995), as farmers shifted resources towards food crops since these could be marketed through unofficial channels, where prices were higher (especially for maize) than official prices offered by NMC

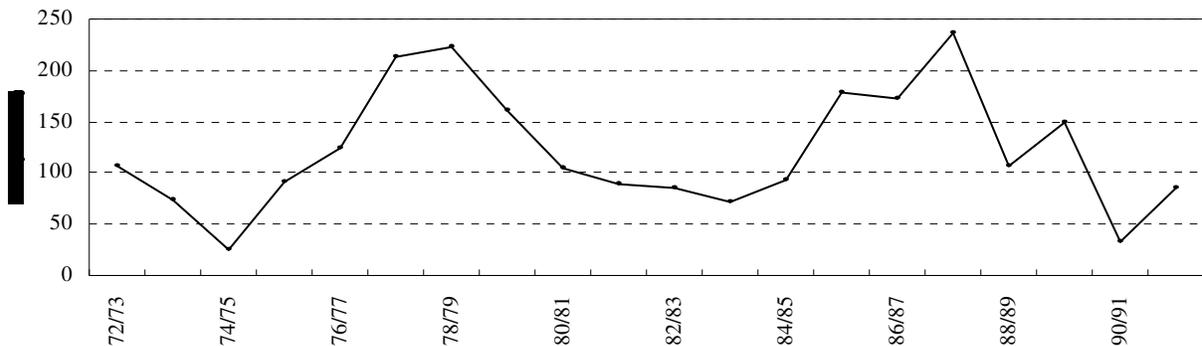
It has been noted that the establishment of villages enabled the Central government to impose its will upon the people, sometimes imposing production decisions through party cadre and government leaders, via various politically motivated campaigns including the; (i) Iringa resolution in 1973, which was conducted under the slogan “*Siasa ni kilimo*” (Politics means agriculture), (ii) “*Kilimo cha kufa na kupona*” (Food as a matter of life and death) in 1974 and many other localized campaigns. Under such campaigns farmers were sometimes forced into making irrational production decisions, in the pretext of nationalism and national interests. Minimum acreage for food and export crops became compulsory for farmers in almost all regions.

When relative prices of coffee became unfavorable during the 1980s, farmers switched to producing horticultural and other food crops. However, local leaders prohibited them from uprooting their coffee citing legal and nationalistic reasons. A similar case has occurred during recent years for cotton farmers who switched to pigeon peas. Likewise, in Kibondo district (Kigoma region), farmers were forced to grow at least one acre of cotton in order to assure an investor who was to rehabilitate a cotton processing plant in the district. Most farmers obliged but the investor never turned up, leaving the farmers high and dry. Farmers lamented that they missed the opportunity to grow maize or beans which had a ready market in the local market and in neighboring countries (BACAS 1999^a).

The dissolution of cooperatives in 1976 marked another important institutional change. This is discussed further under marketing. The closure of private shops in rural areas (*Operation Maduka*) in 1976 has also been linked to reduced agricultural production

(Hyden, 1980). It has been suggested that lack of consumer goods was a major disincentive for farmers to produce both food and cash crops (FAO, 1986; WB 1994). By 1984, many farmers retreated to subsistence farming, and marketed surplus of food crops, especially through official channels fell to an all time low (Mlay, 1988; WB, 1994) as indicated in Figure 5.

Figure 5: Government Purchases of Maize: 1973 - 1991



Source: WB (1994)

Internal efforts to resurrect the economy began in 1981 when the first Structural Adjustment Program (SAP) was introduced, but it was not successful. The National Economic Survival Program (NESP) soon followed in 1983. During the same year (1983) the first Agricultural Policy was adopted. Among other things the policy recommended that Cooperatives should be re-established. This was affected in 1984, but the cooperatives remained restricted until 1992. Local governments were restored in 1984. The (NESP) initiated a production response for both food and export crops, which was continued after 1986.

(ii) *Prices and Marketing*

During the early 1970s, marketing of many agricultural commodities and inputs were transferred to Agricultural Parastatals, which were established to address inefficiencies that emerged in the performance of cooperatives. The government realized that many cooperatives were established prematurely and they were given too many responsibilities (Kriesel *et al*, 1970). Marketing of food crops fell under the NMC, which had monopoly

Table 8: Evolution of Producer Prices of Maize: 1969/70 – 1973/74

Crop	Announced Producer Price (Tshs/kg)		Percentage Change	
	1969/70	1973/74	Nominal Price	Real Price
Food Crops				
Maize	0.28	0.33	17.9	-16.7
Paddy	0.52	0.57	9.6	-22.4
Wheat	0.57	0.57	0	-29.2
Export Crops				
Cotton	1.06	1.10	3.8	-26.6
Tobacco	4.09	5.28	39.3	-8.6
Tea	0.70	0.74	5.7	-25.3
Cashewnuts	0.91	0.91	0	-29.5
Pyrethrum	3.0	2.75	-8.3	-35.1

Source: Jens Orback (1985)

Table : 9 Evolution of Producer Prices of Maize: 1973/74 – 1978/79

Crop	Announced Producer Price (Tshs/kg)		Percentage Change	
	1973/74	1978/79	Nominal Price	Real Price
Food Crops				
Maize	0.33	0.85	157.6	32.4
Paddy	0.57	1.20	110.5	8.2
Wheat	0.57	1.25	119.3	12.7
Export Crops				
Cotton	1.10	2.29	108.2	7.0
Tobacco	5.28	7.89	49.4	-23.2
Tea	0.74	1.50	102.7	4.2
Cashewnuts	0.91	1.64	80.2	-7.4
Pyrethrum	2.75	4.02	46.2	-24.9

Source: Frank Ellis (1982)

Table 10. Evolution of Prices Producer Price of Maize: 1978/79 – 1983/84

Crop	Announced Producer Price (Tshs/kg)		Percentage Change	
	1978/79	1983/84	Nominal Price	Real Price
Food Crops				
Maize	0.85	2.20	158	-22.5
Paddy	1.20	4.00	233.3	1.7
Wheat	1.25	3.00	140.0	-28.1
Export Crops				
Cotton	2.28	5.72	149.8	-25.2
Tobacco	7.18	17.35	141.6	-27.6
Tea	1.50	2.80	86.7	-44.8
Cashewnuts	1.67	6.79	306.5	21.8
Pyrethrum	4.00	14.00	250.0	4.8

Source: Jens Orback (1985)

in marketing grains. Private marketing was legally reduced. Transportation of significant quantities of grain was not allowed without the approval of the NMC. Cooperatives continued to be major purchasing agents of the NMC. Marketing of export crops was transferred to commodity parastatals, which were responsible for coordinating production and marketing.

When cooperatives were abolished in 1976, the marketing system for food crops became two-tier, with *ujamaa* villages as primary cooperatives became agents of the NMC. Real producer prices of both food and export crops had been declining (Table 8). After two consecutive crop failures in 1973/74 and 1974/75 the government changed national priority towards food self-sufficiency. Prices were used for the first time as a policy instrument on food crops in 1974/75. Large increases of producer price were instituted for all crops, but in favor of food crops in real terms (Table 9 and 10).

A strong egalitarian bias in government policy outweighed economic consideration. Pan-Territorial pricing was introduced in 1976 in order to achieve inter-regional equity and stimulate production in remote areas through price incentives. This strategy however, taxed areas that had a competitive spatial advantage while subsidizing remote areas. (Ndulu, 1980 in Hanak, 1986; WB, 1994). A similar pan-territorial price for consumer goods favored urban consumers. Prior to 1976 the government fixed consumer prices below ex-store cost of the NMC, in order to protect consumers. Fixing producer prices of food crops was discontinued in 1983 as part of the structural adjustment program (NESP). After 1976 the government fixed producer prices. Upward adjustment of prices continued until 1978/79.

Although the price changes represented significant improvement in nominal terms, they represented significant implicit taxation of up to 99% (Mlay, 1988). Real producer prices eventually became negative. Producers responded by selling their produce through parallel markets where even in nominal terms prices were relatively higher than official consumer prices, especially during the period 1983/84 – 1985/86 (Mlay, 1988). The

annual growth rate of maize, which was sold through official channels declined, while imports of maize increased (Table 11).

Table 11: Production and Official Purchases of Maize Growth Performance

Period	Estimated Annual Production Growth Rate (%)	Estimated Annual Growth Rate of Official Purchases (%)	Average Annual Maize Imports ^(a) ('000 Metric Tons)
1969/70 – 1977/78	9.9	-5	92.9
1978/79 – 1982/83	2.0	-26	118.2
1983/84 – 1986/87	8.4	19	104.9
1969/70 – 1986/87	7.2	-5	102.6

^(a)Including food aid
Source: Mlay, 1988

From 1982, the government applied the policy of regional pricing, giving premium price to areas with higher productivity potential. For instance, a premium price of 1.75 Tshs/kg was given for maize in the Southern Highlands and Arusha. Compared to 1.5 Tshs/kg for other regions. Premium prices were paid for sorghum, millet and cassava in drought prone areas, which led to accumulation of these less preferred food in NMC stocks (Hanak, 1986; Mlay, 1988). Government price policies during this period introduced significant distortions. For example although the nominal price was rising, the real price of maize continued to fall until 1983/84 when it began to rise, following relaxation in government control of prices for grains (Mlay, 1988). Producers responded to these change by increasing production of food crops while that of export crops declined (Isinika, 1995). Imports of maize declined in the interval 1975 – 1979 (Figure 10 and Mlay, 1988).

Figure 6 depicts the nominal and real prices of maize while Figure 8 presents the production of main cereals during the interval from 1967 – 1986. According to these data maize production increased by about 195% compared to about 91% increase in area, implying that production increased at a rate that is about twice as much as the area gain. The change in area and production for sorghum is almost proportional at 158 and 167% respectively. In the case of paddy, production gain was almost 2.7 the times change in area under production. These changes indicates that there was intensification of maize and paddy production during the interval (1967 - 1986, which was associated with

productivity gains, coming mostly from increased use of chemical fertilizer in the case of maize and higher plant population coupled with irrigation in the case of paddy.

Figure 6: Nominal and Real Official Producer Price of Maize (1976 = 100)



Source: Isinika (1995)

Figure 7: Production of Main Cereals: 1967 – 1986

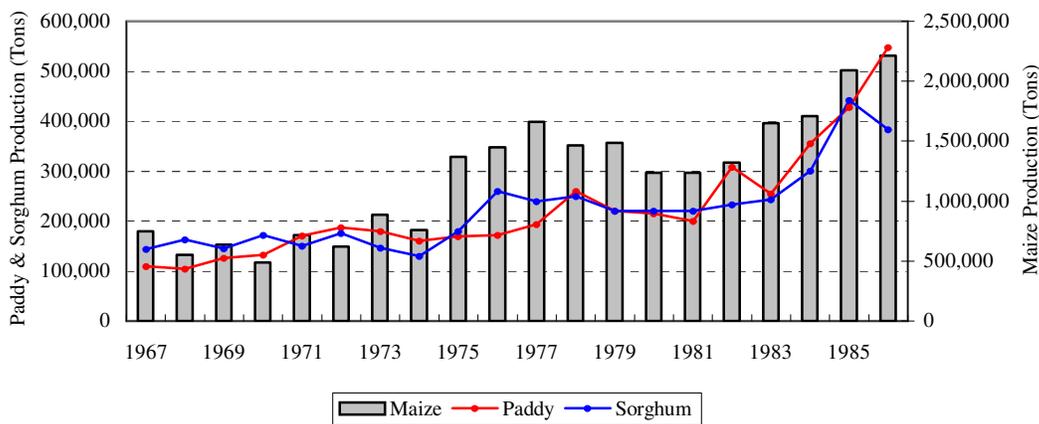
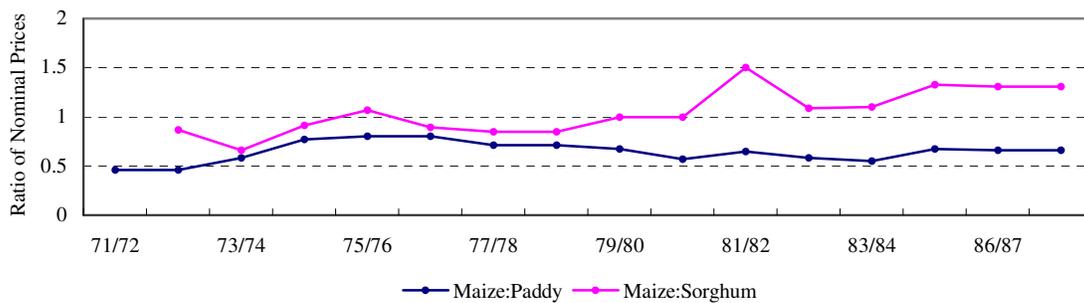


Figure 8: Nominal Price Ratio of Maize relative to Competing Food Crops



Source: MAFS Data

The crop mix was also influenced by relative prices. It has already been stated that the general price policies worked in favor of food crop, of which, maize sorghum and cassava had a comparative advantage under regional pricing. Sometimes the price of sorghum and cassava was very favorable, being at par or better than that of maize, especially after 1980 (Figure 9). The NMC accumulated stock of these less preferred staple, since they could not be sold within a reasonable time, contributing to the parastatal's losses (Hanak, 1986; FAO, 1986).

(iii) *Monetary Policy and Exchange Rates*

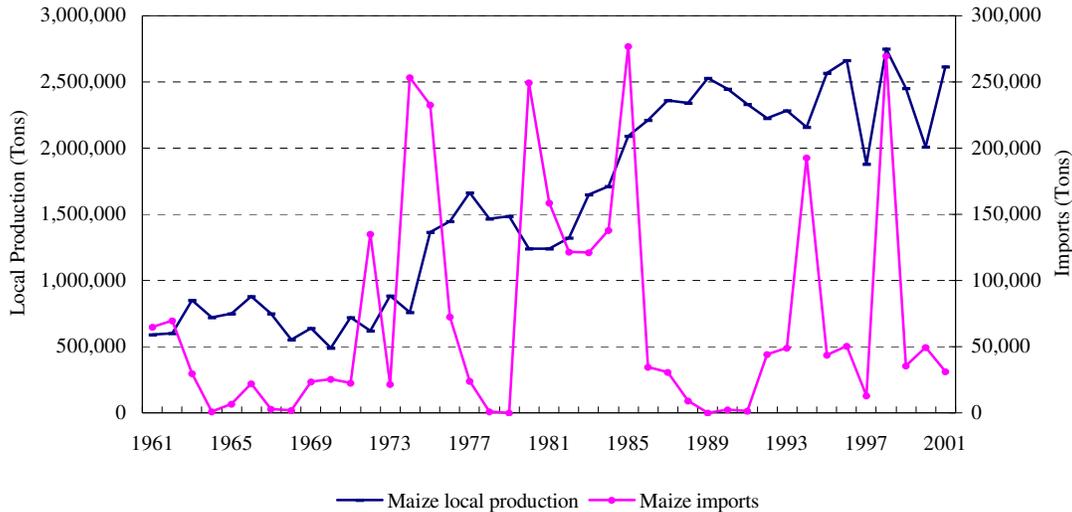
During most of the period from 1967 to 1979 Tanzania did not deliberately use the exchange rate or the monetary policy to influence production. However, institutional and price policies that were adopted by the government had repercussions on money supply and the exchange rate, which in turn influenced production and consumption decisions. The overvalued exchange rate taxed agricultural exports, while imports become relatively cheaper. The subsidy acted as a tax to the NMC and producers, and it was so significant that it became cheaper for the NMC to import maize than to buy locally (Table 12). Figure 9 plots local production against imports, which were normally made to meet anticipated shortfalls from local production. However, such imports sometimes competed with local production.

