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AGRICULTURAL DEVELOPMENT COUNCIL
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**THE DEVELOPMENTAL
EFFECTIVENESS OF
FOOD AID IN AFRICA**

**Cheryl Christensen
Edward B. Hogan
Beatrice N. Okigbo
G. Edward Schuh
Edward J. Clay
John W. Thomas**

**Foreword by
Wila D. Mung'Omba**

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FOREWORD

The African Development Bank was honored to host the A/D/C seminar on *Improving the Developmental Effectiveness of Food Aid in Africa*, the third in a series of seminars on the important problems of food aid and development. The food issue is one of the most critical concerns of African countries, particularly those of the sub-Saharan region. The situation is worsening, and prospects are not encouraging.

In response to the food and agricultural situation of the African countries, the Lagos Plan of Action, adopted in April 1980 by the heads of state of all African countries, has set as a goal for the region the achievement of food self-sufficiency by 1985. The strategy recommended is to develop national food plans that include food security requirements. Since 1977, when it launched its first Five-Year Operational Programme, the African Development Bank Group has given highest priority to agricultural development projects of its member countries. As the Bank Group prepares to launch its second Five-Year Operational Programme (1982-1986), it will place particular emphasis on food production requirements of member countries, in line with those countries' individual and collective development plans.

The role of food aid programs has long been well recognized. Many of the countries in the region have benefited from bilateral as well as multilateral food aid programs. We are quick to recognize that the United States Agency for International Development has contributed significantly to relief and to other needed projects in the countries of Africa. The role of USAID, as well as the role of other similar programs, will no doubt continue in the 1980s.

In order to improve the effectiveness of food aid in Africa, donors will be increasingly required to take into account the broader objective of the countries concerned and of the African region as a whole, that is, an equitable distribution of the benefits of economic and social development. In this context, food aid programs could contribute effectively. And the humanitarian concerns of these programs will, of necessity, continue to be an important consideration. This seminar has provided a rationale for both aspects of the question.

WILA D. MUNG'OMBA
President
African Development
Bank Group

Chapter 1

FOOD AID AS AN INSTRUMENT OF DEVELOPMENT: A SEMINAR REPORT

Cheryl Christensen and Edward B. Hogan

The seminar on "Improving the Developmental Effectiveness of Food Aid in Africa," held in Abidjan, Ivory Coast, in August 1981, was the third in a series of food aid and development seminars sponsored by the Agricultural Development Council, through its Research and Training Network, and the Agency for International Development. The first seminar in this series (Princeton, New Jersey, January 1979) took a worldwide perspective on development issues relevant to food aid; the second (Colombo, Sri Lanka, August 1980) explored the Asian viewpoint.

The focus on food aid as a development instrument is timely for several reasons. First, food aid is becoming a larger share of United States development assistance, primarily because other sources of aid are declining. There is no reason to expect that these other sources of aid will increase in the next few years. Thus it is extremely important to examine the current use of food aid and to think creatively about ways of using it more effectively as a tool of development.

Second, food aid is a resource that (at least for the United States) has real opportunity costs. The shift from food aid as surplus disposal to food aid as development instrument occurred at a time when not only were there sizeable food surpluses but these surpluses were expected to continue. Today, when surpluses in one year can be followed by relatively tight markets in another, food aid cannot be considered a cheap resource. This is particularly true as the United States moves through a period of substantial domestic budget tightening.

Third, countries other than the United States are beginning to provide a much larger proportion of total food aid. Currently it is estimated that over 40 percent of cereal food aid comes from non-United States sources, and that member countries of the European Economic Community (EEC) contribute almost 20 percent of the total of such aid. In addition, noncereal assistance is gaining in importance, particularly because in EEC member countries surpluses of noncereal agricultural products are relatively greater than cereal surpluses.

The focus on Africa is also timely. Africa is emerging as a serious food problem area. Since the early 1970s there have been major food emergencies in the Sahel (1972-1974), in East and Southern Africa (1979-

1980), and in Morocco (1981). These emergencies have been superimposed upon a persistent and very disturbing trend—the steady decline in per capita food production throughout sub-Saharan Africa. In fact, sub-Saharan Africa is the only region of the world where per capita food production has declined for two decades. Although production has improved in a few African countries, in most there have been moderate to severe declines. Preliminary 1981 figures show per capita food production was less than 90 percent of 1969–1971 averages in Angola, Ethiopia, Ghana, Guinea, Madagascar, Mali, Mozambique, Niger, Nigeria, Senegal, Sierra Leone, Sudan, Togo, Uganda, Upper Volta, and Zaire (Economic Research Service, USDA, forthcoming).

Declining production, coupled with dietary changes, has led to a significant increase in food imports. Given the severe financial problems of many African countries and the fact that most have limited foreign exchange, such rising commercial food imports are difficult to manage. As a matter of fact, a considerable portion of these imports has been concessional. In any case, increasing imports cannot be an adequate response to domestic production problems. Unless the production trend of the last two decades is reversed in the present one, countries will remain poised for disaster; widely fluctuating weather patterns will easily trigger major food emergencies.

Since the mid-1970s, Africa has been taking an increasingly larger share of total food aid. Not only has African food production generally declined; a considerable strain has been placed on the foreign exchange resources of many African economies by recent higher world prices for both petroleum and food. Moreover, Africa contains many of the world's poorest countries, the countries to which United States food aid has been increasingly targeted.

As the total volume of food aid to Africa has increased, the number of donors has multiplied and so has the number of recipient African countries. As a result, the coordination and management of food assistance has become highly complex. It is essential that donors and recipients develop a working consensus on how to make effective use of food aid in promoting African development. The Abidjan seminar took a step in the direction of such a consensus. It is also imperative that we develop ways of implementing the policies and programs that we agree are necessary. The latter task lay beyond the scope of the present seminar, and it remains an area for exploration and research.

FOCUS OF THE SEMINAR

Seminar discussions focused primarily on the role of food aid in fostering agricultural development, where the latter includes production, processing, and marketing of products; human nutrition; and the operation of food systems as affected by various policies and institutions. This focus did not reflect insensitivity to the broader scope of economic development. Rather, it emerged from a recognition of the central role played by

inadequate production in Africa's current economic problems and from a realization of the important role that food aid may have in coping with these problems.

From beginning to end, the seminar placed great emphasis on two matters. First, the need to develop research programs that will deal effectively with existing production problems was clearly identified as the first priority requirement of any agricultural development effort. Second, great importance was given to the need to increase understanding within the development community of the internal and external economic, political, and administrative forces that have determined the structure of African agriculture. Seminar participants stressed the significance of the latter issue if politically acceptable policies and institutions that affect agricultural production and marketing are to be formulated and implemented.

MAJOR POINTS OF CONSENSUS

A number of general issues represented a core of consensus around which discussion of other points centered. These issues reflected a shared perception of the African situation and of the general areas in which food aid can be most effectively used.

