NUTRITION AND AGRICULTURAL DEVELOPMENT IN AFRICA

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Preface

This paper is a contribution within the framework of the Food and Agriculture Program. Although the nutrition profile in Africa is discussed, the fundamentals of nutrition considered in the paper are true for almost all developing countries.

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Abstract

As in other developing countries in the tropics, severe malnutrition in Africa is mainly a problem in young children and pregnant women. The various disorders are discussed. Seasonal food shortages, maldistribution, ignorance, especially with regard to weaning, and urbanization, are major contributing causes. Better nutrition should not be regarded only as a means to development, but a principal goal of development itself. Policy measures to improve nutrition are outlined.

Despite great variation in diverse ecologies, nutrition profiles in Africa show a common theme, with severe malnutrition mainly a problem in young children and in pregnant and lactating women, vulnerable groups with little political voice. Nutritional imbalance in the diets of adults is also a problem. The fundamental nutrition problems of Africa are similar to those of other developing countries in the tropical regions of the world. Protein-energy (calorie) malnutrition is the most widespread nutritional disease among children in all of the developing countries of the world. From region to region and country to country within Africa both the causes and solutions of nutritional diseases and existence of various nutritional deficiencies may vary widely. Food habits, climate, and geography vary considerably not only between countries, but also within countries. Over five thousand foods of animal (domesticated and wild), fish, and vegetable origin are consumed all over Africa,[1] but the staple foods produced in Africa belong to two main groups: cereals, and starchy roots and fruits. Millets, sorghums, and maize are the main cereals, although wheat, rice, barley oats and rye are also grown. The starchy fruits and roots include cassava, yams, plantains and several types of bananas.

Fred T. Sai, until 1972, Director of Medical Services in Ghana and member of the Protein Advisory Group of the U.N. states that no country in Black Africa has attained a level of nutrition commensurate with good growth, and development, good health and satisfactory working efficiency. The seriousness of nutrition problems in the countries of Black Africa is rarely fully

appreciated by the governments. Reliable facts about the morbidity and mortality due to malnutrition, are non-existent, as far as national figures are concerned. There is some appreciation of chronic calorie shortages, though little is actively done about it. However, the importance of specific nutrient deficiencies and the havoc that malnutrition plays with the lives of the vulnerable groups such as children, pregnant and nursing women and, some special working groups is hardly appreciated.(2) These groups are vulnerable primarily because of their relatively great nutritional needs, and in the case of the young child also because of their complete dependence on the support of others. Pregnancy always means a considerable drain on the mother. If her nutritional status is poor - maybe affected by repeated earlier pregnancies at short intervals - this means that the situation is precarious both for her and the unborn child.

It has been estimated that the pregnancy and lactation periods, taken together, mean an extra demand, if optimal development is to be ensured of some 219,200 kcal. i.e. 110 extra days of full comsumption for an adult, and some 6,400 grams of protein, not to mention minerals, vitamins, etc. (3) This is for a single pregnancy and lactation. It is easy to understand how precarious the situation can become if pregnancies are repeated ending up with 6 to 10 or more over a period of 15 to 20 years. The most sensitive period for the individual, also from the nutritional point of view, may be in foetal life. Malnutrition during foetal life may lead to early development of protein - calorie malnutrition and other deficiencies.

Also critical, is breast feeding, which means literally life or death for the baby during the first 6 months of life and is of enormous importance for a long period thereafter for most African families. It has the virtues of being hygienic enough and nutritious enough and yet within financial reach.

When this inherent vulnerability is combined with socio-economic stress factors, such as poverty, ignorance and primitive living conditions, the situation is truly precarious. Living in poverty, under social and economic deprivation, school children and adult males who are the breadwinners, also frequently do not have their nutritional needs met. Adults, with the exception of reproductive women do not, however, require food for growth, only for maintenance and energy production. The first thing that happens to a child who, for any reason, becomes undernourished is a slowing down of growth.(4)

In Africa, 25 to 30 percent of the population and more than 50 percent of children are estimated to suffer from significant malnutrition. (5) As in other tropical regions, the principal nutritional disorder is protein - energy malnutrition (PEM). Almost equally widespread are nutritional anaemias and endemic goitre, and certain vitamin deficiencies in some areas. Bailey, Regional Nutrition Advisor, WHO Regional Office for Africa in a recent article has provided a statistical summary of fragmentary available data. He states that from 6.5 to over 50% (Median 15%) of admissions of children to hospital are due to malnutrition. Fatality rates among malnourished children are relatively high (21-24%), as is the percentage of child deaths due to malnutrition