Table 12: Subsidy on Maize Grain as a Result of Currency Overvaluation (Tshs/Ton)

Year	Nominal Ex-store Cost of Local Maize	Nominal Ex-store cost of imported maize	Real Ex-store Cost of imported Maize	Level of Subsidy
81/82	3,182	2,463	3,423.8	960.8
82/83	3,760	2,634	4,208.9	1,574.9
83/84	4,954	3,433	7,588.3	4,155.3
84/85	7,582	4,511	12,283.6	7,772.6
85/86	10,054	5,548	19,682.9	14,134.9

Source: Mlay, (1988)

Figure 9: Local Production of Maize and Imports



Source: MAFS Data

Government borrowing and credit requirements by crop marketing institutions became the main source of imbalance between money supply and output in the productive sector, resulting in inflationary pressure on the economy. Deficits in the government recurrent budget and hence the need for borrowing from banks assumed significant proportions from the 1978/79 financial year. By 1986 the government deficit had risen to 2,803.7 Million shillings while inflation rose from 12.2% between 1978 – 1979 to 34% between 1983 and 1986. Inflationary pressure affected the production and consumption of food crops through real price and income effects. In the absence of income increases to compensate for inflation, real producer prices and consumer income declined, acting as a disincentive for producers, and led to food insecurity for consumers, particularly for low-income households. Both supply and demand elasticities of maize were inelastic with respect to price during this period (Mlay, 1988).

(iv) Input Supply and Use

Agricultural intensification is associated with interventions that enhance the productivity of land and labor. Productivity of land may be improved by using fertilizer, manure, higher yielding seed varieties, pesticides and irrigation. Tools and equipment that reduce drudgery while improving the efficiency of agricultural operations enhance labor

productivity. The use of irrigation, improved seed, and agricultural chemicals remains very low in Tanzania. Less than 25% of the land that is suitable for irrigation is used for this purpose, which is less than 1% of the arable land and only 1.5% of the land under cultivation. Animal traction and tractors account for only 20 and 10% of the cultivated land respectively, and mostly for primary cultivation. Hand hoes cover the remaining 70% (WB, 1994). In 1978 Shinyanga region had the highest number of trained oxen (102,540), but Arusha had the highest number of oxen implements (35,893). The most efficient use of animal drawn implements (ADT) was recorded in Shinyanga, Mwanza, Singida and Rukwa where the ratio of oxen to implements was less than 0.5 (URT, 1982).

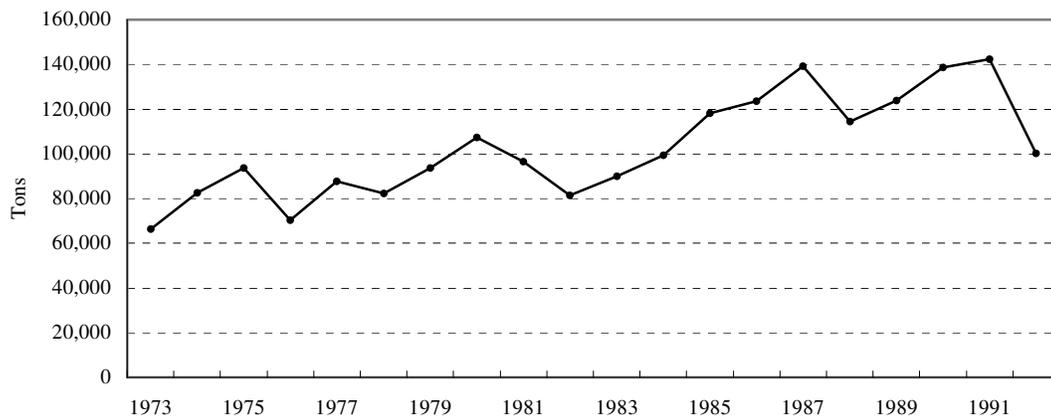
In 1980, it was estimated that 120,378 ha (84%) of the irrigated land was under traditional irrigation systems while large schemes, which were then owned by the government, had 23,622 ha (16%). However, official statistics often underestimate the area under irrigation since it does not count some of the traditional irrigation systems and practices, such as cultivation of valley bottoms during the dry season. This farming system is practiced in many parts of the country, especially in Iringa and Kigoma. It is estimated for example that in Kigoma region during 1998, off-season farming accounted for 38,650 tons of food crops, which was approximately 5% of the total annual food production (BACAS, 1999^a). Such farming systems involve intensive production of cereals and vegetables. A survey in six villages of Iringa district (Iringa region), revealed that off-season production from *vinyungu*¹⁴ provides income for about two thirds of the farmers, contributing up to 40% of the household income (Mkivanda and Kaswamila, 1999). Under the household survey for this study (Afrint) up to 48% of the respondents from Iringa reported to be irrigating at least a quarter of their maize farms, compared to only 7% of the maize producers in Morogoro, therefore underscoring the importance of *vinyungu* in Iringa.

The ministry of Agriculture provides figures on fertilizer production, imports (commercial & grants), Total availability, region wise distribution or supply and demand.

¹⁴ Vinyungu is a traditional irrigation system that is commonly practiced in Iringa region at valley bottoms, taking advantage of groundwater within stream and river banks

It is difficult to get exact figures for fertilizer consumption because records of stocks carried forward from year to year at various distribution points are not available. In any case, such stocks are normally small. Available data indicate that about 93% of the fertilizer that is distributed annually is used during the same year. As such fertilizer supply is used as a proxy for consumption. Utilization of fertilizer and other agricultural chemicals increased during the 1970s, but their supply to farmers was erratic, which undermined sustained use by farmers, after they adopted these technologies. Fertilizer use rose from 80,000 to 100,000 tons during the 1970s, and the proportion of farmers using fertilizer rose from 7% in 1971/72 to 14% in 1986/87 (WB, 2000).

Figure 10: Annual Fertilizer Supply for Tanzania Mainland: 1973 - 1992

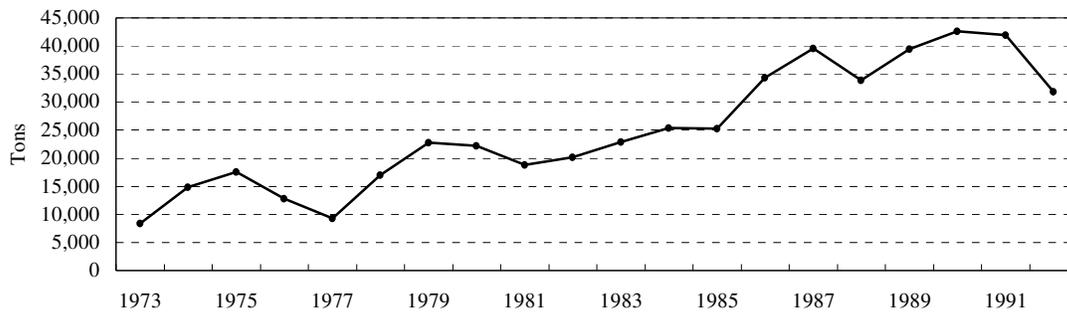


Source: MAFS Records

By world standards, the level of fertilizer use in Tanzania is very low. In 1985 for example, when fertilizer consumption was rising, the average availability of nitrogen, phosphorus and potassium was only 7.8 kg/ha of cultivated land. Comparable figures for Zimbabwe were 24.3 kg/ha while the United States of America had 92 kg/ha (FAO, 1988). Estimates by Isinika (1995) based on aggregate data indicated that the average rate of fertilizer application rose from about 9 kg/ha in 1971 to a peak of about 25 kg/ha in 1987. The total supply exhibited a general upward trend from 1974 until 1981 and then from 1983 to 1988. From there on supply has been erratic (Figure 10), due to high dependence on grants, which averaged around 50,000- 60,000 tons per year since 1973, peaking at 85,000 tons in 1987.

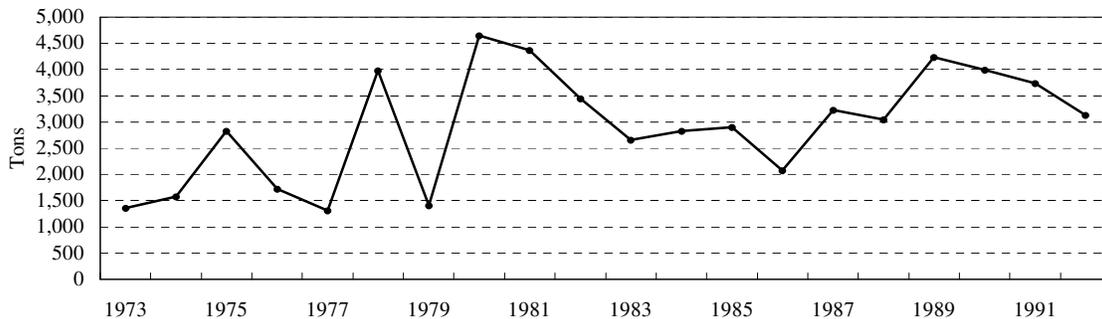
The trend in annual fertilizer supply in Iringa followed the national pattern (Figure 11), but that of Morogoro did not (Figure 12). Supply for Morogoro was more erratic before 1981, but it indicates a general increasing trend between 1986 and 1987. The supply of agricultural chemicals followed a similarly erratic, but upward trend (Isinika, 1995).

Figure 11: Annual Fertilizer Supply for Iringa Region: 1973 – 1992



Source: MFAS Records

Figure 12: Annual Fertilizer Supply for Morogoro Region: 1973 - 1992



Source: MAFS Records

Use of fertilizer on food crops increased substantially after 1974 when the National Maize Project was introduced. The project involved a packet of fertilizer, improved seed and pesticides, which were subsidized initially at 100%. A subsidy of 50% on fertilizer remained effective from 1976 to 1982. Regions with high potential, especially the Southern highlands regions of Iringa, Mbeya, Rukwa and Ruvuma, commonly referred to then as the big four, and Arusha were given priority in the allocation of subsidized fertilizer. Another fertilizer project funded by the FAO from 1989 similarly targeted high

potential regions including the Southern highlands, Kilimanjaro, Arusha and Morogoro. In 1983 the Southern highlands regions consumed about 70% of the fertilizer (FAO, 1986).

The demand for fertilizer was high, but it was constrained by availability, which was estimated at 170,000 tons per year in 1986, of which 50% was used for food grain (FAO, 1986). The supply of improved seed indicates a general downward trend, especially after 1981 in the case of maize and paddy. However, the amount of available improved bean seed per hectare trended upward until 1986, but declined there after up to 1992, after which data is not consistently available.

(v) Supporting Services

In addition to adequate inputs and a functioning marketing system, agricultural development requires facilitation by way of providing various supporting services as public goods or through the private sector. Such services include extension, research, training, regulations, animal health and crop protection, rangeland management, land and water resource utilization and management and agricultural information (URT, 1997). For this discussion, we will focus on agricultural extension, research and training because these have undergone considerable institutional changes since independence, with a direct bearing on agricultural productivity.

As it has been previously stated, after independence, both agricultural research and extension changed their focus towards food crops. Related with this, there was institutional expansion in terms of infrastructure and human resources during the 1970s up to the mid- 1980s. Extension services were expanded in order to have at least one extension agent in every ward, while expansion of research stations aimed at increasing their spatial distribution across each agro-ecological zone to meet the increasing demand. There was also a corresponding expansion of Agricultural training institutes and their output, especially of technical staff (diploma and certificate holders). In addition, the Faculty of Agriculture was established in 1970 under the University of Dar-es-Salaam. Almost all graduates from these institutions were absorbed into the expanded public

sector (extension, research, training and parastatals). A corresponding expansion of agricultural training institutions became necessary. Programs for farmers were also instituted through Farmers' Training Centers under the Ministry of Agriculture and Folk Development Centres (Isinika, 1998).

More than seventeen new research stations have been established after independence, and the number of programs included more on food crops. Although these were desirable changes, they resulted in thin distribution of resources and discontinuity of research programs when donors pulled out. Studies have shown that any productivity or technological gains during this period fell below the corresponding level of investment (Smith, 1990; Isinika, 1995). The research infrastructure continued to depreciate during most of the 1970s and much of the 1980s, as agriculture continued to receive low priority in recurrent financing. Thus research productivity, measured in terms of the number of technologies released declined, compared to the 1950s and 1960 when research was credited for increasing productivity in coffee, sisal, cotton and tea (Fuggles-Couchman, 1964). Similar arguments apply for training institutions (Isinika, 1998). Likewise, low performance of agricultural extension has been widely documented (Lupanga, 1986; Isinika, 1995; BACAS, 1997).

All three (extension, research and training), underwent significant organizational changes. In 1972, under decentralization, extension services were transferred to the Prime Minister's office to be under Regional and District Directorates, where extension staff were cut off from their technical ministry. Extension staff were required to undertake many non-extension duties (Isinika, 1995). Their morale declined due to various reasons and so did their performance. Recognizing these institutional problems, extension services were reinstated to the Ministry of Agriculture in 1984, based on recommendations outlined in the first Agricultural Policy of Tanzania (URT, 1982).

In 1980 the Ministry of Agriculture was split into two, one responsible for crops and another for livestock. At the same time, agricultural research was reorganized under two parastatal organizations, the Tanzania Agricultural Research Organization (TARO) for

crops and the Tanzania Livestock Research Organization TARILO). Both were disbanded in 1989, as a result of mismanagement, poor performance and fragmentation of research (Ravnborg, 1989, World Bank, 1994), and the management of research services reverted to the Ministry of Agriculture. Regional Development Centres for training farmers, which latter became Folk Development Centres, suffered a similar problem, being moved to four different Ministries between 1968 and 1975 (Mosha, 1985).

The poor performance of these supporting services has been attributed to many factors including spreading available resources too thinly, which lead to under funding of programs with subsequent demoralization of staff and frequent instructional changes in an attempt to address immerging issues. It is not easy to discern the specific effects of all these changes on individual crops, but their negative effect on the agricultural sector in general and crop production in particular has been extensively documented.