- *Africa's food problems are rooted heavily, though not exclusively, in inadequate production.* Current projections indicate that if the dynamics of the present inadequate food production system remain unchanged throughout the 1980s, the consequences will be extremely severe (Christensen, Dommen, Horenstein, Pryor, Riley, Shapouri & Steiner, 1981). Under conditions of "no growth," (constant real per capita incomes and agricultural prices as of either 1974 or 1979), import requirements would increase, but unmet food needs would exceed commercial imports. The food aid burden would increase, and domestic consumption would probably deteriorate. Even under conditions of income growth (following either the pre-1974 or post-1974 trend), serious problems would tend to reflect the skewed growth that has prevailed historically. Oil-exporting West Africa's commercial imports would increase significantly, eliminating any aggregate "calorie gap." The need for food aid would increase, however, in the Sahel, Central Africa, and East Africa, and the latter would be in particular need of concessional food imports (see Table 1.1). The conclusion seems clear: increased food production based on greater productivity will be essential to the economic well-being of nations and the physical survival of people throughout sub-Saharan Africa.

- *Food aid must play a temporary role in Africa.* Food aid must be used and administered in such a way that it does not create a permanent demand for concessional food flows. Thus to deal with the problems of both food production and food aid we must address the factors in the recent production decline. These include the physical production environment and particular techniques of farming; the impact of urbanization

TABLE 1.1 Projected Import and Calorie Gaps, by Regions, Sub-Saharan Africa, 1990 (in 000 mt cereal equivalent)

Projection	Region					Totals	
	The Sahel	West	Central	East	Southern	Gross*	Net
C1975							
Import gap	1,220.0	5,279.4	(549.8)	2,057.6	3,434.4	11,991.4	11,441.6
Calorie gap	1,060.0	1,236.7	909.6	9,160.1	(5,845.0)	12,366.4	
C1979							
Import gap	984.6	6,558.1	(424.0)	2,141.5	727.9	10,412.1	9,988.1
Calorie gap	1,728.6	233.0	717.1	10,323.8	(2,286.7)	13,002.4	
T1965							
Import gap	964.3	11,863.9	(349.6)	2,457.7	3,294.6	18,580.5	18,230.9
Calorie gap	1,472.9	(7,131.4)	570.4	7,024.8	(5,410.5)	9,068.1	
T1974							
Import gap	1,133.0	18,167.9	(356.5)	2,543.6	(405.5)	21,844.5	21,082.5
Calorie gap	1,386.3	(14,640.8)	596.7	8,099.4	(1,215.2)	10,082.4	

SOURCE: Christensen, Dommen, Horenstein, Pryor, Riley, Shapouri & Steiner, 1981.

NOTES: Projections are made on the basis of four different definitions of trend and assume that the patterns established will continue throughout the 1980s. The first and second projections (C1975 and C1979) assume that real per capita income and real producer prices remain at their 1975 and 1979 levels, respectively. The third projection (T1965) uses the trend over the 1965-1979 period, smoothing out some of the disturbances of the 1970s. The fourth projection (T1974) is based on the patterns in the 1974-1979 period, following the first major increase in oil prices and the onset of the food crisis of the early 1970s.

Parentheses enclose surplus amounts.

*Sums all deficits, assuming that surpluses are not traded across regions, and that dietary improvement occurs in regions where it is possible.

on dietary patterns and thus on demand for food; the lack of infrastructure in key areas; the prevalence of policies that provide weak incentives for increasing agricultural productivity; and the shortage of managerial talent.

- *Some features of African agricultural production particularly underline the need for research in attempts to promote agricultural development.* These features are (1) elaborate cropping patterns that have been developed to manage the fertility of delicate tropical soils; (2) a much less complex mechanical technology than is common in other countries; and (3) a scarcity of labor, together with labor bottlenecks that limit production increases. The African food production system is the reverse of the United States system in that the former is characterized by a relatively simple mechanical technology and a very complex cropping pattern, whereas the latter applies a complex mechanical technology to a relatively simple cropping pattern. Because the African cropping pattern is designed to adapt production to local requirements of land and labor, it must be studied carefully. Sensitive local research will be required before outside technology that promises to increase food production and productivity dramatically can be brought in.

Throughout much of sub-Saharan Africa, limited labor availability (especially during peak periods) limits the quantity of land that can be farmed. Thus an approach quite different from that embodied in green revolution research—which was oriented primarily toward increasing the productivity of limited land—is required in Africa: technologies that economize scarce labor resources are needed to increase the productivity of labor.

- *Food aid can play an important role in cushioning change in four major areas: physical production, marketing, policy, and institutions.* Food aid can alter the productivity of small-scale production; it can strengthen and backstop thin markets; it can provide a way of smoothing out the effects of change while allowing time for consensus building; and it can provide the funds to train capable professionals and to strengthen and restructure institutions that perform key functions. Attempts to use food aid to cushion change must be sensitive, however, to the range of impacts (direct and indirect) on different groups within countries as well as on donor interests. In addition, in using food aid to support institutional or policy change, consensus must be sought on the character and direction of such change.

- *The use of food aid should not make heavy administrative requirements of African countries.* Trained managers are a scarce resource. Thus mechanisms should be simple, and donors should coordinate their activities so as to eliminate administrative burdens.

AREAS OF DISAGREEMENT

Beyond the core issues, there was considerable discussion about—and disagreement on—a number of additional issues that seminar participants felt were of considerable significance. The first two of these issues have general applicability in the area of food aid. The third and fourth issues have particular relevance to the African situation.

- *Building human capital.* In general, participants agreed that food aid can be used in building human capital, but they disagreed on the way this should be done. Some felt food aid should be targeted to the poor—including, for example, pregnant and lactating mothers and the young—in the hope of increasing their productivity and competitiveness. Others felt that it is also legitimate to use counterpart funds to contribute to “high-level” human capital formation, as in the training of managers.

- *Balance of payments support.* Some participants felt that food aid should not be given simply to provide balance of payments support, particularly because balance of payments deficits often signal inappropriate policies. Others felt that this was a necessary and legitimate use of food aid, especially when countries face sudden, serious emergencies.

- *Adjusting the commodity mix.* Participants disagreed on the practical importance of the commodity mix and on the extent to which food aid donors should try to adjust the mix. Some felt that food aid creates tastes among the general population for certain foods (e.g., wheat and rice) that

may ordinarily be eaten only by higher-income people and that steps should be taken to avoid this situation. One suggested measure is the "self-targeting" approach, whereby imported commodities that would normally be eaten by wealthier people are simply sold to such people, and the proceeds are used to purchase more appropriate food aid commodities. Other participants felt that food aid does not have a strong effect on the tastes of a population and, indeed, that the commodity mix itself is not an issue in many African countries.

- *Maintaining food security.* Participants disagreed as to whether food aid should play a role in providing food security, defined as the ability to maintain normal food consumption patterns in the face of emergencies. Some felt that food security is better achieved through other instrumentalities: for example, currency reserves and use of international markets; increased domestic production; and commercial purchases. Others felt that food aid is at least as desirable an instrument of food security as commercial purchases because it reduces costs.

ISSUES FOR FUTURE DISCUSSION AND RESEARCH

Seminar discussions revealed a number of important issues that the present meeting could not address. It was agreed that these issues constitute an ongoing agenda for study and research.

- *Acute/chronic food problems.* More thought must be given to different ways of using food aid in two categories of countries—those with short-term food shortages and those with the long-term problem of structural food deficits.

