

Structural Adjustment, Environment and Food Security in Tanzania

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1. Introduction

In many African countries most food comes from the agricultural sector. Nevertheless, food production does not meet domestic demand. In Tanzania, for instance, about 80 per cent of people live and depend for their livelihood on the agricultural sector, and about 50 percent of the land is crop land and pasture. However, much has to be done to increase production and food security. The 1993 document on the African strategies on the implementation of the United Nations Conference on Environment and Development, UNCED, Agenda No. 21, therefore, correctly stressed the need to achieve food self-sufficiency and food security—among others—as Africa continues with structural adjustment programmes (SAPs).

In Tanzania adjustment started in the early 1980s, although more visible reforms were introduced in 1986. Two economic recovery programmes (ERPI:1986/87 - 1988/89 and ERP II: 1989/90 -1991-92) have been implemented. Currently there is the Rolling Plan and Forward Budget (RPFb: 1993/94 - 1995/96). The adjustments or reforms involve policies centred essentially on trade liberalization and privatization. These have both positive and negative implications on food security and environment in Tanzania. This is the central concern of this paper.

The link between structural adjustment, environment and food security is viewed through the spectacles of poverty alleviation analysts. This is because there is a close link between poverty and the environment. The poor may be forced sometimes to over-exploit resources in order to survive. As Ramphal (1990:39) stresses:

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Poor people often destroy their own environment—not because they are ignorant, but to survive. They over-exploit their soils, overgraze fragile grass lands and cut down dwindling forest stocks for firewood. In the context of short term needs of survival each decision is rational; in the longer term and wider context, the effects are disastrous.

It seems however, there is a general consensus that poverty may be both a cause and effect of environmental degradation. Environment degradation exacerbates the status of the poor, and further environment degradation worsens their status.

If environment degradation implies the increase of poverty, this implies decrease in food security since poor people tend to be food insecure. Households which are poor are likely to be food insecure since they cannot afford either enough food, or produce adequate food because they cannot buy enough agricultural inputs such as ploughs, fertilizers, insecticides, etc.

This paper aims to:

- (i) examine qualitatively and empirically the situation of food security and environment during adjustment period,
- (ii) show the link between structural adjustment, environment, and food security in Tanzania, and
- (iii) to draw policy implications and recommendations.

After the introductory section, food security and agricultural development are presented in section 2. The agriculture sector is examined in its broad sense to include not only crops and livestock, but also natural resources, i.e., wildlife, bees, fishery and forestry resources, which form a substantial part of the environment. Section 3 analyzes empirically the demand for food in Tanzania. Section 4 examines more closely the link between structural adjustment, food security and environment. Conclusion, policy implications and recommendations are presented in Section 5.

2. Agricultural Development and Food Security

2.2 Food Security

Food security means access by all people at all time to enough food for an active healthy life (World Bank 1986:1). Food security/food self-sufficiency was taken for granted during the first five years after independent (1961-1966). Growth trend in food production was higher than that of population. By 1968 Tanzania

had a surplus of 50,000 mt of maize which it exported at a loss (Amani, Kapunda and Ndulu 1988:72).

The situation remained similarly impressive in the early 1970s. However, the two years' drought: 1973/74 and 1974/75 changed the situation. Great food imports especially the staple food (maize) were necessary, self-sufficiency rates (food production rates) were not impressive thereafter until the advent of good rains in 1984/85. This coincided with the introduction of trade liberalization and price incentives policy which added favourably to increase in food production. Tanzania was then food secure at national level. However, the bad weather in 1987/88 and early 1990s contributed adversely to food production.

Nevertheless, Tanzania is still roughly food secure at national level; but there is food insecurity at household level.

It should be stressed that food security implies equilibrium of supply and demand for food. It seems demand which is a function of purchasing power is a major problem especially at household level. Indeed, as the World Bank Policy Study on Poverty and Hunger (1968:V,1) maintains:

Problems in food security do not necessarily result from inadequate food supplies, as is widely believed, but from a lack of purchasing power on the part of nations and of households.

Thus many poor people at household level in Tanzania are food insecure. Their capacity to work is limited by poverty and nutritional deficiencies.

2. Agricultural Development and Food Security

2.1 Agricultural Development

Defined in broad sense to include crops, livestock, forestry, and hunting, the agricultural sector continued to contribute the largest share of real GDP in 1993 (43.8 per cent). Real growth was 7.3 per cent (well above the target growth of 4.4. per cent or 5.7 per cent at the beginning of the economic recovery programme in 1986). This was largely due to relatively significant increase in both cash and food crops compared to 1992.