(Median 20%). He describes these figures as an underestimation of the importance of malnutrition among hospitalized children, since only overt cases of PEM (Kwashiorkor and marasmus) are included. Apart from 20% of deaths directly due to malnutrition, PEM was a contributory factor in at least a further 53% of deaths. A recent study in the Congo revealed that, in addition to the 17% who were frankly malnourished, 70% of children suffered from diarrhoeal or respiratory disorder in which malnutrition played a very important role; 87% of children, admitted to hospital were in fact malnourished. (6)

TYPES OF MALNUTRITION

The three main forms of severe protein - energy malnutrition are kwashiorkor, marasmus, and marasmic kwashiorkor. (7) Marasmus is due to insufficient calorie intake while kwashiorkor is protein deficiency frequently occurring when a child is weaned and has his diet abruptly changed to a low-protein, low fat diet, usually the local staple. Marasmic kwashiorkor occurs when the diet is deficient in both energy and protein. In practice, it is rare to find either marasmus or kwashiorkor in their typical forms. The first symptoms of kwashiorkor are anorexia, diarrhorea sometimes accompanied by vomiting. All these factors result in a deficiency of the diet and the real calorie intake is lowered. Soon protein malnutrition is accompanied by a calorie deficiency, and mixed intermediate forms of kwashiorkor marasmus appear.

Even if a diet is adequate in its protein content, but not enough quantity is eaten to cover energy needs, some of the protein will be used mainly as a source of energy. Protein deficiency in the absence of energy deficiency is, however, not

likely to occur, a possible exception being in populations that subsist on cassava, plantains, yams or breadfruit; foods that are extremely low in protein content. In most African countries where cereals and pulses are the staples, the consumption of more food will simultaneously correct any insufficiency of energy and protein. This statement is valid for adults and older children, but does not hold true for infants and preschool children whose ability to consume more food is limited and hence foods with a higher concentration of protein are needed. Regular cereal - based diets will often not satisfy the protein nor the energy needs of infants and young children due to the bulky nature of the home - milled staple. The "protein problem" becomes more than ever a problem of specific population groups rather than a universal problem of the population in developing countries. In the starchy root areas four to six year olds consume as much food as they can and still achieve only around 80 percent and 70 percent of their respective calorie and protein requirements. (8) Protein malnutrition is generally commoner among those whose staple food are tubers rather than cereals. Severe protein energy malnutrition is naturally more common in areas exposed to flood or drought such as the Sahelian zone, where there is a high prevalence in both children and adults. Maize seems to be the poorest of the cereal staples, and cassava the poorest of the tuber staples.

Kwashiorkor is seen more often in rural areas, while marasmus and marasmic kwashiorkor are more common in urban areas. Almost everywhere, except perhaps in cassava areas, marasmus is several times more frequent than kwashiorkor. An important question on which little direct evidence is available is whether

this predominance of marasmus is mainly due to an overall lack of food or to particular infant - feeding practices. In infants, this situation may arise either from insufficient breast-feeding or from artificial feeding that is too little in amount or too diluted. Marasmus in breast-fed children below 6 months of age is due to inadequate lactation. The mother may be malnourished and obliged to work in the fields soon after the delivery. In Africa, quite young babies are often left with grandmothers or siblings, who pacify them with inadequate foods.

In addition to marasmus and kwashiorkor there are other nutritional disorders caused by vitamin and mineral deficiencies. Iron deficiency and sometimes folate and vitamin B_{12} deficiencies contribute to the widespread occurrence of anaemias. Although iron intakes often appear adequate, iron absorption appears to be inadequate. Other non-nutritional factors such as malaria, hookworm, schistosomiasis and abnormal haemoglobins, also play a role. Anaemias occur most often among pregnant women and in children of pre-school age and almost everywhere.

Severe vitamin A deficiency affecting the eyes (night blindness, later xerophthalmia, and ultimately keratomalacia) occurs particularly in the sub-Saharan zone, including parts of Mali, Ghana, Niger, Nigeria, and Upper Volta, because of the scarcity of the common sources of provitamin A (green leafy and yellow vegetables, yellow fruit and red palm oil).[9] There are various other factors contributing to blindness, e.g. trachoma onchocerciasis, measles and other infections.