- *Labor constraints.* Because African agriculture has serious labor constraints, a greater effort should be mounted to understand the way labor is allocated across sectors and activities and within households. Because production often involves complex, sex-differentiated labor patterns, a better understanding of the role women play in production should also be sought.

- *Increased commercialization and better markets.* We need detailed study of the ways in which food aid might help make the transition to more permanent commercialized agricultural production and more adequately developed markets. Even when farmers are market-oriented for specific export crops such as coffee, cocoa, and tea, food production in much of sub-Saharan Africa is still dominated by a subsistence orientation. Farmers do not ignore marketing possibilities or prevailing prices, but their decisions about food production are often directed by subsistence considerations. As a result, food marketing suffers: for example, a poor harvest will generally reduce marketing by far more than the shortfall in production itself. Conscious effort will be required to create stable, and generally positive, expectations about food production for the commercial market.

- *Urban-rural migration.* We need to examine the impact of migration from farm to city both on agriculture and on the structure of demand

for food (e.g., increased demand for convenience foods like rice and wheat). Areas to be explored include the terms of trade between agriculture and industry, disincentives to remain in agriculture that are both pricing and policy-related, and the different impacts of seasonal and permanent migration.

- *Role for nomadic peoples.* Greater thought should be given to the ways in which nomadic peoples might make a transition to more permanent production modes. For example, range management might offer a viable alternative to settlement. Nomadic groups become more vulnerable as change occurs in other agricultural activities.

- *Use of local staples.* Increasing urbanization, coupled with changing tastes, has created a tendency toward greater consumption of some products that cannot generally be produced locally (e.g., wheat) or that are often relatively expensive to produce (e.g., rice, in many areas). Urban life puts a premium on more convenient foods that require less preparation time. Thus bread and rice are more convenient than the traditional roots and tubers. In addition, because roots and tubers are bulkier than wheat and rice, their transportation is more expensive. Furthermore, some basic staples have a relatively short shelf life and thus are more damaged by delay in transportation. Some of the tendency to consume fewer locally grown products could be reversed if more attention were given to possibilities for processing local staples in ways that will make them both more convenient to use and easier to transport and that will extend their shelf life. Postharvest losses are frequently high in commodities that, if available on a regular basis, would have important potential for reducing malnutrition and promoting food security.

- *Problems of implementation.* Intensive and frank discussion is essential to understand the problems of implementation that arise in the operation of food systems in many African countries. Attempts to promote or cushion policy change will be futile unless strategies for implementing such changes are developed.

- *Role of government policy.* When recommending policy changes it is important to keep in mind the complexity of policies that affect retail prices, marketing, production, input supply, and trade for a varying mix of commodities. In general, policies must provide farmers with an incentive to produce, and the price farmers receive is an important element of that incentive. An adequate price, however, is a necessary but not a sufficient condition for increased productivity. Policies that govern the delivery of inputs, the timeliness and completeness of payments for products, the incentives for marketing organizations to import rather than purchase locally, and macroeconomic factors like the exchange rate will all have an impact on the success of efforts to increase food production and productivity. Moreover, inconsistencies among policies, which often reflect the varying interests of different organizations, are frequently as important in explaining the outcome as is the correctness of any single policy.

In addition, although policy changes are often necessary to provide

better incentives, unless there is a genuine basis for increased productivity—and this requires improved research and better use of research results—there will be a point at which policies will simply trade an emphasis on one commodity off against another. Relative prices will be an important guide to this tradeoff. The decade of the 1980s may see important policy-related improvements; to sustain these improvements into the 1990s will require additional support from research and extension institutions.

OVERVIEW

The Abidjan seminar papers and discussions reflected participants' concern over the serious deficit in food production that has developed recently in Africa. Among the areas of the developing world, Africa at present faces the most crucial threat in this regard. A number of significant issues emerged from the seminar discussions—issues that provide at least a partial agenda for study and research over the next decade in Africa on food aid, agricultural production, and overall agricultural development. African leaders face a formidable task as they attempt to deal with these highly complex matters and to resolve the potential conflicts between short-term consumption requirements and long-term development objectives.

This monograph explores a number of these important issues in some detail. In the chapters that follow it is noted that studies of agricultural production must be restructured and expanded to put the major focus of agricultural research on food crops. This research must be based on recognition of Africa's extremely complicated patterns of crop production and directed toward the development of technological packages that are compatible with the total farming system.

Food security problems are by no means limited to variations in annual food crop production. The effects of food insecurity vary at different levels within society—individual, family, community, region, nation. These effects also vary as a function of the structure of the economy: they are different for urban and rural people overall and for various categories of rural producers and urban consumers. The study and analysis needed goes far beyond consideration of such things as the comparative advantage of food security buffer stocks or food financing facilities. To determine the optimal composition of food aid we must understand how to cope with these complicated issues of food insecurity.

The shift within the economies of many African countries from food surplus production to food deficit has created serious institutional and policy problems. Policies and institutions that affect development—and that of necessity must deal with an amalgam of political, economic, and social issues—have generally been formed to deal with situations in which food security was not an issue. Modifying policy and institutional structures to include means of dealing with food insecurity, food aid, and ways of increasing food production not only affects food consumption and pro-

duction but raises far-reaching social and economic issues. Understanding these complex relationships is essential if policies and institutions are to be modified in ways that will improve the management of food assistance for development purposes.

Finally, the effect of food aid on the recipient may be both positive and negative. In the short run, food aid can increase the supply of food available to consumers and decrease pressures on a budget and on the balance of payments. Over the longer term, however, food aid can have an adverse effect on economic and social development, including agricultural production. Recipients and donors alike need to explore all these potential effects thoroughly; they need to devise ways of avoiding the disincentive effects of food aid and of maximizing development effects.

The coming decade will see an intensified effort to explore the foregoing issues. Chapters 2 through 5 of this monograph set the stage for this venture, offering a challenging analysis of these important development problems and opportunities.

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Chapter 2

AGRICULTURE AND FOOD PRODUCTION IN TROPICAL AFRICA

Bede N. Okigbo

Africa has an area of 30 million square kilometers and lies roughly between latitudes 37.5° north and 35° south. Because there are major differences in farming systems and level of agricultural development between the extreme north of the African continent—the subtropical or Mediterranean region—and the extreme south, this chapter will confine itself to a discussion of what is known as “tropical Africa.”

Tropical Africa is bounded roughly by latitude 20° north and an east-west line drawn between about latitudes 15° and 20° south: the northern boundary runs from Cape Blanc, on the Atlantic coast of Mauritania, to the northern tip of Ethiopia, on the Red Sea coast. The southern boundary runs from Mocamedes, on the Atlantic coast of Angola, southeastward to the southernmost tip of Mozambique, on Africa's east coast, and includes the island of Madagascar. Tropical Africa is a land mass 5,150 kilometers long, from north to south, and 7,400 kilometers wide, from longitude 52° east to longitude 18° west, with an area of about 22 million square kilometers (Kimble, 1962). This area, which is about twice the size of the United States and represents about 18.3 percent of the world's surface, exhibits great diversity in relief, climate, vegetation, peoples, and cultural-historical features.