With a population of about 27 million people, and per capita income of Tshs 32,770, Tanzania has a total area of 94,509,000 hectares with land covering about 88,604,000 hectares. Approximately 50 per cent of the land is crop land and pasture. The sector accounts for about 40 per cent of GDP at current prices. The main cereals are maize, rice, wheat, sorghum and millet. Major cash crops include cotton, coffee, tea, tobacco, cashewnuts, cloves, and sisal.

Using FAO production data, calculations indicate that, on average, cereal production increased by about 4 per cent annually in the last decade or so (1981-1991). This was well above the average population growth of about 3 per cent per annum. However, on the average, total food production increased by about 2 per cent annually over the period. For details see Table 1.

Livestock is an important sector in Tanzania. Whereas the crop sector contributes about 40 per cent of the GDP, the livestock sector contributes an additional 10 per cent (Kapunda 1994:7).

Table 1: Agricultural Development and Food Production Trends in Tanzania (1981-1993)

Year	Real Growth rate of Agric. Sector	Real Growth rate of Agric. Sector	% Change	Food Production (Indicas ^b)	% Change
1981	1.0	2821	-	100.91	1.0
1982	1.3	2820	0	104.07	3.1
1983	2.9	2846	0.9	106.48	2.3
1984	4.0	3286	15.5	107.82	1.3
1985	6.0	3632	10.5	113.33	5.1
1986	5.7	3777	4.0	115.56	2.0
1987	4.4	4037	6.9	114.94	-0.5
1988	4.5	3726	-7.7	115.14	0.2
1989	4.6	4793	28.6	125.58	9.1
1990	6.6	3842	-19.8	123.7	-1.5
1991	-1.4	3826	-0.4	116.98	-5.4
1992 ^c	2.3	4169	8.5	127.00	9.0
1993 ^d	7.3	4169	0	130.00	2.4

Notes: ^a - metric tons; ^b - 1979/81 = 100; ^c - 1992/93 (provisional); ^d - 1993/94 estimates.

Source: FAO, *Production Year Book* (various issues 1981-91); URT, *Economic Survey*: 1992-1993 (various issues).

In the past decade or so (1981-1991), on the average livestock production grew at 2.6 per cent annually. However, the average production after 1984 improved to about 3.6 per cent annually. For details see Table 2.

Table 2: Livestock Production Indices (1981-1991)

Year	Livestock Production Indices	% Change	Year	Livestock Production Indices	% Change
1981	106.3	6.3	1987	115.7	2.3
1982	109.0	2.5	1988	121.7	5.2
1983	104.2	-4.5	1989	126.3	3.8
1984	103.6	-0.5	1990	129.4	2.5
1985	109.0	5.2	1991	132.4	2.3
1986	113.1	3.8			

Note: Base 1979/81 = 100

Source: FAO, *Production Yearbook*, (Various Issues)

The number of cattle is about 15 million, and that of goats and sheep is about 14 million. For details see Table 3.

Table 3: Livestock Population 1994 - 1993 ('000 head)

Year	Cattle	Sheep	Goats	Chicken
1984	12,500	3,080	6,444	14,000
1985	12,600	3,487	7,255	14,000
1988	13,500	4,700	6,600	30,000
1989	14,000	5,000	6,650	30,000
1993*	15,000	6,000	8,000	35,000

Note: * Estimated data for 1993.

Source: UN-ECA (1990,1992), *Survey of Economic and Social Conditions In Africa A-42, I-41.*

About 80 per cent of livestock owners are farmers also. Livestock plays a significant role to farmers not only as an indicator of wealth, means of paying dowry or a source of cash income, but also a source of food security especially during times of crop failure. Indeed the keeping of livestock in Tanzania seems to improve further the food security situation. Some studies have even indicated that there is generally low rates of malnutrition in livestock keeping areas (Kavishe 1991: 42-43).

However, on the average, *per capita* consumption of animal protein in Tanzania is low. In 1985, for example, meat consumption was only 9 kg per head per annum compared to 11 kg in Africa, or 79 kg per head per annum in Holland (Kapunda 1993). This situation has not changed significantly.

2.1.4 Food and the Natural Environment

Environment viewed as attributes of land, water and air include man's related activities (Kikula and Mwalyosi 1994:34). It includes natural resources which are a significant source of food in many African countries, and Tanzania in particular. Natural resources contribute directly and indirectly to food security as shown detailed below.