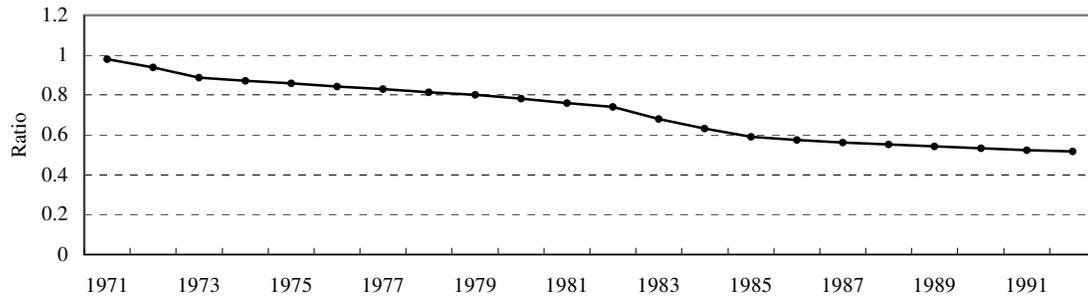
2.3 Land Use

Changes in yield per unit area or land per unit of labor are among indicators of crop intensification (Larson, 1996). While these variables can be computed for each crop, aggregate national or regional data masks spatial variations, which are often significant. Therefore, while yield and land to labor ratios will be computed based on aggregate data, more specific experiences of intensification will be inferred from case studies or location specific data. Isinika (1995) computed the ratio of land under 15 major crops food and export crops for the period 1971 – 1992, and established that the ratio declined form 0.98 to 0.52 during the interval representing a -2.2% annual rate of decline (Figure 13).

The ratio of area under crops to the rural population does not show a similar downward trend (Figure 13), fluctuating between 0.08 and 0.1 for maize while the per capita production of main food crops show a gradual upward trend after 1981 (Figure 2). A study by the Human Resources Development Survey (HRDS, 1996 cited in WB, 2000) established that the annual growth rate of area under maize was 2.4%, but the growth of output kept pace with that of the population at 3.1% (WB, 2000). However, in the case of paddy, the ratio of area to rural population increased from 0.04 to almost 0.1 between

1961 and 1989, indication that the area under paddy has increased faster than the rural population.

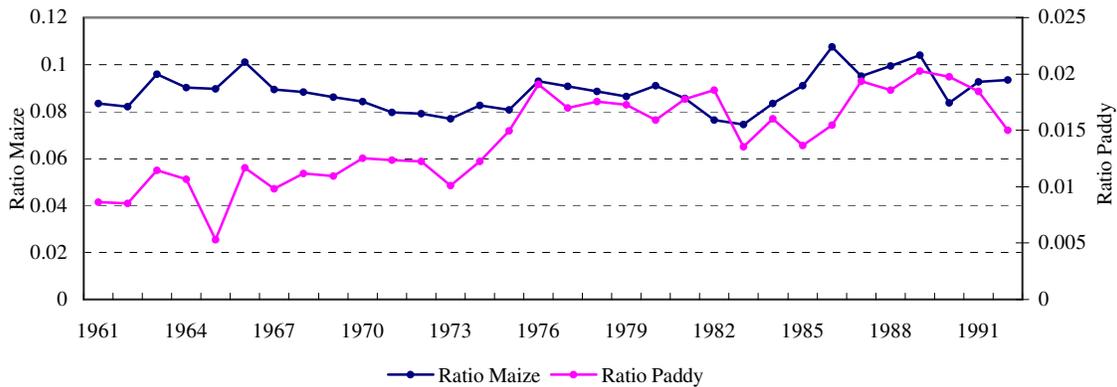
Figure 13: Ratio of Land per Unit of Agricultural Labor



Source: Isinika (1995)

In many parts of Tanzania, the land frontier has not yet been reached, but the limit is getting closer in many areas. A study in three villages of Njombe District (Iringa region) showed that among 118 farmers who were interviewed, only 6% of the farm plots were under fallow during 1996/97 (Isinika & Mdoe, 2001). It has also been observed that smallholder farmers make more intensive use of their land, using 75% if it at any time compared to only 36% for land under large-scale cultivation (WB, 1994). In areas where the land frontier has been reached, farmers have responded by either migrating to new areas or intensifying crop production. Under this study results of the focus group discussion indicate that within households between 0% and 20% of the land is under fallow in any given year depending on the village. Meanwhile, results of the household survey show that about 21% and 28% of the respondents in Iringa and Morogoro respectively practice fallowing. Figure 14 depicts the area under maize and paddy per unit of rural population as a proxy for the agricultural labor force. The trend reflects the rising popularity of paddy.

Figure 14: Ratio of Land under Crops per Unit of Rural Population



Source: MAFS Data

2.4 Other Factors

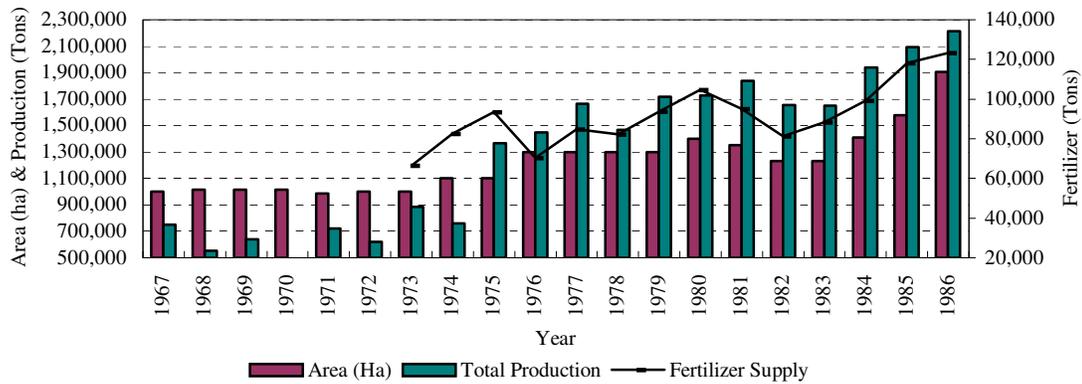
Besides factors that are related to national policies, the economy of Tanzania was also affected by external factors including the oil shock in 1973, drought in 1973 - 1975 and the war with Uganda in 1978. These reduced the ability to import inputs for the agricultural sector and the Basic Industries Strategy, which was adopted in 1976. The role of donors has also been attributed some of the blame. Donors financed almost all the capital expansion of the public sector during the 1970s. It has been said that the donor community were important accomplices, as they helped to finance many of the failed resource allocation policies (Hanak, 1986; Tibaijuka, 1992).

It has already been stated that by 1970 donor financing amounted to 50% of the investment budget. Sometimes donors gave ill advice to the government. The settlement schemes of the 1960 and the import liberalization policy of 1976-1978, following the beverage boom from hiked coffee prices in the world market are cited as examples (Hanak, 1986; WB, 1994). It can be said that the government often falls victim of donor pressure due to being dependent on external technical assistance, which often comes as part and parcel of some donor funded programs, which dominate development financing.

2.5 Crop Production Response

Figures 15 – 19 present the relative movement of the area, production and fertilizer availability of maize and paddy for Tanzania and Iringa and Morogoro. Between 1970 and 1987 maize production accounted for 78% of the preferred staple, 59% of the total grain and 27% of the total energy requirement (Mlay, 1988). Although the yield of maize rose by approximately 91% from 0.98 tons/ha in 1971 to 1.87 tons/ha in 1987, yield decreased in 1973, 1978, and 1981-82.

Figure 15: Maize Area and Production against Total Fertilizer Supply for Tanzania: 1967 - 1986



Source: MAFS Data

Figure 16: Maize Area, Production and Total Fertilizer Supply Iringa: 1982 – 1989

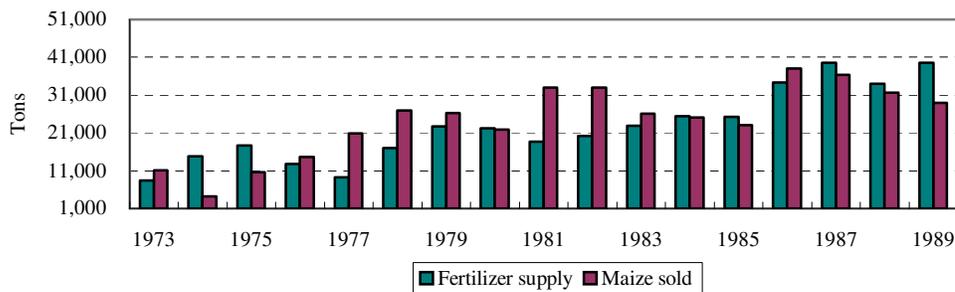


Figure 17: Paddy Area, Production against Total Fertilizer Supply for Tanzania: 1967 - 2000

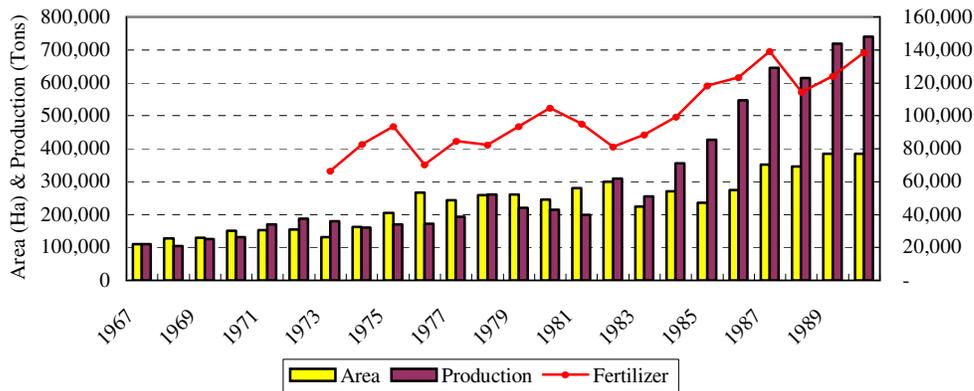
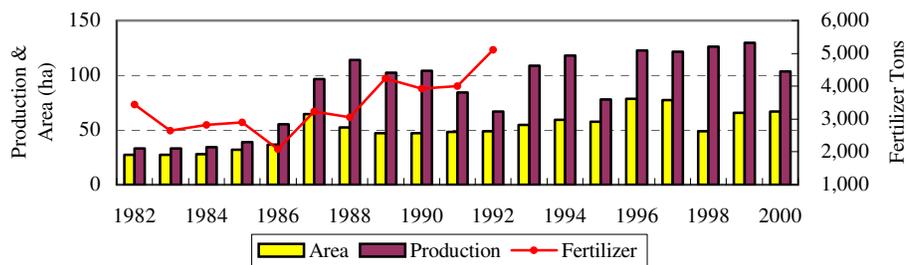


Figure 18: Paddy Area, Production and Fertilizer Supply: Morogoro



While the decline in 1973 may be weather related, but the rest are more likely linked to agricultural marketing policies and the ability of the economy to import agricultural inputs, especially fertilizer and implements. The yield of paddy, which was 1.74 tons/ha in 1971 declined to 0.78 tons/ha in 1977. An upward trend began in 1984, reaching a high level of about 2.5 tons/ha in 1989. This yield response began during the period when locally initiated economic recovery programs were operational.

The study by Meertens *et al* (1996) in Usukumaland clearly illustrates crop intensification up to 1991. Other documented examples of intensive food production include application of high fertilizer rates for maize production in the Southern highlands under the Maize project during the 1970 (FAO, 1986; WB, 1994). The adoption of high yielding hybrid maize and improved varieties of Irish potatoes also in the Southern highlands (Isinika 1998), intensive rice cultivation in Shinyanga regions (Meertens *et al*, 1996; WB, 2000), and many others have also contributed to more intensive crop production.

2.6 Summary

The period from 1967 to 1985 represents a period when Tanzania pursued socialist objectives as guided by the Arusha declaration, whose main goal was to develop an egalitarian society. This period is also characterized by frequent changes in development policies, which affected resource allocation within the agricultural sector both at the household and the national level. Some of the positive actions by the government during this period included facilitating increased availability of chemical fertilizer and other agricultural inputs, which were mainly obtained through donor financed grants and credit. The government also expanded agricultural services, especially research, training and extension.

At the same time the government pursued other ambitious or controversial programs that competed for resources with the agricultural sector. These included the abolitions of Local governments and decentralization (1972), villagization (1974 – 1976), the Basic Industries Strategy, dissolution of Cooperatives (1976) and the war with Uganda (1978 – 79) to mention a few. In addition the pricing policies for agricultural commodities during this time were very politically motivated, sometimes inducing farmers to substitute away from export crops in favor of food crops, which faced less marketing restrictions and offered higher real prices in the open market. Such substitution becomes very obvious after 1982, when liberalization of food and agricultural input markets began.

Despite good intentions, along with strategies that were pursued by the government, the interactive effect of all the negative policies and actions had their toll on agriculture. By the early 1980s both the state of the economy and the situation of food faced a downward slide. The government attempted to resurrect the economy by adopting home made structural adjustment programs, which began by liberalizing markets for food crops during the early eighties. However, the damage to the economy had been severe and external financial as well as technical support was essential for the recovery program to take off. Thus donor funds from the World Bank and some bilateral donor were mobilized to finance a recovery program that began in 1986.

3.0 THE SAP AND POST SAP PERIOD: 1986 – 2002

The year 1986 marked another turning point in the economic orientation of Tanzania, after which Tanzania is characterized by economic reforms involving policy changes in many sectors, in order to address distortions, which had been introduced into the economy through previous policies and strategies. In 1986 Tanzania adopted a three year (1986 – 1988) Economic Recovery Program (ERP I), which was financed by the IMF, World Bank and other bilateral donors. The main objective of the program was among other things to;

- Restore macro-economic stability and
- Remove market distortions.

The second phase (ERP II), also referred to as the Economic and Social Action Program (ESAP), followed (1989 – 1992), to address social constraints arising from structural adjustment (WB, 1994). In the political front, the Zanzibar Declaration in 1991 basically removed many of the political constraints imposed by the Arusha declaration. In 1995 Tanzania introduced multiparty rule, which was abolished shortly after independence. In this section, we will discuss policy changes that are relevant to agriculture and food production in particular during this period. A World Bank analysis of the agricultural sector in Tanzania (WB, 2000) distinguishes the early reform period (1986- 1992) and the period since 1993. In fact institutional reforms have accelerated since 1995 (WTO, 1998). Since most of the macro-economic and fiscal constraints had been addressed by 1992, and all subsidies were phased out by 1994, this study assumes that the post-SAP period begins from 1995. However, the World Bank report (1994) refers to 1993 as the post-SAP period.

3.1 Policy Changes and Development Strategies

During the early period of the reforms, the government took various steps to restore macro-economic stability and minimize distortions in the commodity and financial markets. The reforms included;

- Devaluation of the shilling

- Raising producer price by 5% in real terms annually or paying 60 – 70% of free on board (fob) price, whichever was higher
- Raising interest rates with the target of attaining positive real interest rates
- Further liberalization of trade, and reduction of items under price control
- Imposing a ceiling on government expenditure (Mlay, 1988)

Thus, the exchange rate rose from 33 Tshs per USD in 1986 to 425 Tshs per USD in 1993. The shilling continued to depreciate against the US dollar, currently (April, 2003) exchanging at slightly over 1,000 Tshs to the USD. This policy resulted in a sharp decline in the real effective exchange rate. Revenue from exports began to improve and so did imports of raw materials and consumer goods.

From 1986 and 1990 the government deregulated private trade of food crops. Control on the movement of food was abolished in 1987. Sorghum, millet and other food crops were de-confined in 1988/89, cassava, beans, oilseeds and grains except wheat followed in 1989, wheat was de-confined in 1990. Regional pricing was abandoned in 1989 and the Strategic Grain Reserve was left to purchase crops from more remote places. Fertilizer was de-confined 1988/89 and private traders were allowed to distribute fertilizer in 1992. Under ERP II, subsidy on fertilizer was removed. A 2% export duty on agricultural exports was eliminated in 1998 while a zero import duty on tractors was zero-rated in 2000.