Physically, tropical Africa is a massive plateau surrounded by a coastal plain that varies in width. Much of this plateau is undulating lowland that ranges in altitude from zero to 600 meters. To the north and west and rising above 600 meters are the Guinean highlands, the Ahaggar (2918 m) and Tibesti (3145 m) mountains, and the Cameroun (4070 m) and Adamawa (2009 m) highlands. To the northeast are the Ethiopian highlands (4520 m). The high plateau of east Africa lies south of these highlands and extends to the Angola plateau on the southwest. The highest points in the east African plateau are Mount Kenya (5202 m) and Mount Kilimanjaro (5963 m).

Three main river systems dissect the tropical African plateau: those that flow into the Atlantic Ocean, including the Congo (4700 km long) and the Niger (4200 km); those that flow into the Indian Ocean, the longest of which is the Zambezi (2700 km); and the Nile (6500 km), which flows into the Mediterranean Sea. Many of these rivers descend from the plateau through falls and cataracts, thus obstructing navigation.

A striking feature of Africa is the Rift Valley, a deep trench whose eastern arm cuts across the Kenya highlands to the Ethiopian highlands; the valley's western arm extends from the Luangwa valley through Lake Edwards to the Upper Nile valley. Within the Rift Valley are some of the world's largest and deepest lakes: Lake Victoria, which has an area of 69,485 square kilometers, and Lake Tanganyika, which is 1434 meters deep.

In the tropics temperatures are uniformly high all year round. Except in the highland areas, mean temperatures during even the coldest months usually exceed 18°C. The mean annual temperature range is 20–30°C, and annual temperatures of above 30°C occur in desert areas such as the southern parts of the Sahara. Annual temperature ranges are low and are often exceeded by the diurnal ranges. Solar radiation varies from about 330 cal/cm²/day in the rain forest region near the coast to over 580 cal/cm²/day inland at the desert margins. High relative humidities in excess of 80 percent occur throughout the year close to the equator, especially in the Congo basin and on the west coast. Inland and at higher latitudes the relative humidity varies with the season; it may be below 30 percent during the dry months. Rainfall varies from up to 4000 mm in some areas close to the equator to below 100 mm in the semidesert and desert areas of the Sahara and in southwestern Angola close to the Namibian desert (see Figure 2.1). Table 2.1 describes the five climates of tropical Africa, based on classifications by Trewartha (1968), Hare (1973), and Troll (1966), among others. As this table shows, vegetation zones parallel the climatic zones, especially in relation to amount and duration of rainfall.

Along coastal areas there may be coastal swamp and mangrove vegetation. Highland areas above 900 meters have montane vegetation that corresponds to vegetation zones encountered at progressively higher latitudes: from the savanna woodland of the plateau through forest and bamboo thickets, lobelias, and then grasses below the snow line. It must be noted that there are local variations. Coastal savanna is found along the coastal areas of Togo and Ghana. And some savanna vegetation has been produced within rain forest areas both by certain physiographic features and by man's disturbance of climax vegetation through such activities as burning, grazing, clearing, and farming. As a result of all these, most of the forest areas have been converted to secondary bush and derived savanna.

The soils of tropical Africa are in general highly weathered and of low inherent fertility, except for the young volcanic soils and alluvial soils in river flood plains and valley bottoms. Figure 2.2 and Table 2.2 describe the main soil groups found in Africa.

From a socioeconomic point of view, the countries of tropical Africa are markedly similar:

- They have gained their independence during the last 25 years.
- They are among the least developed countries of the world.
- They have rapidly growing populations (2–3% annually), with over 40 percent below 15 years of age.

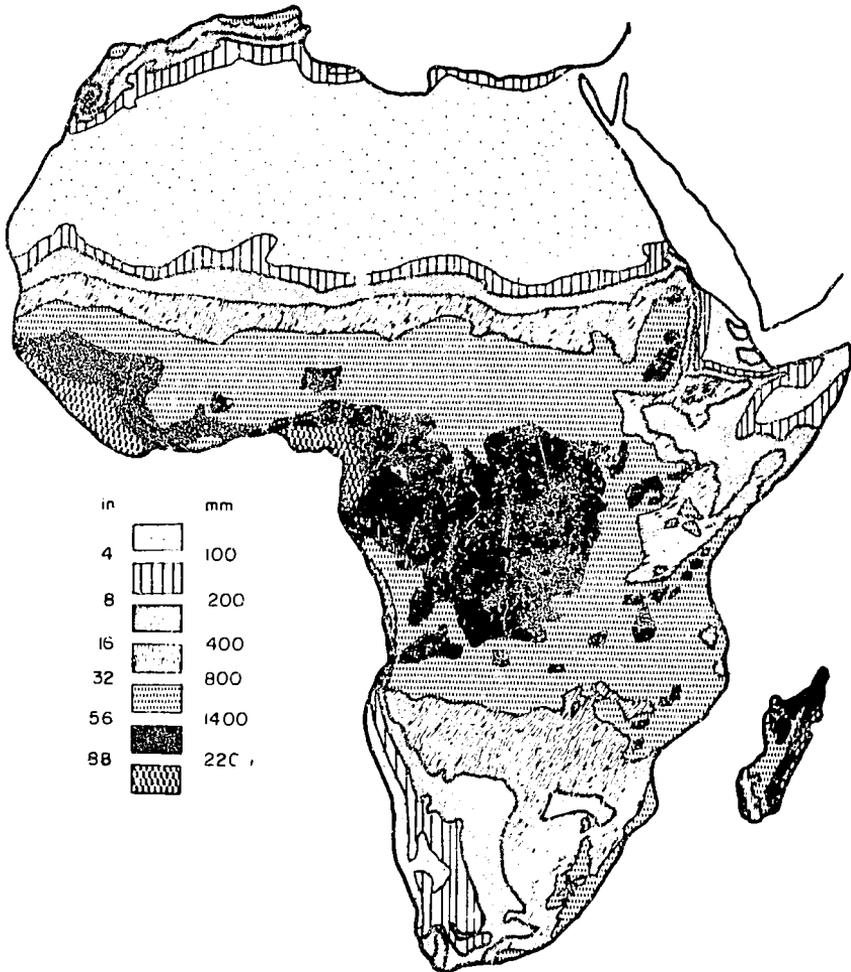


Fig. 2.1 Africa: Mean annual rainfall. (After Best & de Blij, 1977)

- They suffer from an acute shortage of trained manpower at various levels and disciplines.
- They exhibit marked country or regional specialization in agricultural commodities—most depend on just one or two commodities and/or minerals for foreign exchange.
- They have in the past given higher priority to cash or export crop production, improvement, extension, and marketing, neglecting food crops.
- They are relying increasingly on food imports to satisfy rapidly increasing demand due to such factors as the population “explosion” and urbanization.