Riboflavin deficiencies are frequent and may contribute to

growth retardation, poor resistance to infection, and anaemias that are common in Africa. Vitamin D deficiency results in rickets, while Vitamin C deficiency causes scurvy and is found mostly in barren areas. In North Africa rickets continues to be a serious nutritional problem as are zinc deficiency and pellagra. (10)

Pellagra - Vitamin PP deficiency due to nicotinic acid deficiency (or tryptophan deficiency or relative excess of isoleucine), has been commonly observed, especially among adults, in some countries of South Eastern Africa. As it is often found among populations where maize is the staple, crop diversification may be a preventative measure. (11)

Endemic goitre is widespread in Africa, especially in remote mountainous areas. It is largely attributed to iodine deficiency, but certain substances (e.g. cyanogenetics glucoside) present in cassava or pulses may play a role in development. Iodine is found mainly in sea foods, and to some extent in vegetables and water, depending on the iodine content of the soil. Soils are deficient in iodine in many mountainous areas.

Infections interact with nutrition by decreasing the resistance of the host, by lowering his normal food intake and incrementing nutrient loss. The diseases of prime importance affecting the nutritional state are diarrhoeal diseases, malaria, measles, respiratory infections, skin and urinary tract infections, and intestinal parasitism. It is most often the interaction of nutrition and infectious diseases. Inadequate nutrition decreases the body's resistance against infection; at the same time,

infections worsen the body's nutritional status. Malnutrition has, therefore, been called "the biggest single contributor to child mortality in developing countries." Post-neonatal mortality age 1-11 months is 150 per 1000 live births in Africa; 20 to 30 per 1000 live births in Europe. Mortality 1 to 4 years is 50 to 80 per 1000 in Africa; 2 to 3 per 1000 in Europe. (12) Infant mortality rates in selected countries are given in Table 1.

CAUSES OF MALNUTRITION

The causes of malnutrition are many, but it is generally agreed that the fundamental causes are an insufficient supply of the necessary foods, an uneven distribution of the food that is available and thirdly, ignorance. (13)

Seasonal food shortages present a major problem. Availability of local food supplies is highest soon after harvest of the staples and lowest in the interval between planting and harvesting of the next main food crops. Often, available food is of poor quality.

Maldistribution is at least as important a cause as is an insufficient food supply. Food is unevenly distributed, first, within the family itself, and second, within the region as a whole. It is the custom in many parts of Africa for the males of the household to eat first, consuming the foods rich in protein. Little is left for the children who come last. An African agriculturalist relates how he realizes now why he is taller and stronger than his brothers and sisters. He was his grandfather's favourite and ate sitting on his lap. The dishes which were offered to his grandfather first, contained meat. The other children who ate with the women, found there was no meat left when the food came to them last.

TABLE 1. INFANT MORTALITY RATES IN SELECTED COUNTRIES

(Deaths under one year per 1000 live births)

Israel	23	Sweden	12
Jamaica	39	Japan	13
Sri Lanka	48	France	15
Uruguay	49	Australia	18
Dominican Republic	64	United Kingdom	18
Philippines	67	United States of America	19
Mexico	69	Ireland	19
Colombia	76	USSR	24
Ecuador	91	Germany, Federal Republic of	24
Iraq	104	Italy	29
Zaire	115	Hungary	36
Egypt	118		
Malawi	119		
Turkey	119		
Indonesia	125		
Ivory Coast	138		
India	139		
Pakistan	142		
United Republic of Tanzania	162		
Central African	163		
Swaziland	168		
Upper Volta	182		
Somalia	190		

Source: International Bank for Reconstruction and Development, 1973.

Maldistribution in the country as a whole may be the result of lack of certain foods in particular areas, i.e. no cattle in tsetse fly - infected country, lack of fruit and vegetables where it is arid, no fish away from the sea and lakes. For example, in the Cameroons, the south has an abundance of tropical fruit of all kinds, whereas the north is without; on the other hand, the north has large herds of beef cattle and sheep, whereas the south is seriously lacking in meat; the coastal area has a large supply of fish which is not available in the interior. These localized shortages are aggravated by poor communications and transport, and by lack of storage and preservations facilities. In the community, poverty results in an uneven distribution of food. The urban labourer frequently does not have the income to buy adequate food.

Ignorance is a major cause of malnutrition. One cannot blame people for being ignorant. It is usually not their fault. A false assumption among African people is that "a full belly" is all that is necessary to provide health. Food habits, beliefs regarding food, and an inability to budget demonstrate the need for nutritional education. Food restrictions and food habits such as having the adults eat before the children, "the biggest piece for father," deprive children of an adequate diet. Restrictions on giving protein foods (especially eggs, fish, and dried legumes) to young children are not uncommon. Other food restrictions apply to pregnancy. Africans in Gabon believe the supposed effect of eggs is malformation of the foetus. A widespread taboo forbids all sexual relations to a nursing woman, so as not to kill the child. As a result many young women give up breastfeeding.

