

Tanzania's Agriculture Development Towards the 21st Century

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Abstract

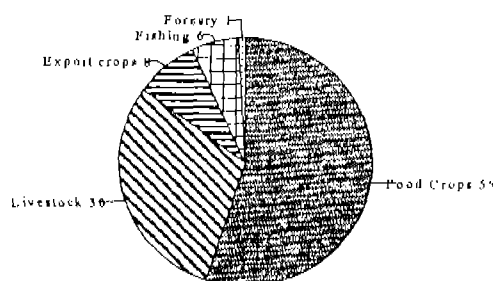
Agriculture has always been the backbone of the economy in Tanzania, accounting for about 57% of the Gross Domestic Product (GDP), over 80% of employment and contributing to more than 70% of export earnings. The importance of the agricultural sector is envisaged to continue into the present (21st) century. This paper examines the performance of the agricultural sector as Tanzania approaches the 21st century in terms of output and productivity trends as they relate to level of use for various inputs. The data presented indicate that agricultural growth lagged below GDP by as much as 65% in the period of 1976-1980. Despite growth in export volume in recent years, there has been a widening of the national current account deficit from 8.8% of the GDP between 1981-85 to over 20% during the period 1986-94. Meanwhile, the food security situation remains unreliable and incidences of severe malnutrition for children can reach 9% in some places. Much of the agricultural potential in Tanzania remains untapped due to technological, financial and institutional constraints. It is argued that if agriculture is expected to contribute to the development of this country, the government must pay attention to the prime movers of the sector, which include technology, institutions, human resources and an enabling environment.

1. Introduction

1.2 Agriculture and the National Economy

The importance of the agricultural sector in Tanzania's economy can be assessed through its contribution to the various facets of the country's economic indicators. According to the World Development Report (World, 1996), the sector employs some 84% of the economically active population producing 57% of the Gross Domestic Product (GDP). The World Bank Country Study (1994) observed that Tanzania's 3.5 million farm families work small holdings, with the area cultivated averaging 0.9 hectares and some 93% of all farmers cultivating less than 2.0 hectares. In 1994 average GNP per capita was estimated at US 140 with an estimated annual growth of 0.8 making Tanzania the 4th least developed country in the world (World Development Report, 1996). The World Bank Country Study observed further that food crop production dominates the agricultural economy contributing some 55% of the Agricultural GDP (AgGDP), with the livestock sub-sector accounting for another 30%, while traditional cash crops account for 8%, fishing and hunting 6%, and forestry, 1% (Figure 1).

Figure 1: percent Share of Agriculture GDP 1989-1991



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1.3 Agricultural Production

Table 1 show indices of agricultural production for selected preferred and drought staples, as well as industrial crops for the period 1965 – 1992 taking the year 1980 as the base. The production trend for the main food crops has been rising, but at low levels during much of the post Arusha declaration period until 1981 when the first National Economic Survival Programme was launched. The production of industrial crops rose until 1974 before the compulsory villagization scheme. From then onwards there was a downward trend, which picked up again in 1992 following the IMF supported Structural Adjustment Programs (SAP).

Table 1: Tanzania Main Indices of Agricultural Production for Selected Main Food and Industrial Crops 1965-1992 (1980 = 100)

Year	Industrial Crops ^a	Preferred Staples ^b	Drought Staples ^c	Total Food Production ^d
1965	95.7	34.98	19.3	27.2
1966	117.6	39.5	36.5	32.9
1967	121.0	43.7	39.2	41.2
1968	81.0	32.6	43.2	37.9
1969	126.7	38.4	45.6	42.0
1970	145.7	31.4	52.6	42.1
1971	146.7	45.0	52.8	42.1
1971	116.7	45.0	52.0	48.5
1972	148.9	41.2	55.6	48.4
1973	156.8	60.6	45.8	53.3
1974	307.9	50.8	68.5	59.6
1975	149.2	81.4	70.7	76.1
1976	113.2	88.0	75.3	82.0
1977	174.6	97.0	100.1	98.6
1978	113.2	90.6	96.9	93.7
1979	102.2	97.5	107.6	102.5
1980	100.0	100.0	100.0	100.0
1981	116.4	101.2	111.7	106.4
1982	95.7	89.3	123.9	111.0
1983	86.1	97.9	132.3	115.0
1984	90.9	112.6	127.2	119.8
1985	82.3	124.7	147.4	135.5
1986	71.1	134.5	127.0	130.7
1987	85.9	116.1	127.6	136.9
1988	97.1	143.5	116.7	130.2
1989	86.6	187.4	131.8	159.7
1990	72.1	156.4	110.0	132.7
1991	90.4	144.4	108.7	126.7
1992	104.2	121.7	126.1	123.9
1993	111.5	131.2	130.7	131.0
1994	108.8	119.4	120.5	119.9
1995	104.8	143.1	127.4	133.8
1996	132.8	140.3	130.9	132.7
1997	127.8	144.4	104.7	136.6
1998	151.6	168.4	103.1	131.5

^a Selected Industrial crops include coffee, cotton, tea, tobacco, pyrethrum, cashewnuts.