TABLE 2.1. Rainfall and Vegetation in Major Climatic Zones of Tropical Africa

Climate	Annual Rainfall		Major Land Use ^a	Vegetation
	Total Quantity (mm)	Humid Months		
Tropical rainy climates (A)				
1. Tropical wet at all season(Af) (perhumid)	2000+	11-12	<i>Taf</i>	Equatorial or tropical rain forest; dense forest; mostly evergreen.
2. Tropical wet monsoon type(Am)	1500-2000	9-11	<i>tAF</i>	Mixture of evergreen and deciduous forest; at northern margin, derived savanna
3. Tropical wet and dry(Aw)	1100-1500	7-9	<i>tAF</i>	Tropical savanna and deciduous trees; tall grasses in Miombo forest; <i>Brachystegia</i> woodland
Dry tropical climate(Bs)	750-1100	4.5-7	<i>AF</i>	Thorny shrubs, Acacias, and short grasses
† Dry tropical with short moist season(Bsh) (Semi-arid)	500-750	2-4.5	<i>AF</i>	Thorny shrubs, Acacias, and sparse short grasses
Arid and desert climate(BWk)	<500	0-2	<i>af</i>	Grass steppe, thorny scrub and desert with short-lived annuals
Mountain climates	Variable	Variable	<i>V</i>	Montane vegetation (basal lowland forest, bamboo zone, <i>Hagenia-Hgpericum</i> zone, moorland or ericaceous belt with alpine zone on highest mountains in East Africa

SOURCE: After Hare, 1976; Sprague, 1975; Trewartha, 1968; Troll, 1966.

NOTE: This is an attempt to arrive at a simplified integrated classification of various climates. It is not surprising, then, to obtain overlapping rainfall and humid month intervals.

^aT = best for tree crops; *t* = good for some tree crops

A = best for arable (field) crops; *a* = good for some field crops

F = best for forage crops; *f* = good for some forage crops

V = variable

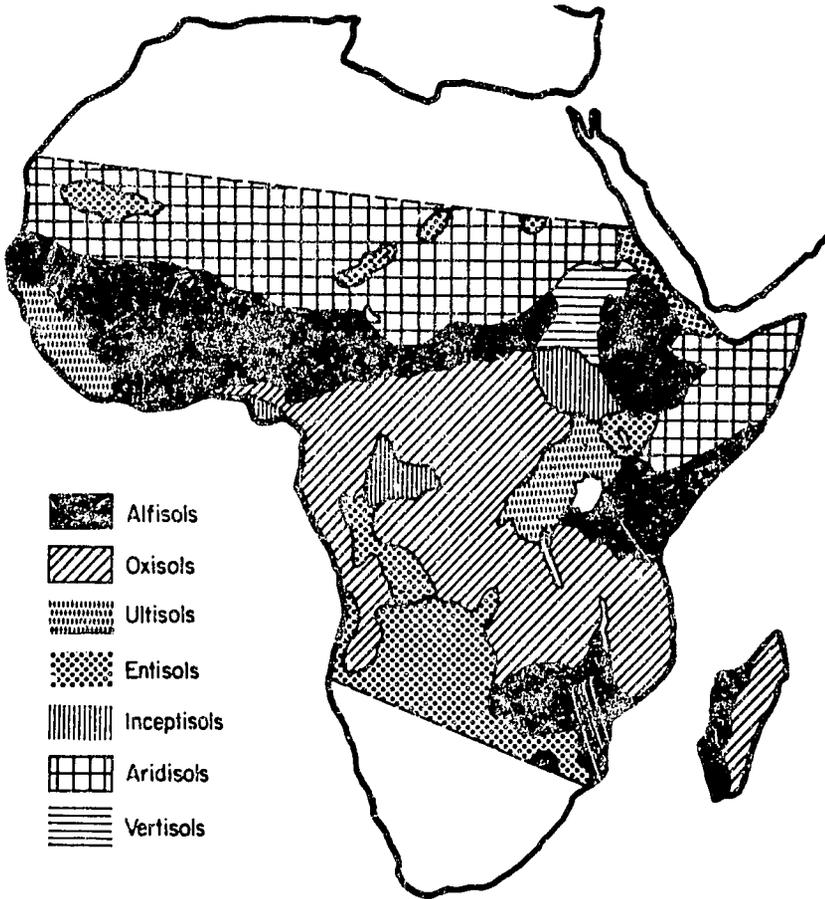


Fig. 2.2 Dominant soil groups in tropical Africa. (After USDA, Soil Conservation Service)

Finally, in all these countries over 60 percent of the population are engaged in agriculture.

Despite these similarities, the diverse peoples of the countries of tropical Africa exhibit marked differences in colonial background and related socioeconomic institutions such as religion, as well as in political institutions and stability, degree of agricultural commercialization, and economic development and development strategies. The interaction of these various peoples with their environment, their materials, and their technology has manifested itself in the diverse agricultural systems discussed in this chapter.

TABLE 2.2 Main Soil Groups Found in Tropical Africa

ALFISOLS: Formed in well-drained upland situations, with coarse or medium textured surface layer and base saturation of over 50%. Found mainly in savanna and forest/savanna transition zones of west Africa and east and central African highlands on which large-scale mechanized farms are located.

ULTISOLS: Morphologically similar to alfisols but with base saturation of the B horizon below 50%, hence more acid and leached than alfisols. Dominant soils in Liberia, Sierra Leone, eastern Cameroun, central Angola, southeastern Nigeria, and Ivory Coast.

OXISOLS: Strongly weathered soils without much variation with depth. Oxisols with basaltic rocks constitute soils of major agricultural importance in east and central African highlands and in a few scattered areas in west Africa.

VERTISOLS: So-called black cotton soils, consist of dark-colored cracking clay soils rich in swelling clays and difficult to work when wet. Occur in alluvial plains in Lake Chad area, Accra plains, savanna areas of east Africa.

ENTISOLS and INCEPTISOLS: Young soils of alluvial and colluvial origin in valley bottom situations.

ARIDISOLS: Formed in arid areas with horizon differentiation and accumulation of calcium carbonate, gypsum or salt, and deep, dark soils of high base status.

MOLLISOLS: Very rich in organic matter.

SOURCE: Joo, 1980.

DEVELOPMENT OF AGRICULTURE IN TROPICAL AFRICA

Evidence of the origins of African agriculture in relation to time, process, materials, and resource base is lost in the sands of time. Prevailing ideas about these origins are based on only a few archaeological, botanical, historical, and other clues (see Clark, 1970; Coursey, 1967, 1976; Harris, 1976; Murdock, 1959, Okigbo, 1980; Porteres, 1962; Purseglove, 1976; Shaw, 1972, 1976, 1977; and Wrigley, 1970). Among those who have attempted to piece together the available evidence of the origins of African agriculture, there has been a long-standing controversy between proponents of the theory of diffusion (e.g., Clark, 1970; Oliver & Fage, 1970) and those of the theory of independent origin (e.g., Murdock, 1959; Porteres, 1962). Now, however, it is generally accepted that African agriculture is the result of several thousands of years (at least 4000) of evolution by trial and error involving independent ennoblement of several species of African crop plants as well as some diffusion of ideas and transfer of materials and practices from elsewhere, and with interactions between these two processes (Okigbo, 1980).