Other countries have similar taboos. Protein foods are thus denied the vulnerable groups whose nutritional need for them is greatest. Most food taboos involve those rich in protein. Few people have strong feelings about cereals, roots, or vegetables. Traditional nutritious foods, however, tend to be dropped for prestige foods, such as bread, sugar, and soft drinks, especially in urban areas. Alcoholism is also a major cause of malnutrition.

Perhaps the most critical form of ignorance is that in matters of weaning. The weaning period is often badly carried out and with no transition. The traditional weaning foods in African communities are portions of adults' diets, which because of their components, bulk, and imbalance in nutrients are unsuitable for child feeding. At the age of about 18 months the baby is suddenly given exclusively adult food, based on the local staple. It is at this time that kwashiorkor frequently arises.

Another nutritional problem is the spread of bottle feeding as opposed to breast feeding infants. To 90% of Africans in the lower income brackets, the bottle - feeding of an infant under six months of age is close to signing the death certificate of the child. This tendency exists because it is believed to be sophisticated and because it is convenient for the working mothers. Misleading advertising by individuals and firms in the media has been a major contributing factor. Only a mother's milk is sufficiently hygienic and capable of providing adequate nutrition. Bottle fed infants are particularly prone to diarrhoeal diseases, which are almost unavoidable in the unhygienic conditions of most households. A vicious circle sets in "diarrhoeal diseases, reduced

intake, early malnutrition, reduced appetite and resistance, further diarrhoea." Urbanization is leading to increased early weaning and bottle-feeding.

In urban areas, poverty, frequently related to lack of employment is a common cause of malnutrition. Even if they do have the money, urban dwellers frequently are not aware of which are the essential nutritious foods, or they may spend their money on consumer goods of little value to them. In times of money shortage, the poor are more likely to go to the grocers than the market because they are given credit. Instead of local food products, they are used to, they buy higher priced manufactured products, whether local or foreign, to which they are unaccustomed, but which are more easily accessible than the traditional commodities.

Urbanization is causing serious nutritional and other public health problems. In migration to cities, families are separated and traditional nutrition is disrupted. In the suburban population of African towns, whole families recently arrived from their village are ceasing to eat pulses and millet long before their purchasing power is high enough for their small consumption of meat to supply sufficient protein to offset the decrease due to the elimination of vegetable sources. In towns and cities, the urban poor live essentially in a cash economy in which they have to pay for everything they need including fruits and vegetables, fuel for cooking their foods and sometimes water. While in the villages or rural areas, the peasants grew or gathered their own foods. They spent nothing in cash to obtain fuel for cooking their foods and had endless time to prepare their foods. In

addition, they were able to supplement their meagre staples with berries, wild fruits, nuts, wild animals, and game.

Men of rural families migrate to the cities or go to work on commercial plantations, mainly for economic reasons. Often their wages are insufficient to allow them to take their families along when they migrate. The wives who remain behind are now alone to cope with the arduous agricultural and domestic duties. If the labourers take their wives and children with them, the entire family is subjected to urban types of malnutrition, disease, and poverty which are less acceptable than their rural conditions.

Introduction of cash crops has frequently lowered the level of nutrition. The peasant having lost his land, is now a salaried employee in danger of becoming unemployed and frequently having inadequate money to purchase food when he is employed. In areas where cash crops (e.g. cocoa or coffee) predominate, the people tend to rely on poorer staples especially tubers and purchased foods for which their financial resources are inadequate. In the past, priority has been given to industrial crops such as peanuts, coffee and rubber, rather than subsistence crops for local nutritional needs. Cash crops are grown on the best land and subsistence agriculture is regarded as a nuisance that must be tolerated to feed the farmer. It is repeatedly stated that tropical staples are ignored in research programs, while export crops are studied intensely. Even when social factors are not considered, the abandoning of subsistence crops for industrial crops and food imports is less economically advantageous than generally thought. The typical case is that of Senegal, where to be able to export $3 worth of peanuts $2 of foodstuffs must be imported.[14] Until

now, in most African countries, little effort has been put into furnishing regularly, and at competitive prices, local products, and foreign imports have not been particularly discouraged.