Fishery Resources: Fishery resources contribute directly and indirectly to food security. They are direct sources of food in many African countries, including Tanzania. They can also generate revenue, part of which may be spent on other types of food by the government. During the past decade or so (1981-1990) fish, crustaceans, mollusca, and the like catch increased at an average of about 6 per cent as can be seen in Table 4.

In 1993 fish and other inland water products amounted to 300,000 metric tons or 87 per cent of the total catch. About 50 percent of fresh water fish were caught from Lake Victoria.

Regarding foreign exchange generation, fish sales are quite impressive. In 1993, for instance, revenue from fish and other water catches was about US\$ 13 million, compared to US\$ 5 million in 1992.

Table 4: Nominal Catches of Fish, Crustaceans, Molluscos, etc (1981-1993)

Year	Fish etc. from inland waters	Fish etc. from Indian Ocean	Total	% Change	Year	Fish etc. from inland waters	Fish etc. from Indian Ocean	Total	% Change
'81	192	39	231	-	'88	344	49	393	14.9
'82	201	27	228	-1.3	'89	328	50	378	-3.8
'83	206	33	239	4.8	'90	330	47	377	0
'84	237	40	277	15.9	'91	270	54	324	-14.1
'85	258	43	301	8.7	'92	290	43	333	2.8
'86	266	44	310	3.0	'93	300	45	345	3.6
'87	303	39	342	10.3					

Notes: % calculation by the author.

Source: FAO (1992) *Fishery Statistics*; URT. 1993. *Economic Survey*, (1991-1993).

Wildlife Resources: As regards wildlife a number of animals live in the national parks of Tanzania. There are 12 national parks, Udzungwa being the most recently established major park. Other major ones include Serengeti, Manyara, Ngorongoro, Arusha, Mikumi, Ruaha, Tarangire, Kilimanjaro and Gombe.

Despite paucity of data, the overall number of wild animals has been increasing after the elimination of rinderpest. Annual die-off of wild beast calves ceased in at least one of the popular and largest park—the Serengeti plains. Animal population built up from 100,000 in the 1960s to 1,000,000 in 1986 (FAO: 1986:29); and the number generally increased further after that year, an indication of increase in food stock (animal protein reserve).

However, the over-exploitation of some wild life resources resulting from uncontrolled commercialization and unlawful hunting has had serious effects on the status of certain species such as crocodiles, leopards and zebras. The number of elephants, for instance, has dropped from 203,900 in 1981 to only 61,000 in 1989. (Barbier *et al.*, 1990).

As is the case with fish, wildlife is also a good source of revenue. In 1991,

for instance, total revenue from hunting, fees and sales of meat of wildlife and live birds was Tshs 1,418,586,000, or equivalent US\$ 7,388,000. This amount rose to about US\$ 9,000,000 in 1993.

Earning from tourism sector increased from US\$ 60 million in 1989 to US\$ 65 million in 1990, however declining to US\$ 62 in 1991. The revenue projection for 1994 was US\$ 75 million (URT 1992:140, URT 1994:123).

Forest and Bees Resources: Forest resources are somewhat indirectly connected to food production. Food production depends on weather *ceteris paribus*. However, weather is a function of the environment. Forests and other vegetations have a positive effect on rain. Deforestation and desertification lead to drought and unreliable weather, which in addition to likely further soil degradation and erosion leads to unfavourable food production. Furthermore, revenue from forest products may be used to purchase food.

Industrial wood harvested by public and private wood industries, and businessmen in 1991 was 88,000 metres, and the corresponding revenue was about TShs. 2.5 billion or US\$ 13 millions (URT 1992:138). It should also be noted that the largest use of fuel wood in Africa, and Tanzania in particular, is in rural household predominantly for cooking.

Connected to forestry is *bees as resources*. Honey is a popular bee-food product. In Tanzania honey and beeswax are not only important for domestic consumption but also for external market. In 1991/92, for instance, 23,200 tons of honey and 1546.7 tons of beeswax were produced. 112 tons of honey and 5.86 tons of beeswax were exported and the resulting into a revenue of US\$ 2.62 million.

3. Demand for Food

As noted earlier food security implies equating food demand and supply. Tanzania has been bridging the gap between demand and supply through imports. However, the self-sufficiency rate for cereals is, on average, above 90 percent. Table 5 shows the details.

The interrelations between food security/food self-sufficiency, population growth and (agricultural) development are reflected in the following Ohkawa-Edel model (1956, 1969).