One important and widely accepted idea is that advanced by Porteres (1962), who holds that Africa developed two agricultural complexes: a *seed agricultural complex*, characteristic of the savanna and involving the cultivation of grains and seed-bearing crops in open-field systems, and a *vegetural complex*, peculiar to the forest regions and involving the

growing of roots, tubers, and cuttings in gardens rather than in fields. Harlan (1971) has put forward a theory of *centers* and *noncenters*, in which he indicates that associated with the middle east or southwestern Asian center of domestication are African centers of plant domestication, around Ethiopia and west Africa. According to Harlan et al. (1976) and based on several sources of evidence, "traditional African agriculture is a mosaic of crops, traditions, and techniques which does not reveal a center, a nuclear area or single point of origin" (p. 13). African agriculture is a culmination of thousands of years of hunting and gathering, aspects of which are still practiced today, and thousands of years of experimentation with several wild plants that resulted, about 4000 years ago, in the domestication of the African yams (e.g., *Dioscorea rotundata* or white Guinea yam) as the major staple food crop on the forest margins east of the Bandama River in Ivory Coast (Coursey, 1969). West of the Bandama River, it resulted in the domestication of the red rice (*Oryza glaberrima*) starting from the middle Niger Delta (Porteres, 1962), which is perhaps one of the earliest floodwater, or *decrue*, agricultural systems in Africa. The guinea corn (*Sorghum bicolor*), millets (*Pennisetum* and *Digitaria spp.*), and cowpeas (*Vigna unguiculata*) were major crops domesticated in the savanna areas. In Ethiopia, wheat (*Triticum spp.*), ensete (*Ensete ventricos*), teff (*Eragrostie teff*), kath (*Catha edulis*), chickpea (*Cecur spp.*), and other crops were also ennobled.

Table 2.3 lists some notable domestic African crops. The production of these crops was based on an early slash and burn, shifting cultivation system. About the first millenium A.D. a number of Asian crops were introduced into Africa, several of these arriving by way of Madagascar Island. And several American crops were brought in after the discovery of America in 1492. Table 2.4 lists many of the crops imported into tropical Africa from other areas. A number of these exotic (Asian and American) crops were not only cultivated in the same way as the related indigenous African crops but were grafted into the existing farming systems. Moreover, it would appear that several of them (Asian yams, cocoyams, plantains) were as easily processed and prepared for eating as the indigenous yams, and each became adapted to ecological zones similar to those of their original homes.

Most tropical African livestock were domesticated elsewhere or were introduced from north Africa and southwestern Asia. These include goats, sheep, chickens, pigs, and ducks. Certain animals became adapted to specific ecological zones. For example, the humped cattle (*Bos indicus*) of India became adapted mainly to the savanna and tsetse-free areas. European-type cattle (*Bos taurus*), which were kept originally in north Africa, are now kept in subtropical and highland areas of the tropics. The only cattle adapted to the forest zones of west Africa—the Ndama and Muturu, or African shorthorn, trypano-tolerant cattle—were poor milk yielders. Thus dairy farming was not a part of the culture of the forest peoples of tropical Africa. In sum, the only livestock that is strictly indigenous to tropical Africa is the Guinea fowl.

TABLE 2.3 Domestic African Crops

VEGECULTURAL ZONE

ROOT CROPS

<i>Dioscorea rotundata</i>	White Guinea yam
<i>D. cayenensis</i>	Yellow Guinea yam
<i>D. praehensilis</i>	Bush or forest yam
<i>D. dumetorum</i>	Butter or cluster yam
<i>D. bulbifera</i>	Aerial yam
<i>Plectranthus esculentus</i>	Hausa or Kafir potato
<i>Solenostemom rotundifolius</i>	Piasa
<i>Sphenostylis stenocarpa</i>	African yambean

TREE CROPS

<i>Elaeis guineensis</i>	Oil palm
<i>Cola nitida</i>	Ghanja cola
<i>Cola acuminata</i>	Abata cola
<i>Cola lepidota</i>	Ochicha cola
<i>Treculia africana</i>	African breadfruit
<i>Dacryodes edulis</i>	African pear
<i>Iringia gabonensis</i>	Nature mango

VEGETABLES, NUTS, AND SEEDS

<i>Abelmoschus esculentus</i>	Okra
<i>Telfairia occidentalis</i>	Fluted pumpkin
<i>Vernonia amygdalina</i>	Bitter leaf
<i>Solanum macrocarpum</i>	African egg plant
<i>Sphenostylis stenocarpa</i>	African yambean
<i>Celosia argentea</i>	Shoko yokoto
<i>Cucumeropsis edulis</i>	White melon
<i>Colocynthes vulgaris</i>	Egusi melon
<i>Ricinus communis</i>	Castor bean
<i>Lagenaria scieraria</i>	Bottle gourd

RICE ZONE

<i>Oriza glaberrima</i>	African or red rice
<i>Aframomum melegueta</i>	Melegueta, or alligator, pepper

SORGHUM-MILLET ZONE

CEREALS

<i>Sorghum bicolor</i>	Guinea corn or sorghum
<i>Digitaria exilis</i>	Fonio or Hungary rice
<i>D. iburua</i>	Black fonio
<i>Pennisetum typhoides</i>	Pearl (candle) millet
<i>Eleusine coracana</i>	Finger millet
<i>Eragrostis teff</i>	Teff

GRAIN LEGUMES

<i>Vigna unguiculata</i>	Cowpea
<i>Voandzeia subterranea</i>	Bambara groundnuts
<i>Kerstingia geocarpa</i>	Kerstings groundnuts
<i>Cajanus cajan</i>	Pigeon pea

TREE CROPS

<i>Butyrospermum paradoxum</i>	Shea butter
<i>Parkia fillicoides</i>	Locust bean
<i>P. clappertoniana</i>	Locust bean
<i>Tamarindus indica</i>	Tamarind
<i>Adansonia digitata</i>	Baobab

VEGETABLES AND MISCELLANEOUS CROPS

<i>Polygala butyracca</i>	Black benniseed
<i>Sesamum indicum</i>	Sesame
<i>Citrullus vulgaris</i>	Watermelon
<i>Hibiscus subdariffa</i>	Roselle
<i>Ensete ventricosa</i>	Ensete
<i>Cucumis melo</i>	Melon
<i>Catha edulis</i>	Kath

SOURCE: Adapted from Harris (1976).

A number of factors have combined to bring about changes in the agricultural systems of tropical Africa. According to Okigbo and Greenland (1976), these changes arose, first, from the introduction of Asian crops during the first three centuries A.D. and the later introduction of American crops, after 1500 (see Table 2.4). These various crops changed the resource base of the African farmer and no doubt contributed significantly to African capabilities for supporting population increases at different times. Associated with these crops were various new production, processing, and other techniques.

In addition, there is no doubt that the introduction of exotic crops relegated some indigenous crops to the background and led to the African farmer's current inability to realize the full potential of the latter. The indigenous crops, at least initially, lacked some of the characteristics that made some introductions attractive.