^b Selected preferred staples include maize, rice and wheat

^c Selected Drought staples include cassava, sorghum and millet

^d Selected Total food production includes preferred staples and drought staples

Source: Constructed from Kaduma (1994) Table 5.1; Bureau of Statistics (1995) Selected Statistical Series: 1951 – 1992. Table 8.1; Bank of Tanzania (1999) Table 1.13; and Ministry of Agriculture (1998) Various Tables

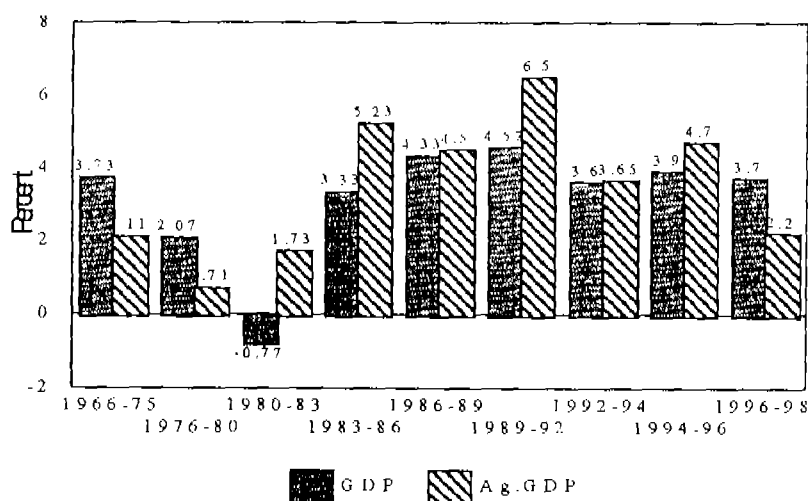
While precise estimates of real growth of the agricultural sector are difficult to obtain, evidence of improved performance of the sector after the mid 1980s is extensive, and it confirms official findings which puts real growth in the range of about 5% during the post socialist policy period (1986-1994), compared to about 2% during the socialist era between 1966 and 1985 (World Bank, 1996).

1.4 General Agricultural Performance

According to the World Bank (1994), real growth in agricultural (AgGDP) paralleled total GDP growth from 1966 through 1992 with agriculture averaging 2.8% and GDP growing at 2.7% per annum. However, when analyzed yearly or within short periods, there emerges marked divergences between the two indicators as shown Figure 2. In general, growth in agriculture lagged behind GDP during the initial period of the socialist economy. Agricultural growth was 45% lower than the GDP rate in 1966-1975, and 65% lower in 1976-80. Agriculture began to recover in the early 1980s, but GDP growth was still negative. From the 1983/84 period, agricultural growth increased relatively faster enhancing the overall growth of GDP and hence per capita income.

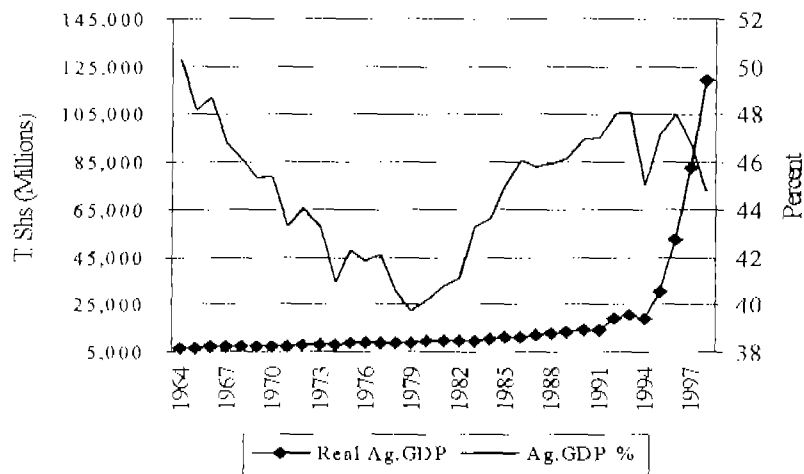
Figure 3 shows agriculture's share of the economy and its GDP at 1976 prices. From 1964 to 1982 the agricultural share of the GDP declined from 50% to 40% being lowest in 1979 at 38.83%. With the onset of the agricultural-led reform programme in the mid-80s the sector's share started to pick up from 42% in 1983 to 48.6% in 1994 and 49.1% in 1998 at 1992 prices. Continued growth of the sector's contribution very much depends on how the Government assumes its role in the market-led economy. However, given the current situation, growth in agriculture is the most effective means of generating foreign exchange, alleviating poverty and achieving food security.

Figure 2: Percent Annual Growth rate of GDP and Ag.GDP At 1976 and 1992 Prices



GDP = Gross Domestic Product; Ag.GDP = Agricultural Domestic Product
 Source: World Bank (1996) Vol II Table 2.2a (at 1976 Prices from 1966 - 1994) Bank of Tanzania (1999) Table 1.5 (at 1992 Prices from 1994 - 1998)NB. All values not adjusted to 1976 prices due to major revision of figures after 1992

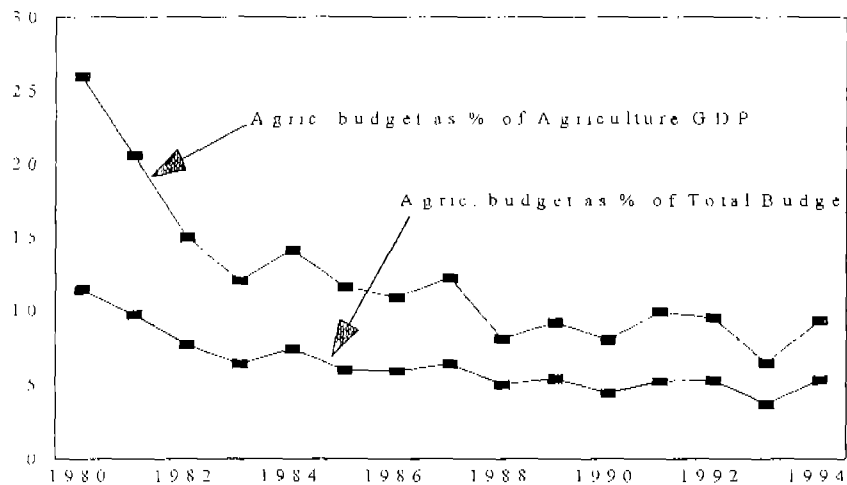
Figure 3: Share of Agriculture in GDP(%) and Agriculture GDP as 1976 Prices



1.5 Balance of Payments versus Agricultural Performance

Available statistics shows that there is no consistent relationship between agric performance and balance of payments. For example in the period 1980-1983, agricultural contri to GDP was increasing while the balance of payments deficit was decreasing. However, in the 1990-1994, both agricultural contribution and the balance of payments deficit increased except i when balance of payments was half of the previous year. This confirms further the aid depende

Figure 4: Total Government Spending on Agriculture and Natural Resources At 1976 Prices



Source: World Bank, 1994

the economy as a whole. Variations in the contributions of the agricultural sector to GDP is partly a reflection of unsystematic funding of the sector and unclear agricultural policy.