Although ERP II officially ended in 1992 policy reforms have continued, focusing on sector specific changes to further consolidate the reform process. These changes include the;

- Land Policy of 1995
- Agricultural and Livestock Policy of 1997
- Cooperative Development Policy of 1997, based on the experience of implementing the Cooperative act of 1991.
- Under the Natural Resources Ministry, there are the Forest, Wildlife, Fisheries, and Beekeeping policies
- Central Government and Local Government reform since 1997
- Gender policy of 2000
- Poverty Reduction Strategy Paper of 2000
- Rural Development Strategy of 2000
- The Agricultural Sector Development Strategy of 2001 and

- The Agricultural Sector Development Program (2002)
- The National Micro-finance policy of 2000

In order to effectively coordinate the use of land with, a view of attracting investment in agriculture, the government enacted the Land Act No. 4 of 1999 and the Village land Act No. 5 of 1999, which became operational in 2001. However, their impact in terms of tenure changes on the ground is yet to be felt. While these acts aim at promoting individualization of tenure through titling in order to facilitate the evolution of a land market and increase investment in agriculture, studies and experience in other African countries have shown that titling may not necessarily lead to increased access to credit or investment due to tenure constraints which are imbedded within African customary land tenure (Migot-Atholla, 1994).

Farmers responded favorably to most of the policy changes, which began in 1984 and were further consolidated in 1986. The volume of all food crops and that of non-traditional export crops exhibited a sustained positive growth rate from 1984. Traditional export crops followed after 1986 (Isinika, 1995) as the exchange rate was decontrolled. However, the rate of growth has not been uniform for all crops nor has it been sustained throughout the period, due to some remaining underlying constraints, which are briefly highlighted below.

3.2 Agricultural Disincentives and Production Constraints

3.2.1 Taxation

The liberalization of markets as discussed earlier, brought favorable incentives for farmers to increase production of both food and export crops. The implicit taxation of agricultural products significantly declined, following liberalization of the exchange rate. However, food crops that are sold in informal local markets as well as traders who operate through formal market channels are liable to pay various levies for Village or District councils. At the time of this study, agriculture is faced with many taxes, which reduce profitability. Some of those directly levied on inputs or output include; income tax payable on 35% of net profit, Value Added Tax (VAT) for revenue higher than 20

million shillings per annum, Land rent and land taxes. These are collected by the Central government.

District Councils and Villages also collect a number of other taxes to raise revenue, including; agricultural produce cess, education levy, development levy, trading license village levies, livestock levy plus other, which may vary from year to year. Crop cess may amount to more than 20% of all Council's revenue in many rural districts (Isinika, 2000). The taxes applied at the local level may amount up to 10% of the sales value (WB, 2000). Such taxes are regressive since per unit tax on small operations is much higher in low volume years, which is contradictory to the national goal of poverty alleviation. The agricultural tax structure is currently under review to address some of the following constraints;

- Taxing trade rather than production, which raises the cost of distribution
- Having too many taxes, which are difficult to administer
- Having different tax rates for different commodities, distorting production and sales incentives
- Unpredictable changes in administration of taxes, which raises risk and cost

During this year's budget (2003) a list of 40 taxes have been removed, they include; development levy, transport levy on agricultural crops and livestock and other marketing cess on very small traders, which were administered by local governments since they contradict the governments efforts towards poverty alleviation. The list also contains other fees, which were administered by the Central government. Export duty on agricultural commodities had been removed during 1998. This is a move in the right direction.

3.2.2 Transport Cost

High transport cost has been identified as another major constraint facing the agricultural sector. The transport and communication infrastructure expanded during the 1970 and 1980s (Nyerere, 1973¹⁵, Hanak, 1986). However, little maintenance work was done during the same period and the road surface quality deteriorated significantly. Since the

¹⁵ In a speech by Nyerere "Ten years after independence" delivered at the TANU national conference in 1971

introduction of ERP, rebuilding the road network has been revived. By 1994 Tanzania had a road network of 88,000 km of which, 10,300 were classified as trunk roads, 17,7300 km were regional roads while 32,000 were district roads. Only 1.2% of these roads had asphalt or concrete, 2.6 were surface dressed, 10.5% had gravel and 17.4% were earth roads. It was estimated then that only about 15% of the trunk roads and 10% of the rural roads were in good condition throughout the year (WB, 1994). Trunk roads are currently maintained by TAN-ROADS, a government agency, using a road funds collected though tax on fuel. District and rural roads are maintained by District Councils. These face serious financial constraints and often lack expertise for tendering and supervision, as well as equipment for minor maintenance works.

There is evidence that spatial marketing margins have decreased over time, especially after deregulation of marketing. However, absolute spatial margins remain very high due to high transport cost. Poor roads and communication infrastructure greatly increase marketing cost. A study of wholesale trade between Morogoro and Dar-es-Salaam (220 km on a tarmac road) during 1994/95 estimated that 60% of the marketing cost was attributed to transport cost, 19% went to packing material, 9% to local taxes and the remaining to various storage and handling charges, leaving only 7% as returns to traders (Maro, 1999 as cited in WB, 2000). The World Bank report notes further that transport cost in Tanzania was USD 0.18 per km/ton at 1995/96 prices, which is comparable to West African estimates on rural roads for the late 1980s period.

There are comprehensive marketing studies, which have tried to estimate the share of transportation on consumer price. However extrapolating for the figures provided above, we can make some deductive conclusions. The real average retail price of maize during the same period was (1995/96) was 165 Shs/kg, which is equivalent to USD 0.28.¹⁶ If maize were to be transported from Iringa or Mbeya to Dar-es-Salaam, which are about 600 and 900 respectively, transport cost would be USD 0.108 and 0.162 respectively. Thus transport cost would constitute 60% and 90% of the retail price at the Dar-es-salaam

¹⁶ The mean exchange rate for 1995 and 1996 was 591.65 and 586.59 Shs/USD respectively.

market for maize from Iringa and Mbeya respectively. Of course these computations are only meant to provide a general impression since they are based on aggregate data.

Focus group members for the micro-study reported that there has been great improvement in the road infrastructure during the post-SAP period, which has enabled buyers to reach villages that are quite remote. Some villagers have also been able to take their produce directly to central markets within their vicinity. However respondents observed that transport cost were much lower during the pre-SAP period when government institutions used to buy directly from farmers, thereby providing an indirect transportation subsidy.

3.2.3 Input Supply and Use

Fertilizer is the most dominant purchased agricultural input. Fertilizer use on food crops (especially maize) rose significantly during the 1970s up to the mid 1980s. However, use of purchased inputs remains low in general. The 1994 – 95 National Sample Census of Agriculture indicates that only 15% of farmers use fertilizer, 18% use pesticides, 27% use improved seed but Certified seed represented only 2% of planted seed in 1994. TANSEED and Cargil, the lead seed companies produced only 2,200 tons of improved maize seed in 1992/93. By 1997 available improved maize seed was estimated at 3,416 tons. (URT, 2001^c)

Results from the focus group discussion of the micro-study indicate that over 90% of the respondents used local seed varieties. Likewise, 82% of the household survey respondents used traditional seed varieties, whereas 15% and 12 of the respondents in Iringa region use hybrid or other improved maize seed varieties respectively. In Morogoro region only 5% of the respondents reported using improved seed of any type, which is lower than 12% of the respondents who reported using improved maize seed when their households were formed. The corresponding figure for Iringa is 3%, where hybrid maize seed and open pollinated varieties were introduced during the early 1970, after the Arusha declaration.

Although 70% of crop area was cultivated by hand, up to 70% of farmer in the Southern highlands and Usukumaland reported having at least on plot cultivated by oxen or tractor. In the Northern highlands, at least 60% of farmers had a plot prepared by tractor, mainly for maize. However, in Dodoma, almost all cultivated land was done by hand (WB, 2000). The household survey results for this study show that in the case of maize production 93% of the respondents in Morogoro region and close to two thirds in Iringa region used the hand hoe as their main tool for primary tillage. However, in Iringa region, the remaining one third used oxen and about 3% used tractors.

Figure 19: Fertilizer Use by Zone 1973 - 1975

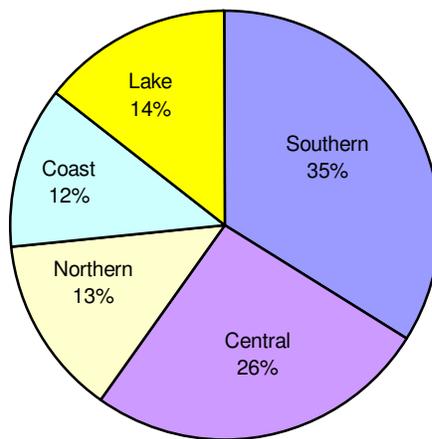
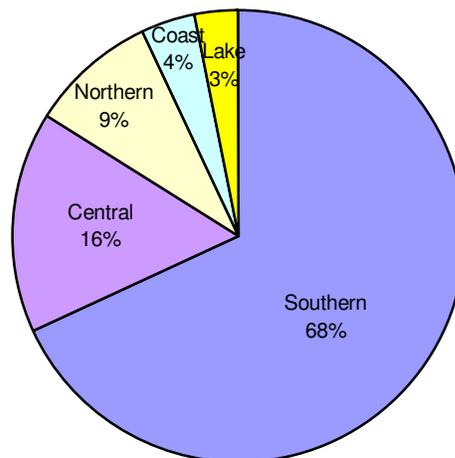


Figure 20: Fertilizer Use by Zone 1989 - 1991



Source: WB (2000)

Until 1991, about 70% of fertilizer was used in the Southern Highlands (Figure 20) compared to only about 35% in 1973-75 (Figure 19). About 50% or more of this fertilizer was used on grain production, mostly on maize (FAO, 1986). About 10% was used on tobacco production in Tabora, Ruvuma (WB, 1994). It is estimated for example that in 1991/92 86,000 tons of fertilizer were used in the Southern Highlands of which 80,000 tons were used on maize.

Although explicit subsidy on fertilizer and other inputs was abolished in 1984, implicit subsidy through an overvalued exchange rate continued. It is estimated that between 1984 and 1989 this subsidy was equivalent to 80% of the farm gate price. (WB, 1994), and demand for fertilizer exceeded supply. In 1985 for example demand was estimated at 171,000 tons while supply was only 118,000 tons. However long term growth of fertilizer use was slow and erratic, being limited by supply and timely availability. Fertilizer consumption increased at an annual rate of 3.4% between 1974 and 1991, but consumption of nutrients grew by 3.8% because of increased use of high analysis fertilizer (WB, 1994).

The proportion of farmers who use farmers using fertilizer may be inferred from the National Sample Census of Agriculture (NSCA), which has been conducted regularly since 1993/94, in order to develop a reliable time series of agricultural data. The title of the survey has change¹⁷ but the underlying objective remains the same. The survey covers 540 households representing smallholder farmers that are distributed through out the country. Results of the survey report on agricultural activities within a farm holding. A household may have one or more farm holding. The average number of holding was reported to be 5.4 in 1993/94 and 5.3 in 1996/97. The 1997/98 IAS covered about 3.5 million farm holdings, of which about 18.8% were female headed.

According to results of these surveys, 19% and 37% of the farm holdings reported using chemical fertilizer and farmyard manure (fym) respectively during the 1993/94 survey.

¹⁷ In 1993/94 and 1994/94 the survey was titled National Sample Census of Agriculture "NSCA" in 1995/96 and 1996/97 it was titled Expanded Agricultural Survey (EAS) while in 1997/98 it was titled the Intergraded Agricultural Survey (IAS).

In 1997/98 only 10% of the holdings reported using chemical fertilizer. About 19% of the holdings used fym, 2% used compost manure, 3% used both compost and chemical fertilizer while 3% reported using other types of fertility enhancing techniques. These results indicate a decline in the use of both chemical and organic fertilizers. An estimated 87% and 68% of the holdings did not use chemical fertilizer during 1996/97 and 1997/98 respectively due to various reasons as indicated below:

	1996/97	1997/98
• Fertilizer too expensive	41%*	27%
• Fertilizer not available	24%	25%
• Did not know how to use	8% ⁺	4%
• Fertilizer destroys soil	5%	4%
• Other reasons	9%	8%
	*or lack of money	
	+ or did not know benefit	

According the household survey for this study, about 38 % of the respondents in Iringa used chemical fertilizer, applying about 52 kg per farm on average. Application rates ranged from 8 to 250 kg per farm. In Morogoro only 2 out of 135 respondents (1.5%) reported using chemical fertilizer at the rate of 23 kg and 100 kg per farm respectively. Furthermore, about 72% of the respondents in Iringa applied pesticides compared to only 3% in Morogoro. The focus group discussion results indicate that chemical fertilizer is used substantially in Ihemi and Kitelewasi villages of Iringa region where 90% - 95% of the households are estimated to use fertilizer. In Isele village, also in Iringa region use of chemical fertilizer is reported to have declined significantly during recent years due to high cost. Instead, about 30% - 40% of the households apply animal manure.

Due to budgetary pressure, the implicit subsidy was phased out, declining from 70% in 1990/91 to 55% in 1991/92, 40% in 1992/93, 25% in 1993/94 and 0% in 1994/95. Taking into account devaluation, the farm gate price of fertilizer rose by 85% in 1991/92 and between 32 – 91% in 1992/93 (depending on type). Meanwhile, between 1990 and 1992, the price of maize rose proportional to that of fertilizer. Devaluation increased the real price of fertilizer by a factor of 2.5 to 3.9 over the period 1991 – 1997. These changes (removal of subsidies and devaluation), combined with lower producer price of maize, had significant negative impact on fertilizer use and maize production especially

in the Southern Highlands (WB, 2000). Nevertheless, fertilizer use remains relatively higher in the Southern highlands even though it is picking up in other regions. According to the Intergrated Agricultural Survey (1997/98) Ruvuma region had the highest number of holdings using chemical fertilizer at 28%, followed by Iringa (21%), Mbeya (17%) and Tabora (15%).

Use of fertilizer in the Southern Highlands has since fallen by 50% or more, while Tabora where tobacco and maize are the main crops now accounting for about 50% of fertilizer use. The percentage of farmers using fertilizer has declined to 24 – 50% for the Southern highlands. In the Northern Highlands the proportion of farmers using fertilizer is reported to be between 10 – 39% while 35% is used in Tabora region. Fertilizer requirements were estimated at 67,000 tons in the year 2001, all to be supplied by commercial imports. The decline in fertilizer use has been associated with low profitability, lack of credit and low liquidity of farmers (WB, 2000).

3.2.4 Marketing Constraints

For food security reasons, Tanzania maintains a restricted policy on export of food crops. However, following the removal of subsidies on agricultural inputs, abandonment of pan-territorial or regional pricing and full liberalization of the exchange rate, remote producing areas have now become less competitive, especially for maize production. Dar-es-Salaam is the main destination for maize and other agricultural produce, receiving 13% of maize, 70% of rice and 95% of marketed beans in 1997/98. As shown in Table 13, Dodoma region now supplies more maize to Dar-es-Salaam than Mbeya, Ruvuma or Rukwa (WB, 2000).