Qualitatively, approximately 50% of foodstuffs purchased in African urban markets are being imported.[15] Imports may be necessary to meet present nutritional needs but the only answer in the long run is self-sufficiency. Imports not only utilize scarce foreign exchange, but may hamper local production.

If Africa is to meet the food requirements of its rapidly growing population, it is likely that imports will increase substantially. The demographic factor should not be underestimated in the nutrition problem. An increasing population requires not only increased production of food, but creation of employment to provide an income to purchase food, particularly in urban areas. Population growth in rural areas causes pressure on available arable land and results in rural inhabitants migrating to urban areas in search of employment. The rural population will continue to grow at approximately 1.9 percent per year until 1985 and will increase by 50% between 1962 and 1985.[16] In the same period, the urban population will grow from 30 to 92 million and the demand for food will be all the greater in that standard of living will rise faster in the cities than in rural areas. The population of Africa as a whole was just over 400 million in mid 1975 and is estimated to grow to 536 million by 1985 and 834 million by the year 2000. The annual rate of growth is estimated to increase from 2.8 percent between 1975-1980 to 3 percent between 1985 and 1995.[17] At present, in mid 1978, the population of Africa is 455 million with a growth rate of 2.8 percent.[18]

Population growth, poor nutrition, high infant and child mortality, and low incomes form a vicious circle. The large number and close spacing of children result in a precarious nutritional state of the children. If parents can be made to understand that improved nutrition will reduce child mortality, they will have fewer children, who under favourable nutritional conditions will become healthier adults. Better nutrition can thus contribute to slowing present population growths. Table 2 indicate rates of growth of population, food production and domestic demand in Africa. Although food production is growing as fast or faster than population, it is still expanding less rapidly than food demand in most countries.

MALNUTRITION AND DEVELOPMENT

The existence of malnutrition and hunger is perhaps, the most disturbing symptom of under-development. Despite the overwhelming moral imperative for all-out efforts to reduce and ultimately elimate malnutrition, neither national governments nor the United Nations system and other internaticnal organizations have satisfactorily laid out a strategy for doing so. Three reasons may be put forward for this failure. (19)

The first reason is that, although malnutrition is a consequence of poverty and under-development, nutritional programmes have largely focused on combating the symptoms. While specific measures to feed hungry people have their rightful place and must be pursued, it is now realized that the basic remedy is development. But it is not enough to achieve this only in aggregate national terms; what is required is to ensure that development improves the lot of the poorest strata of the population, where hunger and

TABLE 2

RATES OF GROWTH OF POPULATION, FOOD PRODUCTION AND DOMESTIC DEMAND, SHOWING PER CAPUT SUPPLIES OF ENERGY AND PROTEIN, FOR INDIVIDUAL COUNTRIES

	ANNUAL RATES OF GROWTH			PER CAPUT DAILY		
	POPULATION	FOOD PRODUCTION	DOMESTIC DEMAND FOR FOOD	DIETARY ENERGY SUPPLY		PROTEIN SUPPLY
	P E R C E N T			KILOCALORIES	PERCENT OF REQUIREMENTS	GRAMS
ALGERIA	2.4	-0.8	3.4	1730	72	46
ANGOLA	1.8	2.7	3.0	2000	85	42
CHAD	2.1	0.9	1.2	2110	89	75
EGYPT	2.6	3.4	3.8	2500	100	69
ETHIOPIA	1.8	2.3	3.0	2160	93	72
GHANA	2.9	3.9	3.2	2320	101	49
IVORY COAST	2.2	4.9	2.6	2430	105	56
KENYA	3.0	2.6	4.7	2360	102	67
LIBYA	3.6	5.3	...	2570	109	62
MALI	2.1	1.6	4.3	2060	88	64
NIGER	2.8	4.1	2.2	2080	89	74
NIGERIA	2.4	2.0	3.1	2270	96	63
RHODESIA	3.4	3.9	4.1	2660	111	76
SENEGAL	2.2	3.3	1.2	2370	100	65
SOUTH AFRICA	2.4	3.9	3.2	2740	112	78
TANZANIA	2.4	3.1	3.0	2260	98	63
UGANDA	2.4	1.8	3.2	2130	91	61
UPPER VOLTA	1.8	4.7	1.2	1710	72	59
ZAIRE	2.0	0.2	2.3	2060	93	33
ZAMBIA	2.9	4.3	4.8	2590	112	68

SOURCE: The State of Food and Agriculture 1974. Rome, FAO, 1975.