In general, the country's external financing situation is weak. Even though export volume has grown faster than imports, the current account deficit (without grants) in proportion to GDP has widened from minus 8.8% of GDP in financial year 1981-1985 to over 20% during the period 1991-1994, with some improvement in 1994 as export prices rose (World Bank, 1996). This improvement continued until 1997 when the current account before official transfers was about minus 11.8% of the GDP. However, in 1998, this figure had risen to minus 17.2% of the GDP (Bank of Tanzania, 1999). The major factors underlying the deterioration of the current accounts are (1) a sharp rise in interest payments on external debt and (2) a rise in import prices leading to deterioration in terms of trade.

1.6 Agriculture and Food Security

Food security is defined as access to food by all people at all times to ensure a healthy life. Availability of food is a necessary, but not a sufficient condition for a healthy life. Availability and access to food are both essential determinants of food security, achieving the first does not ensure the second. Food may be available, but a household, for various reasons, may not have access to it.

While agricultural development is essential for increasing food production, it also has an important role to play in reducing poverty and creating effective demand (the capacity of people to purchase or produce food). Tanzania produces enough food to feed most of its population during most years. However, about 37% of its population are undernourished, basically because they have inadequate access to food, essentially too poor or otherwise disadvantaged to exert effective demand in the market. Experiences in those countries that have made or are continuing to make good progress on food security show that governments are key players in achieving national food security and that economic policies are very important factor in this respect.

The main source of calories for Tanzanians is maize, which provides 62% of total calories. Rice, the other preferred staple, contributes 8% to the calories. The rest of caloric intake comes from cassava (13%), sorghum (8%) roots and bananas (FAO, 1992). According to the World Bank (1994), average caloric intake per capita in Tanzania is estimated at 2,206 Kcal/capita in 1989, being above the 1831 calories estimated in 1965. However, a URT and FAO study (1992) indicates that the availability of food varies by farming systems and regions. Food intake in the sorghum/millet system drops to 1500 Kcal per capita (Table 2), as indicated by high incidences of malnutrition among children (URT & UNICEF 1990; Bureau of Statistics et al., 1997)).

Table 2: Tanzania Food Consumption per Capita per Day; by Farming System

Farming System	Zone	Energy in Kcal/Capita/day	Protein in Grams/Capita/Day
Maize	Southern Coast	2141	52
Maize, Coffee, Cattle	Southern Highlands	2510	76
Cotton, Rice, Sorghum	Central Semi-arid	1547	52
Agro-pastoralist	Agro-pastoral, semi-arid	2168	80
Coffee, Banana, dairy	Northern Highlands	1606	41

Source: World Bank (1994), Table 2.2.1

2. Agricultural Potential in Tanzania

2.1 Land base and land use

Mainland Tanzania covers some 942,800 square kilometers while Zanzibar and Pemba make up another 2000 square kilometers. A description of the country's land base according to the existing agro-ecological zones helps to give a rough idea on the agricultural potential. These classifications are useful for determining production and for assessing the potential for crop cultivation. The World Bank 1994 report (Tables 2.1 and 2.2), show the physiographic regions of Tanzania and the agro-ecological zones as they relate to farming systems. The regions identified as the Highlands (Zone V and VI) and the plateaux (Zone IV) have good soils, reliable rainfall. They are of high agricultural potential. The alluvial soil (Zone VII), also offers good potential for cultivation, being more appropriate for large-scale, mechanized farming. The Coast and Semi-Arid Lands (Zones I and III) are only moderately suitable for annual cropping and intensive agriculture, and are used for more drought resistant crops such as a cassava, sorghum and sisal. The Arid Lands (Zone II) are of low potential for sustained cropping, and are best used for low-intensity extensive livestock grazing (Mlambiti, 1992; World Bank, 1994).

About 22 million ha (23%) of the land surface of Tanzania has been allocated to wildlife/forestry reserves. The area actually cropped in any given season, is about 3%. This amounted to about 3.4 million ha in 1988/89. Another 6.5 million ha, outside of the reserves, is considered arable and suitable for cereals such as maize and rice, bringing the total area of good agricultural potential up to about 10 million ha. Much of this land is already used as fallow or pasture. Within the various reserves, there is an additional 3 to 4 million ha, which while not available, has been assessed as suitable for cereal cultivation.

It is estimated that between 3.4 and 4.5 million ha are cultivated every year. Allowing for inter-cropping and sequential planting in the bimodal rainfall areas, the gross area planted annually is in the order of 5.1 million ha. Of this, about 85% are under food crops, with cereals occupying 58% of total planted area (World Bank, 1994). It is important to note that only 70% of high potential land is cultivated or under fallow. The rest is under pasture, forest and other uses.

Table 3 shows land under farms from the 1987/88 and 1993/94 agricultural sample survey. From the table it can be seen that more than 90% of the cropped land in a given year is cultivated by small holders. The small holders account for 92% of the area under temporary/annual crops (mainly food crops). They are also responsible for about three-quarters of the land under permanent crops (mainly coffee, bananas, cashews and coconuts). Sisal is the exception, it is all grown on large farms mostly in semi-arid areas.