Second, changes have come about as a result of the recent population explosion which has followed the initial population increases engendered by the significant increase in food resources brought about by the introduction of Asian crops. The population explosion was due mainly to advances in science, medicine, sanitation, public health, and general educational level. These developments have created increasing pressures on the land. These pressures, in turn, have drastically shortened the fallow periods that, in the shifting cultivation system, are necessary for maintenance of soil fertility and productivity. Pressures on the land have led to

TABLE 2.4 Crops Imported from Asia and America

Asian Crops		American Crops	
CEREALS			
<i>Triticum spp.</i> ¹	Wheat	<i>Zea mays</i>	Maize
<i>Hordeum vulgare</i>	Barley		
<i>Oryza sativa</i>	Rice		
ROOT CROPS			
<i>Colocasia esculenta</i>	Dasheen, Taro	<i>Manihot esculenta</i>	Cassava
<i>Dioscorea alata</i>	Water yam	<i>Ipomoea batatas</i>	Sweet potato
<i>Zingiber officinale</i>	Ginger	<i>Xanthosoma sagittifolium</i>	Tainia
		<i>Solanum tuberosum</i>	Potato
LEGUMES			
<i>Pisum sativum</i>	Pea	<i>Arachis hypogaea</i>	Groundnut, pea
<i>Cicer arietinum</i>	Chickpea	<i>Phaseolus vulgaris</i>	Common bean
<i>Lens esculenta</i>	Lentil	<i>P. lunatus</i>	Lima bean
<i>Glycine max</i>	Soybean		
TREE CROPS			
<i>Citrus spp.</i>	Oranges, grapefruits, etc.	<i>Theobroma cacao</i>	Cocoa
		<i>Persea americana</i>	Avocado
		<i>Anacardium occidentale</i>	Cashew
<i>Camelia sinensis</i>	Tea	<i>Carica papaya</i>	Paw paw, papaya
<i>Musa spp.</i>	Banana, plantain	<i>Psidium guajava</i>	Guava
<i>Mangifera indica</i>	Mango		
<i>Cocos nucifera</i>	Coconut		
VEGETABLES AND MISCELLANEOUS CROPS			
<i>Solanum melongena</i>	Eggplant	<i>Capsicum annum</i>	Chillies
<i>Allium cepa</i>	Onion	<i>C. frutescens</i>	Sweet pepper
<i>Saccharum officinarum</i>	Sugarcane	<i>Curcubita spp.</i>	Pumpkins, squash
		<i>Ananas comosus</i>	Pineapples
		<i>Lycopersicum esculentum</i>	Tomato
		<i>Gossypium hirsutum</i>	Upland cotton
		<i>G. barbadense</i>	Sea island cotton
		<i>Agave sisalanta</i>	Sisal

SOURCE: Adapted from Harris, 1976.

¹One or more species

the establishment of bush and grass fallow systems and the intensive, more or less permanent production systems currently in vogue in many areas.

Third, European colonization wrought great changes in African agriculture. Colonizers began by commercializing wild forest products such as the Guinea pepper and rubber and later focused on such crops as oil palms, groundnuts, and cotton. The varying colonial policies of the industrial, city-oriented countries of Europe have had far-reaching effects. For example, British colonial policies in east Africa—and especially in the Kenya White Highlands and the Rhodesias, where English settlements were established quite early—resulted in a system of land acquisition and tenure that developed large-scale, European-type farms that produced subtropical or temperate crops, mainly for sale. Native Africans either were made laborers on these farms or farmed as peasants in the traditional farming systems.

On the other hand, in west Africa where the lowland, malaria-infested areas did not attract European settlement, British policy encouraged smallholder tree and cash crop production rather than plantations. Commercialization of cocoa, oil palm, rubber, and groundnut production did take place as a result of both government support for research and extension and farmers' response to returns from cash crops, which were susceptible to fluctuating world prices. At the time, this smallholder policy appeared good, humane, and somehow more "democratic." Today, however, the result of this policy is a major stumbling block in efforts to increase production since smallholder tree crop plantations are unable to absorb some of the inputs of which large-scale farms can take full advantage. By contrast, in Malaysia (then Malaya), a policy that encouraged plantations has resulted in the country's ability today to maintain its place in world oil palm and rubber production.

The French policy of encouraging plantations and cash crop production in west Africa more or less on a "partnership" basis to some extent discouraged (until recently) the development of local, African capabilities in research, management, and technical performance. This policy, however, has also resulted in continuously increasing production of many cash crops in the Ivory Coast and Cameroun. In Cameroun this policy reinforced an earlier, German plantation policy.

The French type of policy has not always been successful where major political upheavals have taken place. For example, in Zaire, Angola, and the Republic of Guinea the exodus of foreign technical staff and managers on the eve of independence limited local management and technical capabilities. Moreover, to some extent, political instability and changes in strategy or ideology have led to disappointing performance by the agricultural sector. There are situations, however, where African takeover of large-scale farms—for example, in Kenya—has not resulted in similarly disappointing consequences.

The high priority generally given to cash or export crop production by the colonial powers—often to the neglect or disadvantage of the food

crop sector—is largely responsible for tropical Africa's current food problems. European colonization usually did result in the commercialization of farming and the development of an export economy, with limited local markets and supporting infrastructure. In addition, European colonization led to the accelerated growth of urban centers and to some commercial production of food crops and horticultural crops in market gardens. Initially, this production was aimed at satisfying demands of European settlements, but later it came to satisfy the general demands of a high rate of urbanization in Africa—a rate that is double the world average (Mabogunje, 1976).

The fourth way in which changes in farming systems have occurred is through the development of railways and road systems that linked major urban and administrative centers and along which also sprang up new settlements, farms, and markets. This development of transportation facilities has resulted in the movement of materials (crops, equipment, techniques) rapidly from one part of Africa, or from one African country, to another. It has given strong impetus to the commercialization of agriculture, and it has facilitated the movement of agricultural and industrial products to and from local and foreign markets and consumers.

Fifth, cassava production has expanded because of the crop's adaptation to shortening periods of fallow—which result in a decrease in soil fertility—and because of the demand for cheaper staple foods in urban centers (Morgan, 1959a,b). Moreover, cassava is one of the few food crops that can thrive without irrigation in areas where the dry season ranges between one and four months. Thus cassava has brought about changes in crop combinations and sequences as well as in land use.

Sixth, major changes in farming systems are being brought about by mechanization, the growing of fruits and vegetables for local processing, and canning and packaging these products both for local needs and for export. In such countries as Senegal, Ivory Coast, Kenya, and Upper Volta, commercial farms are producing tomatoes and other vegetables and flowers for export.

Finally, recent developments in industry such as the invention and manufacture of plastics and machines have resulted in new and better techniques and equipment for increased agricultural production. The increased pace and amount of agricultural research in both food and non-food commodities is giving rise to improved high-yielding and adapted crop varieties and breeds of livestock. These improvements are bringing about remarkable changes in agricultural systems in many parts of Africa.

AGRICULTURE AND AGRICULTURAL PRODUCTION SYSTEMS

This section considers the general features of traditional and transitional farming systems in tropical Africa. This brief review is based on Okigbo (1975, 1980, 1981) and Okigbo and Greenland (1976).

Traditional Tropical African Farming

Purpose and Commercialization of Farming

Farming is predominantly for subsistence, but farm systems show increasing and varying degrees of commercialization. According to Cleave (1974), the percentage of produce sold for cash ranges from 3 percent for maize in Chiweshe (Rhodesia) to 95 percent for cocoa in Abeokuta (Ogun State of Nigeria), and the proportion of farms under cash crops ranges between 8 and 85 percent.