TABLE 3

Income distribution estimates: percentage shares in total national income going to population groups of different income levels in selected countries.

COUNTRIES	POOREST 0 - 20%	LOW MIDDLE 21-39%	MIDDLE 40-60%	UPPER MIDDLE 61-79%	HIGHEST 80%-100%
DAHOMEY	8.00	10.00	12.00	20.00	50.00
GABON	2.00	6.00	7.00	14.00	71.00
IVORY COAST	8.00	10.00	12.00	15.00	55.00
LIBYA	.11	.39	1.28	8.72	89.50
NIGER	12.00	11.00	12.00	23.00	42.00
SENEGAL	3.00	7.00	10.00	16.00	64.00
SOUTH AFRICA	1.94	4.17	10.16	26.37	57.36
SUDAN	5.60	9.40	14.30	22.60	48.10
TUNISIA	4.97	5.65	9.95	14.43	65.00
ZAMBIA	6.27	9.58	11.10	15.95	57.10

SOURCE: F.A.O. NUTRITION NEWSLETTER Vol. 11, No. 4, 1973.

malnutrition are most prevalent. Income redistribution is essential if malnutrition is to be alleviated. The skewed income distribution in some African countries is shown in Table 3. Even substantial national increases in food supplies will not solve the problem if the additional food is not produced by or cannot be purchased by those in need. It is clear that, development is not reaching adequately the rural and urban poor who need it most, especially if malnutrition is to be eliminated.

The second reason is the complexity of the approach that is needed, calling for the contribution of different disciplines: health specialists, statisticians, nutritionists, agriculturalists, teachers, economists and planners must all join forces. Nutrition improvement (probably more than other aspects of development) can only be achieved through a national integrated interdisciplinary interministerial approach, with all the difficulties of organization and management that it entails. This has been recognized in principle but, while progress has been made, it is only in recent years that a view has emerged of how to formulate nutritional objectives and programmes in different country situations as a component of national development plans.

Thirdly, and no doubt partly because of the considerations mentioned above, not many Governments have so far set national nutritional targets. The establishment of such a target would represent a political decision of the first importance and might have a significant impact on the entire national development strategy. All the evidence suggests that, for most countries, the achievement of acceptable nutritional targets would require a

reassessment and redirection of both social and economic development efforts and could entail basic structural reforms. When looking at the development plans of most countries in the developing world, one seldom finds nutrition getting more than a passing mention. Even when better nutrition is cited and discussed as an objective of a plan, its relative priority, measured by allocation of resources or specific policy proposals is low.

In the past, the attitudes of planners toward malnutrition and other aspects of human well-being were much affected by the assumption that poverty and malnutrition were a necessary price to pay for rapid economic growth, as well as simply a characteristic of a low level of development. In order to accelerate development and hasten progress toward a situation where a country could afford to raise its consumption levels, present consumption was to be minimized in favour of investment. Malnutrition is a disease and expenditures to overcome or avoid disease have commonly been regarded as a form of consumption. When, in addition, nutritional improvement was seen largely in terms of specific nutrition programmes, it is not surprising that, as with many programmes of social welfare, they were regarded as avoidable consumption to be out when development plans had to be curtailed in the face of resource stringency. With government emphasis on capital formation and rapid industrialization, modern - sector firms employing relatively few workers, have received preferential access to limited foreign exchange rate, and artifically low interest rates have discouraged domestic saving and disadvantaged exports which in developing countries are primarily agricultural.

The farm population generally bears the brunt of maintaining an over - valued exchange rate and also shoulders much of the burden of subsidizing inefficient domestic industries because of being obliged to pay high prices for farm inputs and consumer goods. At the same time, the growth of domestic commercial demand for farm products is restricted by the relatively slow growth of employment in the capital - intensive firms in the modern sector and the continuing low incomes of those in the informal sector. The net effect of the past emphasis on a narrow view of capital formation and highly protectionist import substitution strategies has been to slow the rate of increase in per capita incomes and to accentuate inequalities in income distribution.(20)

The purpose of development of foregoing consumption today in favour of more investments is to generate a high level of human well-being tomorrow for people. The most people in developing countries, that higher level of well-being substantially is a better diet.(21) Food is the major problem of their lives. Better nutrition should not be regarded only as a means to development, but a principal goal of development itself. Therefore, food and nutrition policies should be a central concern of development planning. In the past, development has been based on Western developed country patterns where adequate food is taken for granted.