Table 5: Cereal Production Trend and Net/Imports in Tanzania
(‘000t)

Year	Production of Cereals	Net Imports	Self Sufficiency Rate	Domestic Demand
1979/71	1059	-31	78	1352
1979/81	2927	-54	97	3017
1988/90	3884	-54	95	4099
1993/94	3959	-58	99	4000

Note: Self-Sufficiency rate = (Domestic Production/Domestic demand) $\times$ 100.

Source: UNECA. 1994. Annex (34); URT. 1994. (97-98).

$$g_f = g_p + e_y g_y$$

where;

g_f = the rate of increase in national food consumption

g_p = the rate of population growth

e_y = the income elasticity of demand for food.

g_y = the rate of increase in per capita income.

This model assumes stability of relative food prices.

If income elasticity of demand for food, annual per capita income growth, and population growth are given the required annual increase in food supply to be equal to the increase in demand can be obtained. In this case it is not population growth alone which matters in determining the demand for food, but other factors like income elasticity of demand for food and the rate of change in per capita income also matter.

It has been found that income elasticities are very high among the poor, low income groups or low economies (Kapunda 1988, 1989). In this model their effect is adjusted by the low income per capita growth. However, the fact remains that income elasticity of demand for food is very high among the poor or low income economies as implied from Engel's law that as income rises, the proportion of income spent on food stuffs decline while that spent on industrial or durable goods increases.

If we take Kapunda (1988) income elasticity of demand for food in Tanzania (0.88), the most recent census estimates population growth of 2.8 per cent annually and the annual *per capita* income growth projected to the year 2000 in the *Tanzania National Food Strategy* (i.e. 2 per cent), the rate of increase in national food consumption should be about 4.6 per cent per annum.

Decrease on population growth will reduce the high demand for food. However, even if the population growth in Tanzania were reduced to zero, the required increase in demand for food would be about 1.8 per cent per annum; a rate which is about the same as the average rate of food production in the last decade or so (1981-91).

4. Structural Adjustment, Environment and Food Security

As noted in the introductory remarks the link between structural adjustment, environment and food security is easily conceived through the spectacles of poverty alleviation analysts. This is essentially because of the existence of a link between poverty and environment. Double causation is not ruled out.

In Tanzania, however, the impact of structural adjustment on the poor—and hence on the natural environment and food security—is a mixed story. It seems there are realized and expected positive and negative effect aspects.

There is enough evidence to show that trade or economic liberalization has improved the availability of food and incentive/consumer goods like soap, clothes, bicycles and cement (Amani and Kapunda (1990), Sankhayan (1994)). This has been positive to the welfare of some of the poor men and women in both rural and urban areas. However, it is questionable to conclude that structural adjustment has improved significantly food production through increase in real producer prices and other policy measures. This is because of the somewhat constantly low level of technology in the agricultural sector, and its 'overdependence' on weather. As earlier, the advent of good rains in 1984/85 coincided with the introduction of trade liberalization and price incentive policy which added favourably to the increase in food production. However, the bad weather in 1987/88 and in the early 1990s contributed adversely to food production and growth of the agriculture sector (see Table 1). Production in 1993/94 was not expected to be good because of drought in some regions, especially Arusha, Kilimanjaro, Mara, Mwanza and Shinyanga (URT 1994:97).

Furthermore, there are mixed observations of the growth rates of the

agricultural sector and food sector. It can be deduced from Table 1 that real growth of the agricultural sector was high (5.2%) during the first five years of the recovery period than during the five year period before 1986 (3.0%). However, food production growth was lower during the first five year of the economic recovery (2.0%) than during the five year period before 1986 (2.6%). The average rate of food production (1986-1993) remained almost the same (2.0%)—the rates being affected negatively by the drought years.

However, what appears to be visibly positive with the structural adjustment is the internal trade liberalization of food items like maize which actually started in July 1984 when the government undertook measures to regulate markets. Individuals were allowed to buy and transport up to 500 kg of food grain. In 1987 the restriction on the movement of food grains was removed by eliminating the requirement to obtain permits (*vibali*) from the National Milling Corporation (NMC) (Amani & Kapunda 1970:76). Such measures improved the supply of food items especially in food-deficit places like Dar es Salaam. At least food availability was no longer a problem, the issue was the need to improve access to food through increases in real income for the poor.

Regarding livestock production, average livestock production was higher during the first five years of the recovery period (3.5%) than during 1981-85 (1.8%). It seems the informal sector—influenced by reform policies—contributed positively to some extent on livestock production levels in some places like Dar es Salaam region.