Table 3: Tanzania Land Under Farms: 1987/88 Agricultural Sample Survey

Description	Land Under Smallholder		Land Under Large Farms		Land Under All Farms	
	Area (,000 ha)	%	Area (,000 ha)	%	Area (,000 ha)	%
Temporary crops	2,515	55	218	16	2,733	46
Permanent crops	140	7	102	8	442	7
Mixed temp. & Perm crops	227	5			227	4
Sub-total cropped area	3,082	67	320	24	3,402	57
Fallow (up to 5 years)	552	12	159	12	711	12
Pastures	120	3	399	30	519	9
Forest	450	18	147	11	597	10
Other	387	8	298	23	685	12
TOTAL	4,591	100	1,323	100	5,914	100

Source: World Bank, (1994), Table 2.4

Table 4: Proportion (%) of Households Using Selected Agricultural Practices

Type of Practice	Type of Practice	
	1987/88 (%)	1993/94 (%)
Farm Yard Manure	24	37
Improved Seed	27	34
Chemical Fertilizers	14	19
Pesticides	12	18
Tractors	5	7
Ploughs	8	-
Extension Services	10	22
Shifting cultivation	-	8

Source: Ministry of Agriculture and Bureau of Statistics: Agricultural Sample Survey, 1988/89 and 1993/94

According to the 1993/94 Agricultural Sample Survey, for small holder farmers as a group, about 50% of their cropped land is under temporary crops while just about 11% is under permanent or mixed crops. The rest is under fallow, pasture or forest or other use. With 79% and 68% of their land under cultivation or fallow during 1987/88 and 1993/94 respectively, small holders make more intensive use of their land than the large-scale farmers who cultivated or had under fallow only 36% of their land.

In Tanzania, only about 4.4% of cultivated land is irrigated (Isinika, 1995). Nation-wide, about 150,000 ha. are under irrigation by smallholder farmers, of which about one-third is located in Arusha/Kilimanjaro area. Another 25,000 ha. are in large centrally managed government schemes, half of them are state farms run by NAFCO or SUDECO. The majority of irrigated lands are small-scale projects, rice and sugar cane are predominant crops. In addition, there are a few farms in the Moshi/Arusha area producing irrigated flowers and vegetables for the export market. The area, which is potentially irrigable in Tanzania is large, estimated to be more than 850,000 ha. (World Bank, 1994). This potential should be exploited through deliberate government policies in order to ensure food security and to alleviate poverty.

3. Use of Agricultural Technology and Services

As quoted by the World Bank. (1996), Van den Brink assessed the rate of technical change in peasant agriculture by comparing the results of the agricultural census of 1971/72, and the agricultural survey of 1986/87. The results show that fertilizer use had doubled over the 15 years from 7% to 14% of all farmers using fertilizer. The largest increase occurred among farmers with 2 to 4 ha. However, fertilizer use declined quite dramatically for farmers with 0 to 0.5 ha. While the evidence of adoption and use of potentially profitable new technologies, especially by the smallest farmers, is encouraging, levels of fertilizer use at 21 kg/ha are low compared to other countries (Isinika, 1995).

The adoption of all agricultural technologies was hampered by several factors including low import capacity, which led to high dependence on grants and credit imported inputs resulting in high annual fluctuations in supply. Poor transport and communication infrastructure further hampered input distribution and marketing of farm products (Mahundaza, 1992). Details for each of the sectors are discussed below.

3.1 Government Funding

Government funding for key public agricultural service, particularly agricultural research and extension peaked in real terms in 1975 and from then onwards it has taken a declining trend reaching lowest levels in 1986 (Isinika, 1995). The Public Expenditure Review of 1988 found that "real pay in cash terms in the public sector declined to one fifth the level of the early 1970s (World Bank, 1987). Total Government expenditure as a share of GDP follows a U-curve through the 1980s, going from some 32.7% in 1980/81 to about 23.1% in 1986/87. Thereafter, it starts to increase, reaching 26.4% in 1991/92.

Several analyses show that the Government has to spend more, in absolute terms, on agriculture-related activities since the whole economy is heavily dependent on this sector. To support this important sector, the government should intervene by developing the infrastructure, generating and disseminating technologies, supervising and monitoring regulations to ensure appropriate use of natural resources, and in providing incentives for investment and growth. In general, government policies and programmes should be designed to address most aspects of market as well as issues related to government failure.

A study of 40 developing countries, between 1984 - 1988, showed that the average share of the central Government budget allocated to agriculture between 1984 and 1988 was 7.2%. For Tanzania, over the same period, it was 6.2%. The same study showed that central government expenditure on agriculture was 11.6% of agricultural GDP for those 40 countries while that for Tanzania was 2.7%. This shows that in Tanzania, resource allocation to the agricultural sector is inadequate, especially in the light of the importance of the sector in the economy. In the 40 developing countries under review, agriculture represented only 23.6% of total GDP whereas in Tanzania it represents about 50% at constant 1992 prices (Bank of Tanzania, 1999). Obviously the need for higher Government spending on agriculture is not only appropriate but also necessary.

3.2 Agricultural Research

Since independence, agricultural research has undergone various policy and organizational changes. Although the number of research stations increased and the number of programme expanded to include more food crops, the productivity of agricultural research measured by the number of technologies released to farmers continued to decline (Isinika, 1995). Consequently, in 1989, the agricultural research establishment was reorganized into its present structure, where agricultural research (crop and livestock) is coordinated through the Ministry of Agriculture, under the Department of Research and Training. Currently, the agricultural research system in Tanzania includes more than 50 research institutes, stations and substations, staffed by 350 graduate level researchers, 550 diploma level technicians, and 760 certificate level assistants. The network is divided into seven zones, based on agro-ecological criteria. Each zone has a lead station and substations. Some institutes have a national mandate, such as Mlingano (soils), Temeke (animal diseases) and Tanga (tsetse).