The fact that agriculture dominates the work force and economic activity means that development of the agricultural sector is found to have important repercussions on overall economic growth. Since the agricultural sector forms the greater

fraction of the gross national product of a developing country, it is largely the growth of the agricultural sector, not the industrial sector, that determines the overall growth of the country's economy. The type of agricultural strategy that is pursued, and the resulting pattern of rural development, will be a major determinant of the rate, and still more of the pattern, of industrial expansion and of the growth of non-farm employment opportunities. The growth of farm demand for inputs as well as for a widening range of consumer goods can provide an important stimulus to the growth of local manufacturing industries. Agriculture provides the needed food and raw materials and is a source of demand for industrial products. Sayed Marei maintains that agriculture is the "cornerstone of industrial development," since the development of industry cannot succeed without the development of agriculture.(22)

POLICY MEASURES TO IMPROVE NUTRITION

In considering policy decisions, a food and nutrition strategy should embrace at least three related elements. First, rural development should foster widespread improvements in productivity and output and be designed to improve income distribution. Expansion of food supplies must be achieved by modernization of existing small and subsistence farms, as production must be increased among the poorest if nutritional goals are to be met. Second, measures must be taken to influence the combination of foods produced to prevent dietary imbalance, processing, and distribution to all income groups. The third element is a complex of measures; nutrition - related health activities and nutrition intervention programmes, especially for vulnerable groups.

The large number of small-scale farmers have normally no or only limited access to fertilizer, pesticides, irrigation and other production factors. Assistance to them necessitates new government services and policies which, in addition, may often conflict with the traditional power system of the rural elite controlling the rural development process. In this way, the task of increasing food production grows beyond its technological nature and becomes a problem of socio-economic character.(23) Land reform is a case in point. Vast areas of farmland remain in the hands of absentee landlords and the poor sharecroppers who work the land have little incentive to improve it. With cheap labour available, big landowners are not interested in modernizing techniques. Over 50 percent of land in Africa is held by smallholders in holdings of less than 5 hectares - if South Africa, Southern Rhodesia, European holdings in Zambia, and commerical holdings in Tanzania are excluded.(24) It is the production of these subsistence farmers that must be increased, with or without land reform.

Governments can assist change by creating new opportunities in technology, credit, and markets, and not least by the provision of supporting services in infrastructure, research and extension. Africa has far less irrigation than any other continent; only 2,610 thousand hectares in 1975.(25) Lack of adequate conservation, storage, refrigeration, and transport, results in high losses of produce, whose cost is added to the final price paid by the consumer. The estimate of 30% post harvest loss is probably conservative for some African countries. Increased production and storage should guard against seasonal food shortages.

Underexploited tropical plants, from cereals and fruits, to forage crops should be given research priority and brought under cultivation.

Of great importance is the introduction of better seeds. The African may sell his best seeds or eat them and retain the poorest ones for seeding. Better seeds should be adapted to local ecology. The growth of leguminous seeds (protein - rich) should be encouraged because of the decreasing consumption of legumes and oilseeds in all areas, in part because of its difficulty of preparation. Legumes and other traditional staples such as breadfruit, cassava, and maize take a long time to prepare and are being replaced by processed cereals, especially in urban areas. There is therefore an urgent need to introduce milled pre-cooked or processed legumes. In African agriculture as a whole much time and energy is expanded on hand-pounding of cereals. Facilities for light milling on a village or regional basis should be introduced. Elaborate machine milling, however, produces a less nutritious product than traditional methods of cereal preparation.

To ensure a balanced diet, crops must be diversified and the production of animal protein improved. Livestock production is in its infancy in Africa, quantity being preferred to quality and overgrazing frequent. Disease also presents a major problem. New strains of animal breeds should be introduced and adapted to local ecology.

In one respect, the nutrition problem in African countries is simpler. The Africans eat relatively few local staples. By

placing emphasis on subsistence crops until marketable surpluses accumulate and in addition improving the quality of education, especially nutrition education, the nutritive value of diets can be satisfactorily increased.

Nutrition education must be undertaken in the broadest sense: politicians, administrators, planners, farmers and the public. The general public should be educated as to what constitutes a desirable local diet, and what food habits to change. Programmes should include better utilization of available resources. Mothers must be educated with regard to breast feeding, weaning, child spacing and child care, including hygiene. School canteens can introduce good feed habits into the thinking of the young, while improving their nutrition.