Economic reforms may encourage increased production of commercial crops and food crops through price incentives. However, as prices of unsubsidized or marginally subsidized inputs tend to increase (poor) peasants tend to intensify the use of forests, for example, for fuel and construction. This encourages further desertification, drought, poverty and food insecurity, or what Mohammed (1994:2) calls the *development trap*. Sankhyayan (1994:75-76), for instance, indicated that in Ruvuma and Kilimanjaro regions, a higher proportion (66%) of the households indicated their preferences to increase area under food crops than in cash crops (47%). Regions like Ruvuma generally use a lot of chemical fertilizers to grow maize and other crops. As the price of these fertilizers increase many peasants resort to extensive cultivation. The study found that bush clearing or cultivation of own old land in Ruvuma, and leasing-in of land in Kilimanjaro were popular methods adapted. It should also be pointed out that re-cultivation of own land using little or no fertilizer causes increased erosion in the long run especially when subsistence crops like maize

and beans are planted compared to soil conserving cash crops like coffee and fruit trees.

The effect of livestock production level on the environment lies in overgrazing. This is particularly acute in pastoral areas around water points and population dense areas. This problem, plus shifting or extensive cultivation, reduce rangelands productivity. The situation appears to be increasing not only in rural areas but in urban and semi-urban areas of Dar es Salaam region.

As regards water-resources like fish, some people have taken advantage of trade liberalization to selling explosives to fishermen who use them in fishing, thereby endangering the environment. The recent decreasing trend of fish catches is an indication to a threat on fish protein (food) security.

Other forms of misuse of the trade liberalization is on the side of investors who throw industrial wastes haphazardly. For example, some dangerous wastes are dumped in Lake Victoria where there is already a problem of oxygen-intensive *hyacinth* which have affected the number of fish in Lake Victoria, especially the traditional fish such as *ningu* and *furu*.

Misuse of trade liberalization seems also to be increasing in the case of wildlife. Illegal hunting, modifications, project undertaking in or near parks, and destruction of habitats are increasingly becoming environmental problems.

5. Conclusion

This paper has examined qualitatively and empirically the situation of food security, agricultural development and natural environment by relating these aspects to poverty alleviation during structural adjustment period in Tanzania.

The paper argues that the interrelation of the aspects is somewhat complex especially when poverty is viewed as both a cause and effect of environmental degradation. However, an attempt to identify both positive and negative effects of SAPs have been made to allow further improvements. The following policy implications and recommendations are in order.

- (a) Policies on food security should be implemented with the view of environment protection during the current reform period. This is because food security implies poverty alleviation or elimination of poverty, and the protection of the environment since poverty, food insecurity and environmental degradation are interrelated. Thus structural adjustment programmes, donors and policy makers should pay more attention to the inter-linkages.

- (b) Planning should link agricultural and food policies to environmental protection. In Tanzania a mixture of both extensive and intensive cultivation is still possible, but should be practised optimally to safeguard the environment.
- (c) Since the fertilizer are still expensive and often unavailable to farmers in time, farm management technology such as organic manuring, crop rotation, and other techniques which use less artificial fertilizer should be encouraged. Where chemical fertilizers and pesticides are used care should be taken by households to avoid food contamination and pollution.
- (d) The government should institute more strict laws to guard against those who misuse freedom in this era of trade liberalization encouraged by SAPs. In fact the government should review the laws relevant to environmental protection to reflect the socio-economic changes in Tanzania:
 - (i) Those who destroy water resources like fish by buying and using 'illegal' explosives in fishing should be punished heavily. This applies also to unjudicious users of fire in forests and game-reserves.
 - (ii) A warning should be given to investors who throw wastes, especially chemicals, in water. They should find other means of disposing of industrial wastes. This applies especially to those around Lake Victoria and other lakes where the practice is a great threat to the environment.
 - (iii) Poachers should be punished more heavily than before.
 - (iv) Private modifications and project undertaking in and near the national parks which are destructive to natural habitats should be monitored and controlled by the government.
- (e) Further steps should be taken to encourage more movement of foodstuffs incentive and consumer goods. The infrastructure should further be improved not only in the urban areas but also in the rural areas starting with places where foodstuffs and goods are available to places of major consumers. Donors should be encouraged to assist the government in this aspect.

- (f) SAPs promoters and the government should support more irrigation projects to alleviate overdependence of food production on rainfall. Afforestation and tree planting should also be given priority.
- (g) Farmers who are also livestock keepers in overgrazed areas should be encouraged to move to other areas which are not under pressure of overgrazing and erosion. Zero-grazing should also be promoted to encourage quality rather than quantity of livestock.
- (h) Further research on economic integration of food production, and cash crop production (encouraged by SAPs programme) should be made in connection with the protection of the environment.

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