Restructuring was done under the National Agricultural Research Rehabilitation Project, which was funded by a number of donors led by the World Bank. The project is currently in its second phase with emphasis on strengthening research programmes. Given the long-term nature of the impact for most research investments, it may be too early to make meaningful ex-post evaluation. However based on observing farming practice by farmers in the country, such impacts are yet to be felt on a significant scale at the farmers' level. As a matter of strategy, the focus of agricultural research should be adaptive to take advantage of spillover effects, particularly from inter-national research centers in order to accelerate the rate of improving the agricultural sector.

3.3 Agricultural Extension

Extension service is one of the important public services, which has been offered by the Ministry of Agriculture. This sector absorbed some 42% of the MOA budget in 1992 and 1993 and up from 30% in 1991 (World Bank, 1994). In 1972, agricultural extension services were decentralized to Regional and district government, leaving the Ministry with policy making and regulatory roles. In 1983, the extension function was re-centralized within the Ministry of Agriculture to facilitate more central coordination.

Since 1988, agricultural extension services have also undergone rehabilitation in terms of improving working facilities, (particularly transportation), organization and methodology. Funds were provided from two main sources, the World Bank for 16 regions and the International Fund for Agriculture and Development (IFAD) for the remaining 4 regions (Southern highlands) of mainland Tanzania. The Training and Visit (T&V) extension methodology was adopted to facilitate management of the unified extension system. As the T&V methodology has been applied, it has undergone various modifications to improve its effectiveness. For example, village extension workers are now required to work with contact groups instead of selected contact farmers. However, effectiveness of the general extension service is said to have diminished due to the inability of the more specialized departments to respond to requests for technical advice in specialized areas such as irrigation, veterinary services, mechanized agriculture and plant protection because of inadequate funding and rigid bureaucratic procedures.

In 1999 another process of decentralizing the extension services was completed. Currently, most agricultural extension personnel have been posted to districts, wards and villages, where they fall directly under District Councils. This change is expected to bring agricultural extension services closer to the people. At this point, it is too early to comment on the effectiveness of the move, but it will largely depend on how District Councils utilize this human resource at their disposal.

3.4 Farmer Cooperatives

The Cooperative movement in Tanzania has undergone four distinctive phases characterized by ownership and main functions. Phase one began from 1932, when the cooperative legislation was introduced up to 1967, when the Arusha Declaration was proclaimed. During this phase, Cooperatives were owned and controlled by the members on democratic principles. After 1967, Cooperatives were perceived as vehicles for furtherance of socialistic policies. The political interference in the affairs of the cooperative movement reached its climax in 1976, when Cooperative Unions and Agricultural Marketing Societies were dissolved and replaced by parastatal crop authorities to handle all agriculture-related functions. The legal framework was provided by the 1975 Village Act which considered the villages to be multipurpose cooperative societies, with major emphasis laid on collective production.

The restructuring of cooperatives in 1976, which formed phase two of the movement, had a disastrous impact on their functioning. By 1980 problems related to the new set up had become so alarming that the Government decided to re-establish the cooperative movement it had dissolved only four years earlier. A new Cooperative Act was enacted in 1982. This formed phase three of the movement that lasted till 1991. The 1982 Cooperative Act retained some of the features of the Village Act, including the principle of automatic membership. The ruling party became politically involved in the re-establishment of the cooperative movement practically in all aspects that affect proper functioning of cooperatives (World Bank, 1994).

This policy also led to cooperatives failure. Primary societies and Unions were hastily formed, without regard for economic viability or managerial capacity, while crop marketing and processing system lapsed into disrepair as large debts were accumulated with the banking system. This chaos, coupled with external pressure from financial supporters, led to the establishment of the 1991

Cooperative Act, which provides for the formation of independent, member-controlled, cooperative movement based on international cooperative principles. This forms phase four and the process of restructuring the movement is continuing but at a slow pace. While cooperatives have great potential of contributing to agricultural development in future, many potential members are hesitant to join due to fresh memories of poor past performance of cooperatives.

3.5 Supply of Agricultural Inputs

Several surveys on farming systems in Tanzania have observed that poor supply of inputs to farmers is the most limiting factor to agriculture productivity (Mlambiti, 1985, 1992 and ADIS, 1992). These studies concluded that improving supplies of inputs to farmers in areas of high or moderate natural potential is the single most important measure that can be taken in the short term to stimulate agricultural production in the country. However, input supply and price were jointly identified as the most important bottleneck to increased output. Data from the 1986/87 and 1993/94 Agricultural Sample Survey of Tanzania indicate the share of all households owning and operating farms using various agricultural inputs as shown in Table 4.

3.6 Chemical Fertilizer and Agro-Chemicals

Fertilizer use varies by income levels as well as by size of holding (World Bank, 1994). Forty percent of farmers above the poverty line used fertilizer, against 30% of those below the poverty line while the higher adoption rates occurred among larger farmers. However, the distribution of all farmers who use fertilizer is heavily weighted towards the smaller holdings. Of all farmers who reported using fertilizer, 74% had farms of up to 2 ha. General growth in fertilizer use has been somewhat erratic, but between 1974 and 1991, fertilizer use has increased at an annual rate of 3.4% per year (World Bank, 1994).

On a regional basis, between 1973 and 1975, the Southern region consumed 33% of national consumption, while the rest had Central 25%, Lake 17%, Northern 13%, and Coastal 12%. Meanwhile, between 1989-91, the rates were 68%, 16%, 3%, 9%, and 4% respectively. In the Southern Highlands most of the fertilizer is used on maize and on average, fertilizer consumption on maize has remained between 60% - 70% of the national consumption to the present. Until 1976 fertilizer prices were subsidized to varying degrees and from 1976 to 1984, subsidy policy reduced farm gate price by 50% (World Bank, 1994). In 1989, due to increasing pressure on the budget, Government decided to phase out the subsidy, which was 70% in 1990/91 and then reducing to 55%, 40%, 25% and finally to zero percent from 1994/95 onward. At the same time the price to farmers rose by about 85% on average in 1991/92 and by a range of 32-91% in 1992/93, depending on fertilizer type.