Legislation and economic measures such as compulsory fortification of local foods and pricing policies will support educational efforts and affect production and marketing. Fortification, like improved plant breeding, makes available improved nutrition inexpensively and without requiring change of food habits. In addition, it is a concealed form of income supplementation for specific purposes. Even if governments required that certain basic marketed foods were fortified, the contribution to nutrition would still be limited, since most of the food in African countries is consumed in the villages where it is produced.

Banning bottle feeding by legislation may also be considered. Other measures to improve nutrition include promotion of appropriate foods, production of local weaning foods and applied nutrition research.

To effect these changes, nutrition planning must receive high government priority. It must be the beginning of food and agricultural planning. One reason why nutrition has been given low priority in the past is that we know very little about the economics of malnutrition. What is the monetary loss to economic development through decreased worker productivity, disease and medical cost, premature death and intellectual impairment? The best way to slow population growth rate may be to keep children alive through improved nutrition and health. Parents assured of the survival of children will have fewer children.

Technologically, malnutrition can be overcome. The basic fact is that governments while having discussed the need, have not faced up to the magnitude of their role. Governments have not for example given the same substantial support to nutrition that they have given to education, health and family planning. Yet, the success of these development components is to a large degree dependent upon nutrition.(26)

In a number of African countries, agriculture and food production have failed to keep pace with the increasing food demands of rapidly expanding and urbanization populations. Although total agricultural production has increased annually, per capita production has frequently decreased during the last decade as shown in Table 4. Per capita food production for 1970-1975 in Africa has fallen to 97 percent of per capita production in the early 1960's.(27) FAO projections of food demand and extrapolations of food production to 1985 indicate that between 1969-71 and 1985 Africa's food demand would rise by 76% but her production

TABLE 4

PERCENTAGE ANNUAL RATE OF INCREASE IN AGRICULTURAL PRODUCTION

COUNTRY	ALL AGRICULTURE		FOOD	
	TOTAL[(a)]	PER CAPITA[(b)]	TOTAL[(a)]	PER CAPITA[(b)]
MALI	0.6	2.7	0.9	3.2
UPPER VOLTA	1.0	1.1	0.6	1.4
ETHIOPIA	2.6	0.5	2.5	0.4
CHAD	2.1	4.4	2.5	4.7
SOMALIA	2.1	0.1	2.1	0.1
NIGER	1.4	4.2	1.4	4.2
DAHOMEY	2.8	0.2	2.0	0.5
TANZANIA	2.9	0.3	3.3	0.7
SUDAN	5.0	1.9	5.0	1.9
CENTRAL AFRICAN REPUBLIC	1.7	0.5	1.5	0.7
UGANDA	2.3	0.4	2.4	0.2

SOURCE: Centre for Development Planning, Projections and Policies of the Department of Economic and Social Affairs of the United Nations Secretariat, based on data from Food and Agriculture Organization of the United Nations, Production Yearbook, 1973 (Rome, 1974), vol. 27.

(a) 1961-1965 to 1971-1973

(b) 1961-1965 to 1971-1975

(c) Data refer to estimates of gross value of output published by the Food and Agriculture Organization of the United Nations (FAO)

(d) Countries are listed in ascending order of their per capita annual gross domestic product in 1970-1972.

by only 45%. [28] These are only projections, it does not have to be that way.

These projections do not, however, bode well for the future. The poor in all developing countries are becoming more aware of the evolving global consciousness that it is the duty of society to provide for the basic needs of all. Increase in communication, not only among the urban poor, but frequently also at the village level has resulted in the poor being less content to hunger. It will therefore become of increasing political interest for the nation state to assure its inhabitants and adequate food supply.

In conclusion, a note of qualified optimism. If marked progress has been made in the growth of cash crops, the same progress can be achieved in food production, if food crops are given priority. Provided the opportunity, the African is capable of change and learning. Increasing consumption of soft drinks, bread, sugar, flour and rice indicate food habits can be altered. When the African peasant finds he can store and market his surpluses because storage facilities, transportation and demand are there, surplus production will become part of his outlook on life. Most of the potentially arable land that is not farmed is in the tropics of Africa and South America, about 1 billion hectares or three-fourths again as much land as is presently cultivated in the world. According to a study by the National Academy of Sciences, annual crop production in these humid lands, if well managed, could be raised to 150 to 200 percent of the temperate zone production per hectare. Growing conditions in many tropical areas are, however, far from ideal, and much research

will be required before cultivated crops can be grown economically and without affecting the environment adversely.[29] Perhaps, the Arab Plan to turn the Sudan into the "bread-basket of the Arab World" will serve as an example as to what can be done in Africa.

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