Table 13: Sources of Maize and Rice for Dar-es-Salaam Market

Region	Maize Supplied (%)	Region	Rice Supplied (%)
Dodoma	46	Mbeya	43
Iringa	19	Morogoro	29
Mbeya	16	Shinyaga	19
Songea	10	Tanga	8
Total	91	Total	99

Source: WB (2000)

A study that was done in 1991 (WB, 1994) determined that the distance of 750 km was the upper limit for profitable maize marketing in Dar-es-Salaam without a subsidy on transportation or 1000 km at the prevailing subsidized transport rate then of Tshs 28/ton/km. Available estimates for Rukwa region indicate that transfer and other overhead cost for maize marketing this year (2002/2003) from the region to Dar-es-Salaam is TShs 153,000 per ton. The current average wholesale price of maize in Dar-es-Salaam is 170,000 Tshs/Ton, which means transport and handling cost account for roughly 90% of the wholesale price. But this is an abnormal year where consumer prices are high due to the impending food shortage, following this year's drought. Under normal circumstances therefore transport cost would represent a higher proportion of the wholesale and the consumer price.

Several reports (WB, 1994; WB 2000; BACAS 1999^b, WTO 1998) have recommended that cross-border trade should be encouraged since it provides net foreign exchange gains to the country while significantly improving farmers' income and therefore contributing to poverty alleviation, since it would increase the profitability of maize in parts of the Southern Highlands, which lie beyond the 1000 km profitability limit from the main market in Dar-es-Salaam. Specific controls could be instituted during drought years. It has been established that cereal production in Tanzania is negatively correlated to that of all her southern neighbors (WB, 1994). On May 22nd 2001 a presidential directive allowed farmers in Rukwa region to export maize to neighboring countries. But this does not go far enough since it does not take into account to reduce the risk and uncertainty for producers and traders, since the directive can be changed at any time.

3.3 Production Response and Crop Intensification

The liberalization of markets as discussed above brought a positive response from farmers for all crops. Until 1971 Tanzania was generally self sufficient during most years in the production of most preferred staple crops except wheat. Dependence on imports increased since 1971, reaching a peak in 1980/81. Following economic liberalization, local production picked up. It is now estimated that imports account for

only 2 – 4% of total food production and about 10% of cereals (WB, 2000). At the household level, about 40% of food consumption comes from own production. Estimates by the Ministry of zproduced, were sold (MAFS, unpublished data). The specific production response for maize and paddy over the period is discussed below.

3.3.1 Maize

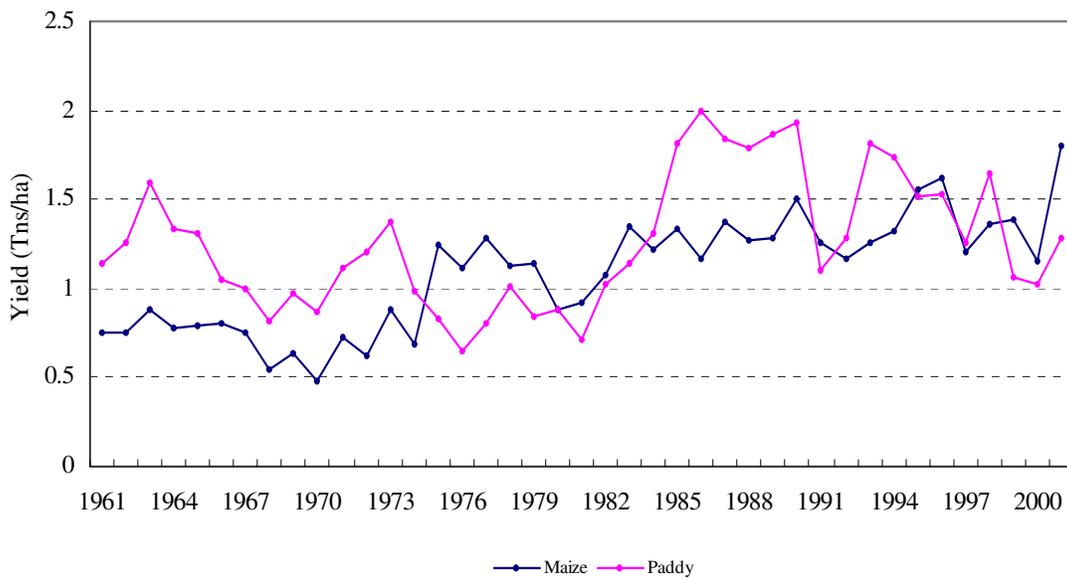
Maize is the main staple in Tanzania, being grown on at least 40% of the land during the long and short rains (WB, 2000). According to the Human Resources Development Survey (1996 in WB 2000), 82% of rural households grow maize and 26% of these sell maize. In the main maize producing areas 100% of the farmers grow maize. Results of the household survey for this study also show that 100% of the respondents in Iringa region and 77% in Morogoro region grew maize. Most of the marketed surplus comes from the Southern Highlands (Iringa, Mbeya, Ruvuma and Rukwa), but as stated earlier, other areas closer to Dar-es-Salaam are gaining prominence. Pan-territorial pricing and subsidized inputs strongly influenced production and agricultural development in the Southern Highlands. The removal of both by 1994 had an effect on both the areas under production and output, which had reached about 2.2 million tons in 1985. In the remote regions of the Southern Highlands (Rukwa, Ruvuma and Iringa) maize output declined by 13 – 19% between 1987 – 89 and 1997/98, while it expanded in Iringa and Dodoma (WB, 2000).

National aggregate data indicate that between 1980 and 1985, the area under maize increased by 8 while the output or production increased by 49% imply an 8% annual growth rate. However, between 1985 and 1990 area increased by 14% while output increased by only 10% (Isinika, 1995), or 2% annual growth rate, which indicates a decline in yield. Similar analysis for the intervals 1990 – 1995 indicates that maize output increased by 21% but area under maize increased by only 0.5%. For the period 1995 – 2001 output increased by 29% while area under production decreased by about 5%. This would imply that yield increase significantly during this period. However, this coincides with the period when input supply and use is reported to have declined, especially in the leading maize producing areas in the Southern Highlands. The

Integrated Agricultural Survey for 1997/98 reported an aggregate average yield of 0.63 tons per hectare compared to similar estimates during the 1993/94 ASCA which reported an average yield of 1.2 tons/ha. During the period 1981 – 1987 yield estimates based on reports from field regional extension staff fell within the range of 1.0 –1.7 tons/ha reported between 1981 and 1987.

The data as presented in Figure 21 indicate that there has been a gradual improvement in yield since 1961, but it has been interrupted by erratic up and down trends, especially for maize. A declining trend up to 1970 is followed by an upward trend, which stabilizes at about 1.4 tons/ha during the early 1980. From 1989 the yield of both maize and paddy indicate a general declining trend. The three-year moving average for the same data reveal a better picture of the productivity trend (Figure 22).

Figure 21: Maize and Paddy Yield (1961 – 2001)



Source: MAFS Data

Figure 22: Maize and Paddy Yield: Three Year Moving Average (1961 – 2000)

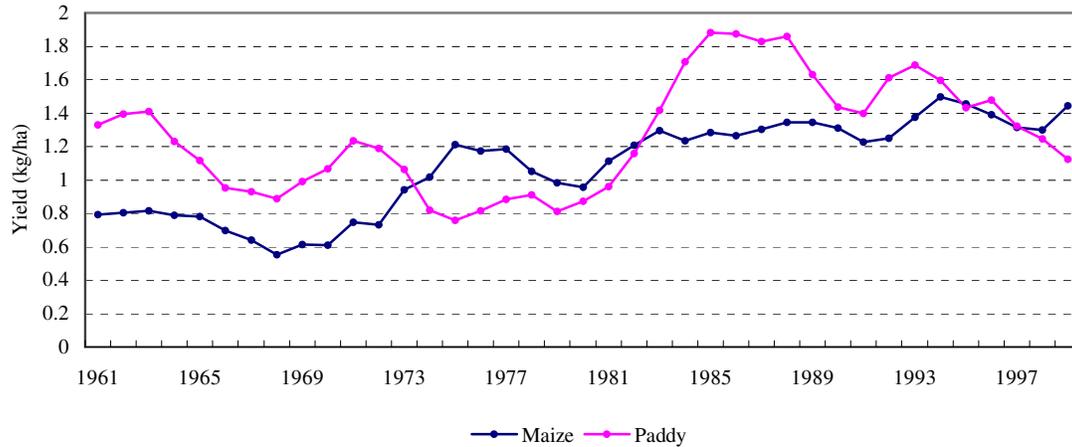


Table 14: Correlation Coefficients Between Area Under Maize/Paddy and Fertilizer

Period	Maize National	Maize Iringa	Paddy National	Paddy Morogoro
1973 –2001	0.47**	-	0.121	-
1973 – 1986	0.83***	-	0.365	-
1986 - 2001	0.073*	-	-0.603*	-
1982 - 1999	-	-0.524*	-	0.438

The correlation coefficient between area and fertilizer supply for the country as a whole (Table 14 & Figure 21) indicate positive and significant correlation, especially between 1973 and 1986, but weaker after 1986. Data for Iringa region on maize indicate negative correlation (Table 14) that is significant at the 90% confidence level. This may imply that farmers in Iringa compensated for loss of productivity from reduced fertilizer use by increasing the area under production. Larson (1996) suggests that farmers will use various techniques to raise agricultural output, including expanding area, switching to high value crops or higher quality varieties and increasing yield.

According to the data presented in Figures 23 and 24, after 1994, high production of maize is attained despite declining fertilizer availability, which is rather puzzling. One explanation may be that more farmers are combining the use of chemical fertilizer with organic manure or compost and other improved crop husbandry practices. Results from the focus group discussion of the micro-study indicate that between 5 and 36% of the farmers use farmyard manure in villages of Iringa region. The household survey further

shows that more than one third of the respondents in Iringa region used manure. Other practices included crop rotation, green manuring, soil and water conservation techniques and fallowing.

Figure 23: Maize Area, Production and Fertilizer Supply for Tanzania: 1986 - 2001

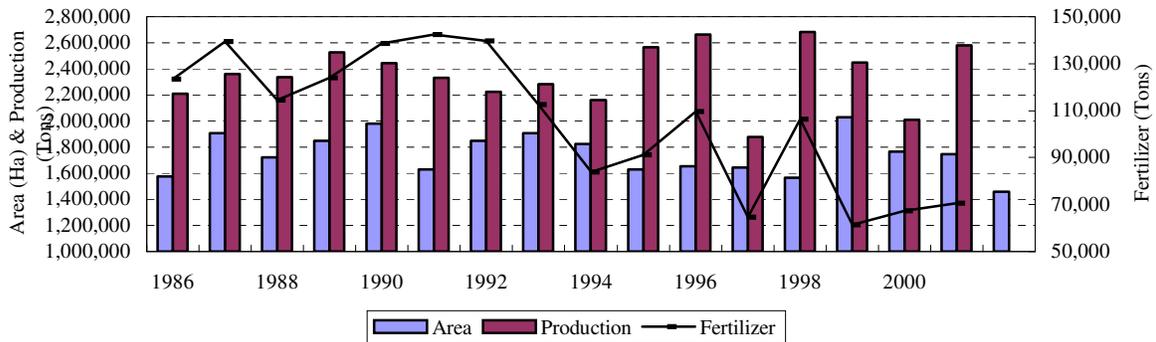
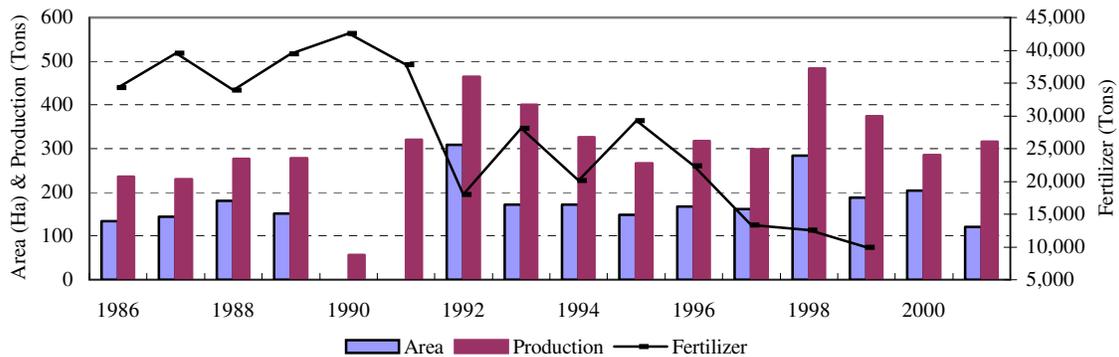


Figure 24: Maize Area, Production and Fertilizer Supply, Iringa Region: 1986-2001



Another explanation could be that more of the annual fertilizer supply is now used in the production of other crops rather than maize, therefore significant positive correlation may not be observed between these two variables. The case of tobacco in Tabora region as previously presented serves as an example. Vegetables and other horticultural crops is another. A study by the World Bank (1994^a) established that the coefficient on fertilizer was not significant in explaining variation in the production of maize. They concluded that since fertilizer use was quite low, even when the subsidy was in place. Therefore its declined use on food crops cannot explain the crop performance (WB, 2000).

As fertilizer and other inputs became more expensive and less timely, farmers responded by using less inputs than the rate recommended by extension agents. In 1991/1992 it was estimated that average fertilizer application was only 120 kg/ha of all fertilizer types as opposed to the technical optimum 200 – 250¹⁸ kg/ha. Similar findings have been established in Njombe district (In Iringa region), where farmers did not apply the total recommended package, and only 15% of them managed to obtain 50% of the potential yield (Isinika and Mdoe (Forthcoming)).

The study further identified factors that contributed most to intensification of maize production as being fertilizer rate and type, pesticide rate and the number of times a field was weeded. Experience from Asia shows that the green revolution was not adopted as one package, rather, selective adoption was observed as farmers found only a part of the recommended technology acceptable (Dias, 1997). Moreover, technology adoption was sequential depending on the task and profitability (Day and Singh, 1997).

Tanzania has a lot of potential to increase maize production if more inputs, especially fertilizers are used, as indicated by comparison of yield with other countries of comparable potential and similar peasant based production. For example, yield of maize in 1987 was 1,196 kg/ha compared to 1,556 kg/ha in Ethiopia, 1,893 kg/ha in Kenya, 1,867 kg/ha in Lesotho, 1660 kg/ha in Zambia, 1917 kg/ha in Swaziland and 2,006 kg/ha in Zimbabwe (WB, 1994).

Despite reduced levels of fertilizer use, available data indicate that maize production maintained a gradual upward trend from increased area and yield. The ADIS study (1992) established that 70% of farmers in Hai district (Kilimanjaro region) invested in fertility enhancing husbandry practices. Likewise 50% of farmers who were interviewed in Mbozi district were investing in fertility enhancing practices, consistent with the hypothesis that population growth and rural densities drive farmers towards more intensive and higher productivity technologies in reaction to reduced fallow (WB, 1994).

¹⁸ Use of 250 kg of compound fertilizer per hectare is classified as high technology for maize production in many parts of the country.