Following market liberalization, the supply of farm inputs, including fertilizer has become less reliable at the farm level. Following the disintegration breakdown of the Tanzania Fertilizer Company (TFC) plant in Tanga, almost all the fertilizer is imported by traders. Their likely sources of finance are own resources, supplier credit, or overdraft from local financial institutions. The importers may use stockist and/or distribute it themselves directly to the farmers. According to Bank of Tanzania records, the value of fertilizer imported between 1990 and 1998 has ranged from zero US dollars in 1994 and 1995 to 3.81 US dollars in 1997. The volume of supply being erratic from year to year.

Under the liberalized system many farmers cannot afford fertilizer and other farm inputs. Recent studies have shown that removal of fertilizer subsidies have reduced fertilizer use with negative environmental effects (Mnkeni, 1994; Kaihura et al, 1996; Solberg, et al, 1994). A computable general equilibrium simulation model further predicted that removal of fertilizer subsidies reduced GDP by about 0.3% (Aune, 1996) as farmers reduced fertilizer use by as much as 70% (Aune, et al, 1996). Consequently, some people have argued that some form of input subsidy may be necessary to arrest declining productivity and food security trends, particularly among farmers. Nevertheless such action should be prudently employed to minimize market distortions. For instance, instead of direct subsidies

on input. Government support should be directed at setting target prices for selected crops. Such a policy would ensure that resources are not targeted at inefficient producers nor directed to less profitable crops. The other alternative is setting up viable credit options.

Coffee and cotton use most of the agro-chemical in Tanzania, mainly fungicides, insecticides and herbicides. They accounted for about 50% of procurement in 1987/88, down from 83% in 1984/85. As the case with fertilizer, its market has been liberalized and imports by the private sector have increased supply relative to that by marketing boards. Until the mid-1980s, the size of the total agro-chemicals market has been around US \$ 30 million annually. All agro-chemicals are imported for direct use or reformulation. The annual capacity for reformulation of 6.3 million liters of liquid and 7,800 tons of powder agro-chemicals, far exceeds current consumption. This capacity has increased further with the completion of the Moshi plant of Tanzania Pesticides Ltd. Nonetheless, by World standards, the level of agro-chemicals use in Tanzania remain very low since most farmers cannot afford to buy the necessary chemicals. While this may have desirable environmental implications, the negative consequences, particularly in post-harvest losses and farm income far outweigh the benefits.

3.7 Certified Seed

The market of certified seeds represent only 2% of seeds planted in the country due to limited supply and high marketing costs, particularly in remote areas. Before liberalization the market for certified seeds was shared by TANSEED, a parastatal and Cargill, a private company. The two companies produced 1400 and 800 tons of maize seed respectively in 1992/93. However, the demand for certified seeds is high. Meanwhile, the quantity and quality of seeds produced at Foundation Seed Farms has been declining due to several factors including close linkage between foundation seed farmers and TANSEED, whose business performance has been poor. Most problems of the seed industry in Tanzania have been attributed to prices being set well below production costs, the inflexibility of Government management and control, the paucity of funds, deteriorated assets, and lack of professional and commercial attitude. A programme to restructure the certified seed market is being implemented (World Bank, 1994).

3.8 Veterinary Drugs, Vaccines, Chemicals and Equipment

About 90% of drugs, vaccines and acaricide have been procured by Government under commercial tender, with additional supplies received sporadically through donor grants. In the mid-1980s, annual purchases were US \$6-8 million, excluding substantial donations. In recent years, value of annual purchases fell to US \$2-3 million excluding declining donations. In the past three years, imports by the private sector increased from around 10% of total procurement in 1990, to 40% in 1992 (World Bank, 1994).

3.9 Agricultural Equipment and Machinery

About 70% of Tanzania's crop area is cultivated by hand hoe, 20% by ox plough and 10% by tractor (World Bank, 1994). Oxen are used by over 70% of the farmers in parts of Southern Highlands and Sukuma land (Mwanza and Shinyanga Regions). Two thirds of farmers in Kilimanjaro Region use tractors while in some agro-pastoralist system such as in Dodoma rural District, almost all cultivation is by hand as is the case also in the cassava-cashew-coconut systems of the south-east. Thus the hand hoe and the ox-plough are more important implements as tools for tillage than the tractor. However, data on annual sales of inputs in Table 4 show that quantities distributed have been declining. Isinika (1995) also indicated declining numbers of tractors per unit of labour as well as per unit of land. While this could indicate a problem of data gathering, several studies have concluded that supply of farm tools is a serious problem (World Bank, 1994).

3.10 Rural Financing

Rural financing is an important factor in agricultural production particularly when farm incomes are low and uncertain. In Tanzania, short-term financing for crop purchases and input distribution form the bulk of the formal sector lending to agriculture, accounting for over 80% of total bank lending to the sector. Most of the credit was extended to cooperative unions and marketing boards for crop and input financing. Lending for crop buying has been about Tsh 27 billion in recent years, while input borrowing has been in the range of Tsh 3-5 billion (World Bank, 1994). However, this is matched up with the increase in miscellaneous trade finance, which goes largely to the private sector substituting for the decline in crop finance through government owned enterprises.

Table 5: Tanzania Mainland: Quantities of Farm Implements Sold per Year, 1975-1990 (in thousands)

Year	Hoes	Ploughs	Machetes	Axes	Other	Total
Avg 1975-80	1818	9	597	75	93	2592
Avg 1981-85	2003	27	448	83	238	2799
1986	1632	25	381	60	240	2338
1987	1853	22	40	140	224	2279
1988	1052	5	582	55	204	1898
1989	1323	14	366	161	135	1999
1990	682	15	267	171	57	1192
Avg 1986-90	1308	16	3112	117	172	1941

Source: World Bank. (1994)

Studies on rural financing in Tanzania, (, 1994, ADIS, 1992, Mlambiti et al, 1990) show that the use of formal credit is rare at the peasant farm level. In fact, surveys observed that on average, less than one percent of the total formal credit goes to peasant farmers. Malkamaki, (1992, as quoted by World Bank, 1994) observed that some 65% of a farmers' funds come from own savings, relatives and friends provide 18%, the formal system 12%, and money lender provide about 5%. Lack of awareness and fear of being in debt were identified as some of the factors limiting effective use of formal credit among small holder farmers. In addition, lack of previous experience in using formal credit, inadequate availability of extension services, gender of the credit recipient, and limited of use of improved implements and machinery in farming were also identified as factor that limit use of credit (Kashuliza and Kydd, 1996).

3.11 Rural Infrastructure

Good road systems enhance agricultural productivity by reducing marketing cost, expanding the market and ensuring timely availability of inputs. An efficient road system helps to improve small holder's access to the market economy with an effect of reducing the price of consumer goods and agricultural inputs while increasing farm-gate prices. All these have overall effect on increasing farm family income, and farmer's responsiveness to market conditions. In other words, the distance from a household to the nearest road is a measure of physical integration in the national agricultural commodity markets. The further the household lies from a road, the less likely it is to participate in important markets.

Tanzania has a road network of 88,000 Km of which about 10,300 are trunk roads, 17,730 are regional and 32,000 are district roads. The remainder, are unclassified. During the 1970s and 1980s there was very little road maintenance work causing significant road surface quality deteriorate (only about 15% of trunk and 10% of the rural roads were in good condition). The situation of roads began to improve following the introduction of the Integrated Roads Programme in 1990. In two and a half years the proportion of trunk roads in good condition had more than doubled to over 30% while that of rural roads was raised to 15%, an increase of 50%. However much remains to be done.

4. Main Constraints to Agricultural Development

Given the above account, the main constraints to agricultural development in Tanzania may be listed as the lack of effective agricultural policies, poor marketing systems, poor rural infrastructure, poor rural financing systems and poorly organized and under funded research and extension services. Other factors include an environment that is not conducive to technology innovation and adoption, inadequate institutional support and an unattractive political and policy environment for investors. Among potential investors, memories of the Arusha declaration, which has yet to be formerly abolished lingers on. In addition, the Investment Promotion Centre, vested with the mandate to implement the National Investment Promotion Act of 1990 has been criticized for poor supervision.

Yet another set of problems relate to poor environmental management for sustainable agriculture. In Tanzania, land is of very important economic, environmental and social concern, particularly in those regions where population and animal growth rates are very high. Increased human and animal populations result in increased agricultural activities and also associated with higher consumption, which lead to soil erosion, deforestation, and soil and water contamination. According to the World Bank (1996), in Tanzania net deforestation is about 50% which is caused by fuel extraction (55.4%), agricultural cultivation (38.6%), tobacco curing (3.8%), and commercial logging (1.8%).

Soil, water, and air pollution is also caused by agricultural chemicals, industrial and mining wastes because government institutions lack adequate capacity to enforcement the national environmental policy and related regulations.

Lack of security of tenure also undermines motivation for households and communities to invest in conservation. Environmental destruction of landscapes, changes of streams and river courses, flooding and beach erosion. All these affect development of sustainable agricultural production.

In response to these problem, the Government has enacted a National Environmental Policy which lays the foundation for coordinated, multi-sectoral action to complement the three national strategy documents on the environment currently in use. These are: (1) the National Environmental Management council (NEMC) of 1983, (2) the National Conservation Strategy for Sustainable Development (NCSSD) of 1992, and (3) the National Environmental Action Plan (NEAP) of 1994.

However, the pace seems to be slow and the content is less than adequate due to unclearly defined property rights, coupled with inadequate monitoring mechanisms to ensure enforcement and compliance. For instance, currently, the country has a registration system for agro-chemicals, which is controlled by the Tropical Pesticides Research Institute (TPRI) at Arusha. But, until 1997 only five insecticides, three fungicides, two herbicides and one plant growth regulator had full registration while many others still have provisional, restricted or experimental registration.

The liberalized distribution system makes monitoring and training on the correct use of agro-chemicals even more necessary. Although in 1993 TPRI started training courses on the safe handling and use of pesticides, it does not have the resources for effective monitoring within the distribution channels. The main concern with the use of agro-chemicals is on killing of non-targeted beneficial organisms, developing resistance among targeted species, and the disruption of ecological equilibria. Also incidence of chemical mishandling by unformed farmers as well as dishonest dealers preying on ignorant farmers with regard to quality and expiry dates are quite common (BACAS, 1996). For the time being, the ecosystems most vulnerable to agro-chemical and fertilizer are considered to include; Lake Victoria and the northern zone.

Based on the foregoing discussion, it is obvious that the agricultural sector continues to be central to economic development in Tanzania. However, the sector faces a multitude of problems, all of which need to be properly addressed in the interim period and in future so as to lay a good base from which a thriving agricultural industry will evolve and grow. Agribusiness is destined to be the primary engine of growth for the economy in Tanzania during this 21st century. In this respect, both political and government leaders as well as the general public have a role to play to ensure that the development process is steered in the right direction.

5. Trade and Agribusiness Orientation: Policies and Strategies

Industrial and institution agribusiness orientation encompasses the range of business enterprise related to the food and fiber industry spanning from input supply to consumption. The new emphasis on agribusiness world wide, stems from its vast potential for employment as well as new institutional innovations for industrial organization both at the firm level as well as on a regional and national and international basis, involving multinational companies through foreign direct investment (FDI), as well as local entrepreneurs.