In Tanzania, smallholder farmers account for 92% of the area under cultivation. Also, 93% of smallholders cultivate less than 2 ha. Farmers who own more than 2 ha comprise only 10% but they own 49% of the cultivated area, implying concentration of land. Access to land is perceived to be difficult in high potential areas (WB, 2000). The profitability of maize seems to have declined over time. A projection by the Bank indicated that returns per man-day declined from 2,218 Tshs/day in 1991 to 501 Tshs/day 1998 (WB, 2000). Farm budget analysis by the MDB indicates that returns may be negative in marginal areas or during dry years.

3.3.2 Paddy

In Tanzania, rice production systems are described as (i) dry land or hilly and (ii) lowland or wetland. Table 15 summarizes the distribution of land under rice between the two ecosystems. Paddy is the second most important cereal staple. Between 1971- and 1980 paddy production was negatively impacted by a 10% decline in area (1971 – 1975) and a 26% decline in yield (1975 – 1980). Since 1980 both yield (Figure 21 and 22) and area under production picked up resulting in a 55% and 67% increase in output in the interval 1980 – 1985 and 1985 – 1990 respectively. Area under paddy increased by 46% and 20% during the same intervals while yield increased by 40% during the first half of the decade, but declined by 4% during the second half (Isinika, 1995).

Shinyanga and Mwanza regions accounted for about 70% of the increased rice production from 1987 – 1992, replacing Mbeya and Morogoro (MAC, 1992). This increasing trend of area under paddy is consistent with findings of the household survey where 42% of the respondents felt that the area under paddy was smaller when their households were formed compared to the most recent season (2000/2001) while 29% felt the area had remained the same and 21% said it had increased. Figures 25 and 26 present production data for Tanzania and Morogoro regions receptivity. The data for Tanzania mainland indicate a general declining trend of paddy yield from about 1.9 tons/ha in 1990 to 1.0 Tons/ha in 2000, which implies that most of the increase in production comes from area expansion, but total production has increased until 1999

Table 15: Classification of Rice Ecosystems in Tanzania

Ecosystem	% Area	Yield Ton/ha	Characteristics	Location
Upland	20			
Dry land	12	0.4 - 0.5	Slash & burn Direct sowing, dibbling, broadcasting	Uluguru, Usambara, Ulanga, Kyela basin
Hygromorphic	8	0.5 - 1	In scattered V shaped depressions Rely on rainwater, underground water & undulating topography	Coast, Tanga, Morogoro, Lindi, Mtwara, Shinyanga, Mwanza
Lowland	80			
Fully Irrigated	5	4 - 6	Highly mechanized Direct seeding	Mbarali, Madibira, kapunga, Dakawa, Ruvu
Traditional supplementary irrigated	1	3 - 4	Small holder, small plots permanently banded, Rice transplanted, puddling by hoe	Morogoro, Mbeya, Dodoma, Kilimanjaro, Mara and Mtwara
Banded Shallow flooded	32	2 - 3	Field banded into small plots Seedlings transplanted Found in 500 – 700 mm rain	Usangu plains, Lake Rukwa, Bahi & Wembere swamps, Mwanza, shinyanga, Tabora
Unbanded and flooded	42	1 – 1.5	Field not banded except for borders	River valleys; Kilombero, Ruvu, Rufiji, Pangani, Kyela Basin

Source: Kanyeka, et al (1995)

Figure 25: Paddy Area, Production and Fertilizer Supply for Tanzania: 1986 – 2001

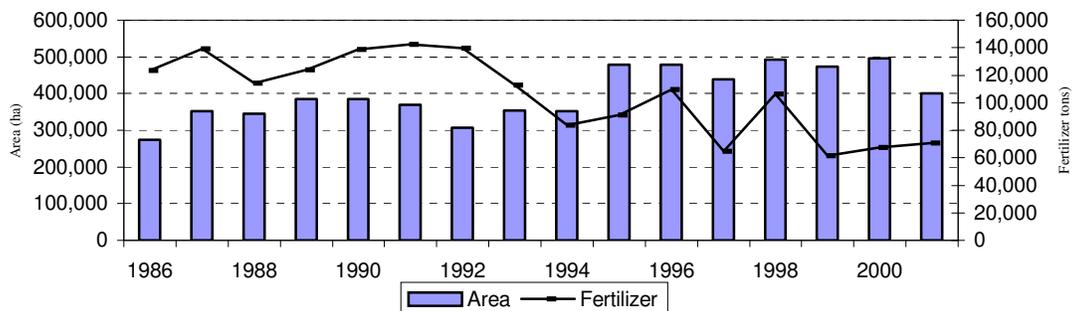


Figure 26: Paddy Area, Production and Fertilizer Supply for Morogoro: 1982 - 2001

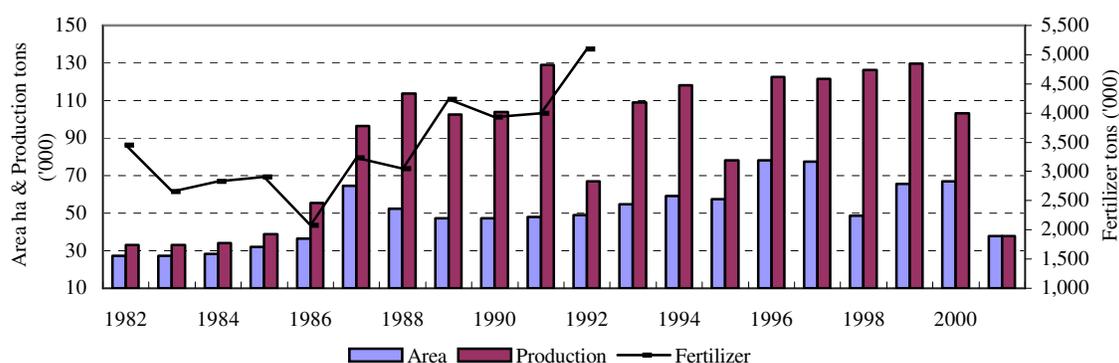


Table: 16 Average Annual Growth Rate of Food Production (Different Sources)

Crop	Annual Growth Rate (%)		
	CMEWU ¹⁹	Statistics Unit	National Account
	1985 – 98	1985 /86 – 1997/98	1985/87 – 1996/98
Maize	2.2	0.7	1.2
Paddy	10.7	7.2	6.2
Cassava	3.8	1.8	2.1
Beans	1.6	0.2	1.8
Wheat	4.0	1.2	1.3
Sorghum/millet	0.9	0.3	0.3

Source: WB (2000)

Between 1995 and 1998, paddy production increased four fold, which represents 11% annual growth rate. The data presented in Table 16 also show that paddy is the fastest growing crop, which has been attributed to two main factors, (i) paddy is a tradable good and therefore domestic price is induced by exchange rate and international prices, (ii) rice has a high income elasticity. Therefore rising income exerts a demand-pull, and subsequent supply response. The short and long run price elasticity of supply has been estimated at 0.68 and 1.33 respectively (WB, 2000). Since 1986/87 Tanzania has exported rice during some years.

Results from the household survey indicate that three seasons prior to the survey 51% of the respondents felt that paddy yield had increased relative to when their households were formed, while 31% felt yield had decreased. Over three quarters of the respondents in the

¹⁹ CMEWU stands for Crop Monitoring and Early Warning Unite

household survey reported to have sold or intended to sell some rice during the season preceding the survey. More rice is reported to be sold now at about 967 kg/household compared to when the households were formed, at which time only about 54% of the respondents reported to have sold rice. Prices and better market outlets, which are said to be better, now seem to be the main incentives.

3.4 A Post SAP Period ?

Whether or not there is a post-SAP era is subject to debate. As stated earlier, the World Bank (2000) considers the period after 1992 as post-SAP because ERP II ended then. However, subsidies for the agricultural sector were phased out in 1994, but subsidized fertilizer supply to the Southern highlands regions has been restore. Meanwhile, institutional reform involving development of sectoral policies and their implementation strategies picked up pace after 1995 and they continue to date. However the data presented in this study indicate that both total production and productivity of the main staples began to decline after 1995. Therefore, for the purpose of this study, the period after 1994 is considered to be post-SAP because institutional reform is a continuous process.

The government has demonstrated its resolve to support development of the agricultural sector after structural by putting in place an Agricultural and Livestock Policy, a sectoral development strategy and an implementation programme. Meanwhile, all other sectors are expected to provide complementary input for developing the agricultural sector. It is too early to assess the impact of these government initiatives, but the political will is there, it only needs to be backed up with financing. Since 2002, the budget for the agricultural sector increased significantly to conform to the government's resolve to develop agriculture as the engine of economic growth.

3.5 Effect of HIV/AIDS

The first case of HIV/AIDS in Tanzania was reported in 1983. Since then, the number of cases and deaths has increased dramatically reaching a cumulative total of 144,498 cases by December 2001 (URT, 2001^d). Not many studies have been done to assess the direct effect of HIV/AIDS on food production. According to the World Bank, the infection rate in Tanzania is between 3.9 and 12.4%, but other estimates place it higher. There is no doubt that the HIV/AIDS pandemic affects agriculture due to deaths and increasing morbidity. Projections made in 1994 indicate that the HIV/AIDS pandemic could reduce the GDP annual growth rate by 0.6 – 1.1% over a period of 15 years. Currently the infection rate is as high as 18-22 % for age group from 22 – 39 years. Nationwide, over 1.5 million people are living with HIV/AIDS. The age group between 15 –59 years is most vulnerable (URT, 2001^d). But, it is as high as 35% in some districts (e.g. Makete and Njombe districts in Iringa region). In fact, the United Nations International Children Fund (UNICEF) recently declared Makete district a disaster area due to the high proportion of orphans in the district from the disease.

The life expectancy of Tanzania has been reduced from 51 in 1978 to 49 currently due to rising death rate from AIDS and other diseases, including malaria and tuberculosis. Under the Agricultural Sector Development Strategy, Ministries responsible for agricultural development are required to mainstream issues that are relevant to HIV/AIDS into all their programs of implementation. This has been reflected in the Agricultural Sector Development Program. However, it remains to be seen how Ministries, Regions, Districts and local communities will translate these good intentions into practice.

3.6 Summary

This chapter presents the dynamics of food production following introduction of Structural adjustment programs in 1986. Initially, the liberalization of markets, coupled with the inflow of external capital had a positive impact on both production and productivity. However the removal of subsidies on agricultural inputs, which was

completed in 1994 had an opposing effect. Consequently the yield of both maize and rice begin to decline around the mid 1990s. Production gains that are reported after 1994 therefore come mostly from area expansion.

Although most farmers report that marketing of agricultural products is better now than during the pre-SAP period, they decry the loss of price guarantee and assurance of selling their farm produce and the transport subsidy they perceive to have had when procurement and transportation from their villages was done by Cooperatives or government parastatals. The declining trend in food production after 1994 indicates that structural adjustment had not yet attained a sustainable rate of economic growth and therefore the need for continued government efforts to consolidate any previous productivity gains. HIV/AIDS and other diseases, especially malaria pose a serious threat to ongoing efforts to attain sustainable growth in the agricultural sector. The government is using all possible means including training and dissemination of relevant information on HIV/AIDS

4.0 SUMMARY OF MAIN FINDINGS

Based on results of the study as presented above, there is evidence of production intensification for maize and paddy, during some intervals of the period under review, as represented by rising yields. Data collected for this study indicate that, the yield of maize increased from 0.746 tons/ha in 1961 to 1.795 ton/ha in 2001, representing a 3.5% average annual growth rate. Significant maize yield growth occurred at three different intervals of time. Most notable intensification of maize production occurred from 1971 to 1979, and especially after 1974, which coincides with the National Maize Project (1974 – 1979). This project provided subsidized agricultural inputs to high potential areas until 1983. Most of these inputs were distributed in the Southern Highlands and Arusha region, mostly for maize production.

During this period the government also applied pan-territorial pricing policy in order to stimulate production in remote areas for income distribution purposes. Producer prices were also set low so as to maintain low prices for consumers. The aggregate average yield of maize rose from 0.73 kg/ha in 1971 to 1.323 tons/ha in 1978. This represents a 10% annual growth rate. The yield of maize stabilized at around 1.3 tons/ha before declining to 1.2/ha in 1985. The next period of yield gain occurred between 1986 and 1989, increasing from 1.16 tons/ha to 1.53 tons/ha, which represents 8% annual growth rate. This period coincides with economic liberalization, when the subsidy on fertilizer also increased significantly due to an overvalued exchange rate.

The final period of yield gain covers the period from 1991 – 1996, when the annual growth rate is estimated at 6%. This period coincides with phasing out of the regional pricing policy and implicit subsidies due to an over-valued exchange rate, which was completed in 1994. There was also liberalization of marketing for inputs and agricultural products. Fertilizer supply and use declined, especially in the main maize growing areas of the Southern highlands, where fertilizer use has declined by as much as 24 –50% while production has decreased by up to 20%. It seems that farmers in these areas compensated for reduced levels of input availability and affordability by increasing

the area under production while improving other crop management practices, including weeding, using organic manure and use of pesticides. Overall production of maize has also kept pace with the population growth rate (Figure 16) due to expansion in other areas, which were previously marginalized due to pricing policies. Even when subsidies were in place, levels of input use remained low in most places due to other marketing constraints and government policies that undermined incentives to producers.

Intervals when the yield of maize declined are observed from 1984 – 85, 1989 – 91 and after 1997. From 1990 there was considerable reduction in the use of fertilizer in the main maize growing areas. The increase in yield of maize after 1990, amid decreasing fertilizer availability may therefore be due virgin land being brought under production in new areas such as Dodoma, Morogoro, Kiteto (in Arusha) and Tanga where high yield could be obtained without any or little increase use of fertilizer or other purchased inputs. However, such soil mining farming practices cannot continue indefinitely. These new producing areas will eventually require increasing quantities of external inputs. Statistics from ASU indicate for example that the average yield of maize in Dodoma region decreased from 0.78 tons/ha in 1991/93 to 0.5 tons/ha in 1999/2000. Similar declining trends are exhibited in all regions except Tabora where maize yield increased from 0.73 tons/ha to 1.3 tons/ha during the same interval, which reflects the spillover and residual effects of fertilizer that is supplied for tobacco production.

In the case of paddy, using three year moving averages, the yield obtained during the interval 1996 – 98 was about the same as the level of 1961 – 63. This is due to erratic fluctuations in between. However, two periods of yield growth can be observed. Between 1968 – 77, the yield of paddy increased by 6.4% annually. The next period of yield gain came in 1982 when yield increased from 1.067 tons/ha to 1.925 tons/ha in 1989, representing a 10% annual growth rate. This period coincides with the beginning of economic liberalization, which included removal of price control on marketing of food crops, removal of subsidies on fertilizer and other inputs. During the interval 1968 – 79, the yield of maize grew faster than that of paddy (10% vs 6.4%), but in the interval 1982 – 1989, that of paddy grew faster (10% vs 2%) mostly because relative prices improved

slightly in favor of paddy (Figure 9). A study by the World Bank (2000) also indicated that paddy is the fastest growing crop in terms of annual production.