At the national level, promoting agribusiness is a multidimensional strategy. First, government should provide public goods such as infrastructure (roads, irrigation) and information to reduce firm average and marginal cost so as to increase their profitability and competitiveness in both local, regional and international markets. Second, the government has the role of providing a legal framework for enforcement of contracts. In this regard, means to provide information to the public on markets, prices and quality of goods and services are important elements. Another role for government to promote agribusiness is the definition and enforcement of property rights. This is important, especially to stimulate innovation and competition, which should promote efficiency and spill over benefits to consumers. This aspect includes patents, which are rarely employment in the agro-industry in Tanzania.

Yet another role for government to promote agribusiness is to set a legal framework to address market failure arising from market concentration due to both horizontal and vertical integration. This may already be emerging in some types of agribusiness, such as the animal feed industry and the farm input supply sector.

Financing of agribusiness is an important factor, which also requires government support in terms of promoting the right kind of financial institutions for targeted clientele. While present efforts to promote micro-finance are appropriate for small and medium scale agribusiness, they are not adequate to promote enterprises, which can compete in regional and international markets.

Processing adds value to farm products, thereby creating more employment and returns to the entrepreneur, especially as it relates to regional and international trade. In this regard, Tanzania still ranks very low. At independence in 1961, Tanzania had a very small industrial sector, which over time achieved limited growth and less than satisfactory performance. By 1990, industrial production accounted for only 10% of the GDP. In order to have a competitive edge, Tanzania should strive to pursue an agro-based industrial development. Studies have shown that economies that have high dependence on agriculture with little industrial development are less likely to develop (Rukuni and Ananda, 1996). Meanwhile FDI, which has been the main source of financing development in Asian economies has been flowing to Tanzania at a very low and declining rate, mainly due a relatively unattractive investment climate in terms of infrastructure, policies, educational level of the work force and a conducive living environment (Isinika, 1997).

While regional trade and trade liberalization have been the buzz words of the 1990s, Tanzania does not seem to have clearly set strategies to address both anticipated and unanticipated outcomes. For example Tanzania is set to promote regional trade with SADC, East Africa, PTA and COMESA member countries. However, except for South Africa and Zimbabwe, Tanzania shares the same export commodities with most of her trading partners. Consequently the volume of trade among SADC

members has been growing rather slowly (Rukuni and Ananda, 1996), or declined with some countries (Bank of Tanzania, 1999).

Other potential problems arise from implications of the last General Agreement on Tariffs and Trade (GATT). Including agricultural products for tariff elimination means eventual eradication of such preferential trade terms as the Lome Convention, which has in the past ensured a market share for export products for African and Caribbean countries. How is Tanzania gearing up for such challenges and others related to changing consumer taste and evolving alternatives among consumer goods for some of her traditional exports (e.g. coffee, tea and sisal)?

Then there is the question of competitiveness in international and regional markets. Can/will the country compete based on quality, prices and environmental standards? Already, the infant fish processing industry has been threatened with closure due to poor hygiene leading to poor quality. The country has been able to penetrate the beef export market for similar reasons. The dairy industry lacks organization and future direction. All these issues require deliberate policy intervention to steer agribusiness into the 21st century. Research has a role to play in this regard so as to provide information to guide policy while policy makers have the responsibility to make informed policy decision based on policy analysis. Analysis which is based on realistic facts as supplied by researchers and other reliable sources.

In this regard, the principle framework of prime-movers has been gaining ground as an analytical framework for national development (Christy, 1996, Rukuni and Ananda, 1996). Under this framework, the agri-food system is composed of several inter-related markets (inputs, production, processing, retailing, and consumption) along with interest groups and competitors to form the microenvironment. Economic problems arising within the microenvironment involve pricing, efficiency, impacts on employment/income/profitability, and changes in consumption (Christy, 1996). It has been argued that a useful classification of the fundamental forces that influence the economic process consists of (1) technology, (2) institutions, (3) resources, and (4) people. Rukuni and Ananda (1996) add a fifth prime mover, which is implied by Christy. This is (5) the role of government to provide an enabling political and economic environment with budgetary commitment to agriculture and appropriate pricing, marketing and trade policies to facilitate agricultural growth and food security.

Orthodox economic frameworks are useful in addressing those economic problems arising within the microenvironment. Issues associated with the interaction among the prime movers fall within the macro-environment. The impacts of both on agri-food system, are complex, because they involve problems of public policy and social transformation. The theory of change is expressed as the interactions among changes in technology, institutions, humans, and resources. As a result of these interactions strong complementarity must exist among the prime movers. For example a change in technology requires individual and institutional change. Similarly, changes in institution influence the behavior of humans and organizational performance.

Studies are increasingly showing that national policies need to simultaneously address all prime movers, and for sustained periods of time for significant development impacts. Before India became a net grain exporter in 1991, there had been over 30 years of investment in education, agricultural research, institution building, rural roads and irrigation systems (Isinika, 1997, Rukuni and Ananda, 1996). Such examples provide a valuable lesson for Tanzania, where policy implementation remains uncoordinated, with negative consequences. For instance, sub-optimal investment in both social services and infrastructure are already showing serious negative long term effects on rising school drop out rates, declining access to health care services, limited access to markets for many producers. This scenario does not present a bright future as Tanzania enters the 21st century.

6. Conclusion

This paper shows that in Tanzania, the agricultural sector has been affected by many policy changes that have occurred over time since independence. As a consequence, growth of the sector was declining from mid 1960s until 1986 when ERP were implemented. Nevertheless, the contribution of

agriculture to the nation's GDP has remained over 45% both in real and nominal terms. Thus, although the sector was being strangled, it continued to nourish the economy. Agriculture is the most wide reaching instrument for poverty alleviation and agribusiness is the most viable engine for future economic growth due to its employment potential as well as multiplier effects into other sectors of the economy, if it is adequately promoted and supported. The leadership has an important role to play in this respect, through proper policy formulation, supervision of policy implementation and adequate financing of agricultural and related services.

End notes

1. These are coffee, cotton, cashewnuts, sugar, pyrethrum, tea, tobacco and sisal
2. National park, game reserves or forest reserves

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