Paddy yield exhibited fluctuating declining trends during the interval 1978 – 1981, when the price of paddy relative to maize was declining and after 1992, when marketing of crops and inputs had been liberalized. However, as stated earlier, aggregate data do not provide a typical picture with respect to intensification. The study by Meertens *et al* (1996) indicates that within Usukumaland, as population pressure increased, farmers initially adapted, by expanding production into land that was considered marginal or difficult to work, including black cotton soils (*mbuga*). The adoption of ox ploughing helped. They also used more intensive methods of production, which enhanced soil fertility, including use of manure, mineral fertilizer and more intensive use of labor (weeding). Then maize and rice substituted for sorghum and millet (Table 4) because they were more responsive to intensive cultivation. They show further that in Busagara division in Mwanza region, yield of rice increased from 1,700 kg/ha in 1945 to 3,375 kg/ha in 1990. They summarize the sequence of steps towards intensification as follows;

- (i) Replacement of bulrush millet by cassava, which is higher yielding on sandy soils.
- (ii) Partial replacement of sorghum by cotton and subsequently by maize and rice on *mbuga* soils.
- (iii) Cultivation of rice on the lowland clay soils (*mbuga*) previously considered too difficult to manage with hand tools.
- (iv) Development of local rainwater harvesting techniques, which facilitated the expansion of rice cultivation.

Another example of intensification is sited from Njombe district (Isinika & Mdoe 2001), where it involved use of higher yielding (HYV) maize varieties and mineral fertilizer during the 1970s and adoption of higher yielding varieties of Irish potatoes during the 1980s. At Uhekule village, where the land frontier has almost been reached, other intensification strategies involved timely planting and weeding, which has led to changing the farming system such that all land preparation is completed during the dry season (October – November) before the rains set in (November – December). Most of the land is still prepared by hand (more intensive use of labor), a task that was previously considered impossible. This part of Njombe district, has changed from a food deficit area

during the 1960s to a major supplier of maize and Irish potatoes to markets in Dar-es-Salaam and other urban centers. The same study showed however that at Luduga village, where a Sasakawa project provided inputs to selected farmers on credit, maize yields which had reached 15 – 20 bags/acre during the project were reduced to only 5 – 8 bags/acre as farmers could not afford the input package. This lower level of yield level was nevertheless considered better than average in that village when no improved seed or fertilizer are applied.

In Usambara and Upare mountains, production intensification has involved the adoption of terracing and irrigation techniques that were promoted by a project, using a “tail to mouth approach,” beginning with terracing, which is labor intensive, therefore does not require significant cash outlay but is associated with significant marginal gains, ending with irrigation, which is the most expensive. Therefore, previous yield gains helped to finance latter investments (Scheltema et al, 1999). There are many other such examples of localized intensification success stories.

For the country in general, intensification of maize and rice production was mainly driven by food gaps in the local market, and it was facilitated by increasing availability of inputs during the 1970s and 1980s, especially mineral fertilizer and seed in the case of maize. It has in fact been said that a limited green revolution actually occurred in the Southern highlands during this interval only it could not be sustained due to marketing and other institutional constraints (Eriksson, 1993) including policy failure. Maize was further advantaged by prevailing price policies in high potential areas of the Southern highlands, whereas rice had a strong demand pull from growing urban population as well as export demand in neighboring countries. However within localized areas, where the land frontier has been reached, intensive crop production has been prompted by decreasing land to man ratios, which are reflected in some parts of the Southern and Northern highlands as well as Mwanza and Shinyanga.

Tanzania’s aspiration for national food security has been articulated since independence, as reflected by the following;

- Shift in emphasis towards expanding research, extension and training to support food crop production after independence
- The need for producing sufficient and better food is emphasized in the Arusha declaration
- A fertilizer plant was commissioned in 1973 to improve the supply of inputs
- 1974 – 75 more than thirteen million farmers were moved to *ujamaa* villages where minimum acreage of food crops was imposed.
- In 1975, following two consecutive crop failures due to drought, the national strategy shifted towards food self-sufficiency (pp. 23). The National Maize project facilitated the supply of subsidized inputs to high potential areas, while pan-territorial pricing sought to achieve national egalitarian goals of promoting development proportionally across the country.
- Emphasis on food self sufficiency was reiterated during the economic crisis of the early 1980s, when production of main cereals, except rice was falling and imports rose significantly (Figure 7) and the government took initial steps to liberalize the economy.
- During the 1980s, the government attempted to promote food crop production through regional pricing, which was instituted in 1982 to provide premium prices in high potential areas. Although explicit subsidies were removed in 1984, regional pricing continued until 1989 and implicit subsidies due to an overvalued exchange rate were finally phased out in 1994.
- Preparation of the Agricultural Sector Development Strategy (2001) and the Agricultural Sector Development Programme (2002)
- The Minister of Finance announced revival of subsidized agricultural inputs supply to the Southern Highlands during his budget speech in June 2003.

Other government attempts to ensure food self-sufficiency have included establishment of a Strategic Grain Reserve in 1979, restriction on movement of large quantities of grain and export of food crops. Despite good intentions of the government, some of these policies failed to promote food production due to market and institutional distortions, which were introduced. It has been observed that, the government tended to over-react to emerging problems that affected agricultural production and other development plans (Hanak, 1986). Moreover, there was limited capacity for policy analysis in order to determine their broad ramifications before they were adopted for implementation (Mlay, 1988).

Thus, there were frequent policy changes (Annex 2), which brought uncertainty and increased risk for producers and traders (investors) with consequent detrimental effects to the nation. It has been observed that on average, Tanzania had a policy change or a

government directive that affected the agricultural sector every two to three years (Annex 1). Meanwhile Eicher (1988) noted that no scientific organization could flourish if it passes from one ministry agency to another on average of once every three years. This argument probably holds for other institutions and policy changes as well. Frequent policy changes, which characterized the period under review, imply that the economy was in continuous disequilibria.

Aggregate data for the period after the removal of subsidies in 1994, indicate a general declining trend in the yield of both maize and paddy, which corresponds with a decline in the availability of purchased inputs, especially fertilizer in the case of maize. Intensification in the case of rice production has involved the spread of relatively higher yielding varieties (compared to traditional ones), which are passed from one farmer to another, and the adoption of transplanted rice in bunds, as opposed to broadcasting in open flooded fields.

This more intensive rain-fed lowland production technique is commonly practiced in Mwanza, Shinyanga regions, which have now overtaken Mbeya and Morogoro as major rice producing areas. However, regional statistics from ASU indicated that between 1993/94 and 1999/2000, the most significant yield gains were attained in the following regions; Mbeya (2.3 – 3 tons/ha), Rukwa (1.89 – 2.3 tons/ha), Tanga (1.87 – 2.2 tons/ha), Ruvuma (0.96 – 2.1 tons/ha), Mara (1 – 1.9 tons/ha) coast region, (1 – 1.5 tons/ha), Iringa (1.1 – 1.5 tons/ha), Kagera and Lindi (1 – 1.5 tons/ha). Yield is reported to have declined substantially in Arusha, Kilimanjaro, Mtwara, and Shinyanga (URT, 2001^c).

In the case of maize production, it seems that the state has been the lead actor through inputs supply and price policies, which had a double-edged sword. On the one hand promoting the intensification of maize production in high potential areas through subsidized input supply and favorable maize prices, while on the other hand discouraging production in areas that had a comparative spatial advantage, being close to the market. This led to resource misallocation. Restrictions and distortions that were introduced in the market through various government policies also had a negative impact on

intensification of maize production, especially in the interval 1981 – 1983, and after the removal of subsidies in 1994.

In the case of rice however, intensification seems to have been driven by farmers’ response to market demand. Given the low level of using high yielding varieties in rice production, most of the intensification has come from improved agronomic practices, including transplanting, higher plant population, weeding, bunding to improve water management and bird scaring. The government attempted to increase the production of rice by opening up large-scale irrigation schemes during the 1970s and 1980s under the National Agricultural Food Company (NAFCO). However, high yield, which was initially realized at such farms could not be sustained due to institutional and financing constraints, that affected most government parastal organizations. In any case, fully irrigated rice accounts for only 5% of the area under rice production. Similar attempts were made for wheat in the Basotu wheat complex (Arusha), which also failed. These government farms are currently being privatized.

Referring back to the logical framework for analyzing this study, we can conclude that the pre-conditions existing during the pre-SAP and post-SAP periods were different and this affected the manner in which the state, markets and farmers reacted. The impact on production and intensification at the farm level as well as aggregate national level effects were therefore also different. These have been discussed in details in the report and they are summarized in Table 17 below.

Table 19: Interaction among Actors, Production Intensification and National Level Effects

FACTOR	PRE-SAP	POST-SAP
PRECONDITONS		
Food situation	<ul style="list-style-type: none"> - Initially favorable but could not keep pace with growing demand - Food supply grew at slow pace due to various factors 	<ul style="list-style-type: none"> - Food situation deteriorated due various national policies and dependence on the weather
Agro-ecological	<ul style="list-style-type: none"> - Generally favorable with periodic years of drought 	<ul style="list-style-type: none"> - Generally favorable with periodic years of drought.

FACTOR	PRE-SAP	POST-SAP
		<ul style="list-style-type: none"> - Rainfall indicate three year periodicity
Structure of institutions	<ul style="list-style-type: none"> - Post-independence transformation attempt to try many new institutional ideas (settlement schemes, <i>ujamaa</i> villages, decentralization, many agricultural parastatals). - Many of them eventually failed due to institutional weaknesses in the organizational set up or the rules governing them 	<ul style="list-style-type: none"> - Transformation towards market economy, therefore many policies designed to support the emergence of robust market institutions. - But government ability to provide facilitating environment e.g. public goods, monitoring and enforcement is limited - Reform process still ongoing
Political	<ul style="list-style-type: none"> - Promoted socialism - Strived to build egalitarian state - National goals more emphasized than individual or household goals - National policies and strategies designed to minimize class differences - Many policies and strategies that were introduced distorted markets leading to disincentives for producers and consumers 	<ul style="list-style-type: none"> - Transformation towards market economy - Reforms directed at promoting evolution of effective markets so as to guide resource allocation - Reforms enhanced efficiency of markets and still ongoing - Challenge is to make both inputs and product markets efficient and competitive
ACTORS		
State	<ul style="list-style-type: none"> - Government played a leading role in making production decisions, influencing down to the local level - State acted as benevolent dictator, making decisions for the good of the people - Period characterized by government expansion and increasing government interventions in markets and local institutions - Government introduced price policies and subsidized inputs to promote production of food crops 	<ul style="list-style-type: none"> - Government took the lead to change policies and regulations in order to expedite the attainment of a fully liberalized market economy - Government now playing facilitating role - Government is getting out of direct production and marketing activities

FACTOR	PRE-SAP	POST-SAP
	<ul style="list-style-type: none"> - By 1980s government had to introduce structural adjustment initiatives to address impending problems and economic deterioration - Government services expanded including agricultural research, extension and training, but they became less efficient due to under-funding and other problems 	
Donors	<ul style="list-style-type: none"> - Facilitated government policies through financing and technical advice for some projects and interventions 	<ul style="list-style-type: none"> - Took a leading role in developing plans for and financing ERP I & II and subsequent economic liberalization and institutional reform
Markets	<ul style="list-style-type: none"> - Market incentives played a decreasing role due to price control and marketing restrictions - Resource allocation was to a large extent directed by the state - Declining trend of export crops reduced foreign exchange earning, therefore reducing capacity to import inputs and consumer goods - Over-valued exchange rate made imports cheaper but taxed exports - Government policies introduced multiple distortions in the market (institutional, prices) 	<ul style="list-style-type: none"> - Market liberalization 1986 - 1994 - Private sector now responsible for importing and distributing agricultural inputs and procurement of produce - Supply of inputs has gone down and prices have gone up - Quality of inputs not adequately controlled by government due to limited capacity - Remaining taxes on agriculture serve as disincentive to traders and farmers - Cost of marketing remains high due to poor transportation infrastructure - Export of food crops remains restricted by government thereby reducing economic opportunities for remote areas that are close to

FACTOR	PRE-SAP	POST-SAP
		<p>markets in neighboring countries</p> <ul style="list-style-type: none"> - Agriculture not yet attractive to large scale investors due to land tenure as implied under the land law (Ownership vested on the president on behalf of all citizens). Investors can get Lease titles of up to 99 years - Growth rate of agro-processing and value adding too slow - Competitiveness of producing areas has changed following removal of subsidies
Farmers	<ul style="list-style-type: none"> - Changed crop composition depending on prevailing relative prices - Farmers became residual actors in resource allocation - Reacted to declining real producer prices of export crops by switching to food crops - Sold more of their food crops in parallel markets where prices were higher - Lack of consumer goods in market reduced incentives to produce surplus for market. - Farmers therefore retreated to subsistence production. 	<ul style="list-style-type: none"> - Farmers responded to market price incentives by increasing production of both food and export crops - Reduced use of input due to higher prices and reduced availability, especially in remote areas - Farmers lack information on markets and feel that liberalized markets are not fair for them. They remain price takers as they lack alternative market outlets - Technological gains of 1970s and 1980s are being undermined by prices and limited availability of inputs - Production of maize in Southern Highlands declining but expansion into other producing areas closing the gap. Therefore overall production indicate normal variation mostly related to weather
Effects	<ul style="list-style-type: none"> - Intensification of production 	<ul style="list-style-type: none"> - Removal of subsidies

FACTOR	PRE-SAP	POST-SAP
	<p>was influenced by availability of subsidized inputs and market demand in the case of maize</p> <ul style="list-style-type: none"> - For paddy, intensification was influenced by population pressure, availability of technology (ox-plough in Shinyanga and Mwanza) and market demand - Production increased or decreased depending on relative prices - Imports to fill production shortfalls increased during 1980s 	<p>reduced use of inputs</p> <ul style="list-style-type: none"> - Yield levels and intensification declined for maize, affecting yield and growth rate of production, especially in the Southern Highlands - Growth rate of paddy production increased due to expansion of area under production and increasing intensive production as more farmers adopted labor intensive methods where the land frontier has been reached

5.0 CONCLUSION

In general, we can be concluded that the state has played a leading role in determining the level and degree of intensification in the production of food crops (as illustrated by maize and paddy), through its policies and implementation strategies. During the period under review, the government went full circle. Until 1966, Tanzania was characterized as a market economy. Socialist policies were pursued from 1967 up to 1985, going back to a market economy since 1986. Markets and farmers reacted to prevailing government policies and strategies. Therefore declining trends in yield and production followed periods, which exhibited positive intensification and yield gains. Consequently, the net effect on production increase for the entire period is lower than the potential and the quest for food self-sufficiency has remained largely illusive.

Nationalism (at least on the part of leaders) played an important role in determining the political goals, which were pursued by the government. Often, the quest for socialism and an egalitarian society took precedence over efficient resource allocation. Socialist policies were abandoned since 1985 as they failed to achieve desired goals. Government policies were often characterized by frequent changes, with consequent negative effects such as increased risks for decision-making on the part of farmers and marketing agents. While the government facilitated the intensification of maize production through subsidized inputs, other concurrent policies that were introduced (such as restrictions on trade of food crops locally and in the export market) undermined the basic goal of the government to promote broad based development. Moreover, government monopoly institutions, which were put in place, became inefficient thereby imposing high operating cost.

Although markets have now been liberalized, marketing costs remain high due to underdeveloped marketing infrastructure especially rural roads and communication. As such, the availability and use of agricultural inputs has actually declined and few traders serve remote areas. Taxes on agriculture, especially those currently imposed by District Councils and Village governments act as a disincentive for them to procure crops from

farmers, driving trader out of districts that impose high taxes, leaving farmers to face less competition among traders.

Apart from providing subsidized inputs during the 1970s and 1980s, there is little correspondence between the Asian models and policies that were pursued by the government in Tanzania, mainly because the policies were pursued in an *ad hoc* manner (not synchronized), not consistently for long periods of times and often in defiance of basic market principles. Moreover, no serious policy analysis was done to discern the wider ramifications of policies or directives before they were instituted. Since 1986 however, multilateral and bi-lateral donors, have required more policy analysis and some degree of involving stakeholders in the debates to influence ongoing institutional policies.

It is difficult to say whether or not a post SAP period has begun. The production trends of maize and paddy, these have not yet stabilized. In fact recent trends have generally been negative. However, if one considers the level of macro-level reforms, which to a large extent were completed in 1994, it is conceivable to conclude that 1995 marks the beginning of a post-SAP period, which also coincides with the declining trend of crop production and yield as previously alluded to. Arresting the present declining trend is highly dependent on improving production through intensive production methods, involving fertility improvement and more intensive use of labor. Recent government efforts have been directed at increasing the use availability of fertilizer but this has not yet materialized. The restoration of subsidized fertilizer supply to the Southern Highlands recently will add to these efforts.

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A Historic Timeline of Policies, Strategies and Events Affecting Agriculture, Food Production and Marketing

Year	Activity	Effect on Production/ Intensification
1961	Independence	
1962	Agricultural Product Act and formation of NAPB	Negative on markets
1963	Abolished free hold titles on land replacing them with lease hold titles of up to 99 years	Negative for large scale farming
1961 - 63	First 3 year development plan	Positive for planning
1965	Became a one party state	
1964 - 69	First 5 year development plan, transformation approach	
1964 - 66	Settlement schemes	Failed, too capital intensive
1966	Slump on sisal prices in world market	Negative on foreign exchange earning
1966	Presidential commission to enquire into conduct of cooperatives	
1967	Arusha declaration, socialist development path. Nationalized all major means of production	Focused on national goals at the expense of individual and investors' incentives
1968	Focus on Education for self reliance and Rural development	Focused on agriculture
1968	Ban on hiring agricultural labor	Negative on large scale farming
1970 - 1975	Second five year development plan	Reflected socialist goals
1972	Dissolution of Local governments and decentralization to regional and district directorates	Re-centralization of power to central government. Increasing bureaucracy
1972	Extension services moved to regional and district directorates under Prime Minister's Office	Detached staff at district and regional level with technical ministry
1972 – 80s	Many government parastatals formed to address production, marketing and input supply for agriculture	
1972	Iringa resolution	Politicized agricultural extension
1973	NAPB transformed to NMC	
1973	Fertilizer plant commissioned in Tanga, but ends producing at high cost	Positive on production
1973	Global oil shock	Negative import capacity
1973 - 75	Drought	Reduced production
1975 - 1980	Third five year development plan	
1974 - 76	Villagization, more than 13 million rural people moved to <i>ujamaa</i> villages	Disrupted production institutions. Individual incentives for farmers discouraged
1974 - 82	Pan-territorial pricing	Subsidized marginal areas
1974 - 79	National maize project. Government introduces 100% initial subsidy on fertilizer and other inputs to stimulate production in high potential areas	Positive on production and yield

1976	Cooperatives abolished, marketing role taken by villages and government parastatals	Negative on marketing and eventually on production
1976	<i>Ujamaa</i> and Village Act established villages as production and administrative units	Village leaders used to impose government will on farmers
1976	Basic industries Strategy	Negative on agriculture
1976	Close private shops in villages	Negative on availability of consumer goods in rural areas
1976 - 1984	50% subsidy on fertilizer and other inputs for high potential areas	Positive on production and yield
1976 - 78	Beverage boom, windfall foreign exchange gains due to reduced production of coffee in Brazil	Positive on import capacity
1977	Import liberalization policy, advised by World Bank	Misguided as foreign exchange gain was temporary
1978 -79	War with Uganda	Diverted resources
1980	Ministry of Agriculture split into two	Negative for coordination
1980	Agricultural research split into two (TARO and TARILO)	Negative for coordination, costly and inefficient
1981 - 83	Structural Adjustment program	Not successful
1983 - 85	National Economic Survival Program (NESP)	Initiated economic recovery but did not go far enough
1983	First Agricultural Policy	Positive for planning
1982	Import of fertilizer deregulated	
1982	Pan-territorial pricing abolished	
1982	Regional pricing introduced	
1984	Explicit subsidy on agricultural inputs removed	
1984	Restriction on trade of food crops removed	
1984	Cooperatives reinstated but not given full powers	Not so positive for marketing
1985	Local government reintroduced, but weak and limited capacity	Positive for decentralization of powers
1986- 88	ERP I, addressed macro-economic issues; exchange rate was pegged	Positive on market incentives
1987	Restriction on free movement of food crops abolished	
1989	Regional pricing of food crops abolished	
1989 - 92	ERP II, to address social constraints arising from reform process	
1986 - 1990	Deregulation of local trade on food	
1988/89	Fertilizer de-confined, private traders allowed to distribute fertilizer	Negative on supply reliability and quality
1989	Ministry of Agriculture and Livestock reconstituted. TARO and TARILO restored under Ministry of Agriculture	
1989	Ministry of Agriculture reconstituted to one	Positive for coordination
1989	TARRO & TARILO restored to one	Positive for coordination
1990 - 94	Implicit subsidy on fertilizer due to overvalued exchange rate reduced from 70% - 0%	Negative on fertilizer prices and availability
1991	Zanzibar resolution	
1991	Cooperative Act	
1995	Land Policy	
1997	Agricultural & livestock policy, and Cooperative Development Policy	Positive for planning
1997	<i>El-nino</i> rains	Negative on production
1998	2% import duty on agricultural exports eliminated	Positive on exports
1999	Land Ac No. 4 of 1999	Does not go far enough to

	Land Act No 5 of 1999 Both became operational in 2001 but understanding and impact at small holder level limited thus far	attract large scale farmers Villagers awareness on ramifications very low
2001	Presidential directive allowing export of maize from Rukwa to neighboring countries	Positive for income of smallholder farmers in Rukwa
2001	Agricultural sector development strategy	Positive for planning
2002	Agricultural sector development program	Positive for planning

Table: Summary of Farming Systems in Tanzania (Mainland)

FARMING SYSTEM	REGION	DISTRICT	FEATURES	INTENSITY	PRODUCTION LIMITATION
<p>1. COFFEE – BANANA/HORTICULTURE</p> <p>The system is based on intercropped coffee and banana on permanent holdings as dominant activities, with some other subsistence crop: (maize, beans, potatoes, yams, etc) in separate plots. Two cropping seasons per year are possible.</p> <p>A few heads of dairy cattle are commonly kept and stall-fed.</p> <p>Fruits and vegetables are also interplanted</p> <p>Tea is grown by smallholder farmers and on plantations in the highlands</p>	<p>Arusha</p> <p>Tanga</p> <p>Kagera</p> <p>Kilimanjaro</p> <p>Mbeya</p> <p>Ruvuma</p>	<p>Arumeru</p> <p>Lushoto</p> <p>Bukoba Ngara Karagwe Muleba</p> <p>Moshi Rombo Hai Mwanga</p> <p>Rungwe Ileje</p> <p>Mbinga</p>	<p>Relatively small area of land is suitable for crop production in relation to population</p> <p>Modern crop technology</p> <p>Poor soils support pastoral (Arumeru) and other food crop activities</p> <p>Population density critical in some areas</p> <p>Complementarily between crop and livestock</p>	<p>Shade trees interplanted minimize soil degradation</p> <p>Use of mulch and compost manure builds up organic matter and soil erosion control is possible</p> <p>Soil degradation occurs where conservation measures are not adopted, e.g. the Usambara mountains</p>	<p>Highly intensive farming particularly in Kilimanjaro</p> <p>Pests and diseases:</p> <ul style="list-style-type: none"> • Coffee berry; • Banana weevil; • Nematodes and sigatoka disease <p>Scarcity of suitable crop land</p> <p>High production costs of coffee due to need for pesticides and fertilizers</p>

FARMING SYSTEM	REGION	DISTRICT	FEATURES	INTENSITY	PRODUCTION LIMITATION
<p>2. MAIZE/LEGUME</p> <p>This type of farming is mainly located in the more resource favored areas and is based on pure stands of maize grown extensively by smallholders with medium technology</p> <p>As the preferred staple it is also grown in less favored areas, despite the risk of uncertain production.</p> <p>Others food crops (cassava, beans, groundnut some cash crops (Coffee tobacco pyrethrum) are grown in separate plots</p>	<p>Arusha</p> <p>Kagera</p> <p>Kigoma Mbeya</p> <p>Rukwa</p> <p>Ruvuma Iringa</p> <p>Shinyanga Tanga</p> <p>Tabora</p> <p>Morogoro</p>	<p>Hanang Kiteto Mbulu</p> <p>Biharamulo Kibondo</p> <p>Kasulu Mbeya Mbozi Mpanda Sumbawanga Nkansi Songea</p> <p>Iringa Njombe Mufindi Mateke Ludewa Kahama Korogwe Handeni</p> <p>Tabora Urambo</p> <p>Kilosa Ulanga</p>	<p>Both climate and soils are favorable for maize production Hanang is also main wheat growing area</p> <p>Favorable prices and preferential allocation of inputs have encouraged surplus production</p> <p>The remote areas have been less favored with market facilities</p> <p>Fertilizer was also heavily subsidized</p>	<p>Deforestation is encouraged due to shifting cultivation</p> <p>Relative land abundance permits extensive farming to be practiced in most maize areas</p> <p>Short fallow periods are used but do not build up fertility effectively and periods appear to be shortening.</p>	<p>Marketing infrastructure is poor in many of the remote areas</p> <p>Factor and product marketing inefficiencies are widespread</p> <p>Input marketing inefficient (especially in remote) areas) resulting in late and inappropriate supply of materials</p> <p>Resource poor households unable to afford inputs</p> <p>Mechanization is not widespread and confined to land preparation.</p> <p>Larger grain Borer is still a problem</p>

FARMING SYSTEM	REGION	DISTRICT	FEATURES	INTENSITY	PRODUCTION LIMITATION
<p>3. PASTORALIST (a) <i>Pastoralists</i></p> <p>Semi-nomadic and sedentary cattle raising is the main activity in the system which is located in arid and semi arid zones.</p> <p>Arable cropping is very limited although grains are obtained from sales of milk or ghee.</p> <p>(b) <i>Agro-Pastoralists</i></p> <p>The system is characterized by a mixture of food crops especially sorghum and millets with cattle as a dominant group of livestock</p> <p>Arable cropping may be as high as 40% of labour time</p>	Arusha	Monduli Ngorongoro	Animals keep moving in search of water and fodder	Overgrazing may destroy the natural vegetation	Water is the main limiting factor for both crops and livestock
	Mara	Serengeti			Pastures are of poor quality with a short growing season due to low off-take for cattle.
	Singida	Iramba	Crop production insufficient to meet the needs of the population due to unfavourable climate and game reserve restrictions	Bush fires reduce fodder reserves and may impoverish plant growth and soil conditions	Tse tse fly and ticks infestation limits expansion of livestock
				Fodder basis is open bush, untended pastures and fallow	Fodder cropping is non-existent
	Dodoma	Kondoa Dodoma Mpwapwa	Shifting cultivation is largely practiced		Calf-mortality rate is very high due to poor veterinary facilities.
	Singida	Singida Manyoni	Oxen use for cultivation is widespread	Slash and burn agriculture destroys environment	
	Mbeya	Chunya	Grazing residue, fallow grazing and natural grazing provide fodder	Carrying capacity of land is limited and competition for farming and grazing is intense	Uncertain rainfall limits the crop response to inputs in absence of irrigation
	Tabora	Igunga			

FARMING SYSTEM	REGION	DISTRICT	FEATURES	INTENSITY	PRODUCTION LIMITATION
<p>4. LIVESTOCK, COTTON SORGHUM, MILLET</p> <p>Livestock production is complementary to crop production.</p> <p>Fodder crops include sorghum and millets</p> <p>Cotton is the major cash crop in this system, sometimes competing with upland rice</p>	Shinyanga	Maswa Shinyanga Bariadi Meatu	Uncertain/low rainfall and low technology levels restrict crop production	causing soil erosion. Continuous risk of overgrazing leading to soil erosion	<p>Cotton pests and diseases are serious in the zone</p> <p>Livestock are kept for social value and full productive potential is not realized</p>
	Mwanza	Kwimba Geita Magu	Animal population depends on grazing land Production density is relatively low Ridges are used for both cash and food crops	Ridging helps both soil and water conservation	
	Tabora	Nzega	Ox-cultivation is widespread.	Use of manure helps to maintain soil nutrient levels.	
<p>5. PADDY RICE, SUGAR CANE</p> <p>Paddy production is the dominant activity often combined with sugar-cane</p> <p>Traditional, lowland rice is grown by smallholders while irrigated paddy is mainly large scale, and mechanized.</p>	Morogoro	Kilombero	Rainfall and basic resources are suited to paddy production	Absence of control over water flows in the plains may create health hazards	In lowland areas, lack of capital is limiting factor
	Mbeya	Kyela Usangu plains	Paddy culture has been favored by relatively high prices		Poor farming technology – lack of improved seed manual cultivation low inputs, limited production
	Coast	Rufiji	Smallholder technology is generally low.		Salinity may restrict water/land use in plains

FARMING SYSTEM	REGION	DISTRICT	FEATURES	INTENSITY	PRODUCTION LIMITATION
6. CASSAVA, CASHEW COCONUT					
Cassava is a drought tolerant crop grown in districts where the soils are less suited to maize.	Tanga	Tanga Pangani Muheza	Poor resource base is the main reason for limited productive performance	In the absence of alternative production systems fertility is likely to decline because the system consists of perennial or biennial crops which remain on same plots over a long period without additional nutrients	Cassava pests – mealy bugs and mites are a problem. Cassava mosaic virus is a major disease. Low prices and powdery mildew led to dramatic decline of cashew. Sulphur dusting technology is now available by high labour Requirement limits rehabilitation Poor infrastructure limited supply of inputs and marketing of cash crops
It is grown for consumption and sale. Other food crops are secondary and grown in separate plots.	Coast	Bagamoyo Kibaha Kisarawe Mafia	Surpluses are generated seasonally in favoured areas mainly by maize.		
Cashew and coconut are the dominant cash crops and re usually intercropped with cassava.	Lindi	Kilwa Lindi Liwale Nachingwea	Technology is generally low		
Livestock is limited to small numbers of poultry and goats.	Mtwara	Masasi Mtwara Newala	Extension and support services are very poor in most areas.		
In lakeshore and coastal areas, fish is the main source of protein	Ruvuma	Tunduru			
	Mwanza	Sengerema Mwanza Ukerewe			
	Mara	Bunda Musoma Tarime			
	Kigoma	Kigoma			

Source: Food Studies Group (1992)

Annex 4:

Map of Tanzania: Land Resource Zones