Farming and Field Systems

A simplistic model of a traditional farm in tropical Africa consists of a pattern of fields at different distances and in different directions from the compound and/or homestead garden (Figure 2.3). Different methods of soil management and fertility maintenance are practiced on each of the fields and in the homestead garden. Usually these methods include fallows, clearance systems, and production systems for varying numbers of crops and/or livestock according to prevailing practices, customs, and the needs of the farmer. Thus each traditional farm is a complex of units or subsystems differentiated from others in terms of *physico-chemical* (soils, water, climate, nutrients), *biological* (crops, animals, pests), *socioeconomic* (labor, markets, religion, customs, personal preferences), *technological* (tools, machines, practices), and *managerial* (knowledge, decision making, courage) elements of the production process, all aimed at satisfying the farmer's objectives. The farm may be an enterprise and means of livelihood for one or more individuals but it is usually such for a family unit in which some or all members may participate part or most of the time in farm work.

Farms are small: over 60 percent range in size between 0.10 and 3 hectares. Farm size in savanna areas is usually larger than in the rainforest zone perhaps as a result of high labor requirements in the latter for clearing, weeding, etc. In Zambia, Kenya, and many other countries there are only a few large-scale farms but their numbers are increasing. In addition, there are tree crop plantations in countries such as Ivory Coast and Cameroun.

There is a diversity of farming systems, ranging from true shifting cultivation and nomadic herding, where settlements are often moved, to permanent cultivation and intensive livestock production, such as modern poultry production and dairying. True shifting cultivation is now rare, but it was reported to be restricted to parts of Rhodesia, now Zambia and Zimbabwe (Allan, 1965); the Ivory Coast; and Cameroun or the Cameroun-Nigeria border (Grigg, 1974; Morgan, 1969). Nomadic herding is widespread in the semiarid Sahel, the Sudan savanna and the adjacent dry regions in west and east Africa. It should be noted that true shifting cultivation—where homesteads are moved along with farms—has probably been replaced by systems involving permanent homesteads and temporary huts on or close to distant farms. In this regard, it is more

accurate to say that shorter bush and grass fallows of varying but longer periods of cultivation and different shortened periods of fallow now exist in tropical Africa.

Permanent cultivation occurs in kitchen or homestead gardens or compound farms; in some areas where soils have high fertility; in confined sites such as uplands and islands (e.g., the steep slopes of Maku in Anambra State of Nigeria, where terrace farming is practiced, and islands

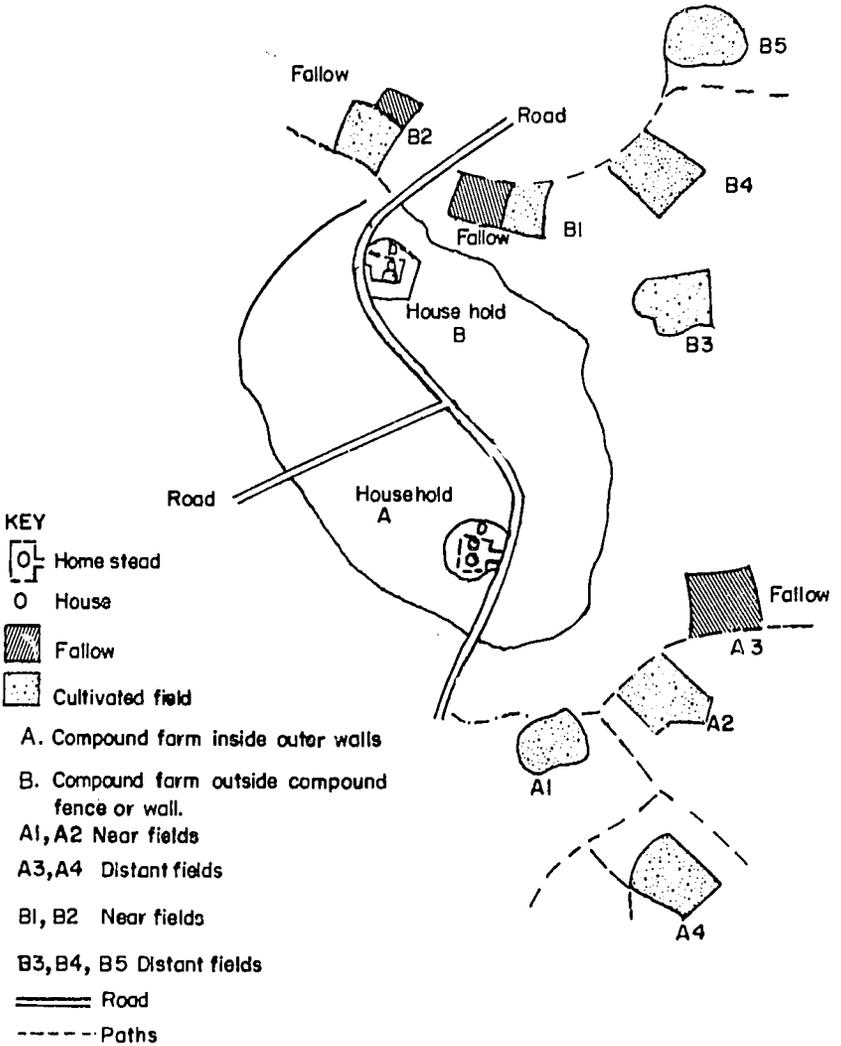


Fig. 2.3 Schematic diagram of compound farms in relation to associated fields systems in traditional farming systems of the humid tropics of west Africa.

such as Ukara Island in Lake Victoria); in plantations in the forest zone or in irrigated farms, as in the Gezira; and in overcrowded areas of high population densities such as the Ibo and Ibibio areas of the Anambra, Cross River, and Imo States of Nigeria, the eastern rice-growing slopes of Malagasy Republic, the Kano close-settled zone of northern Nigeria (Morgan, 1969), and desert oases.

The compound farm system is the most widespread permanent agricultural system. It forms the center from which paths lead to other field systems and other production units, and various activities revolve around it. The largest number of crops in mixtures are found in the compound farm. These crops are grown not only for their use as foods but for various other uses; for example, as sources of oils and fats, condiments and spices, drugs, fibers, structural materials, beverages, animal feed, boundary markers, masticants and stimulants, fuelwood, shade, protection of homestead privacy, ornamentals, and in religious and social functions (see Table 2.5). The development of the compound farm as a regular feature of the traditional farming systems in most areas of Africa—especially in the areas of the humid and subhumid zones that are not highly urbanized—is related to three phenomena:

1. Labor is divided between the sexes such that women are responsible for cooking and the provision of soups and sauces or supplementary food preparations with which the main starchy staples, often produced by men, are eaten and for which all-year-round availability of fresh vegetables, condiments, and spices at close range is necessary and convenient.
2. With frequent clearing of forests and bushes, useful trees often harvested from the wild or protected in fallows are rapidly disappearing; their cultivation in compound farms ensures that their products are readily available and that they do not become extinct or very scarce.
3. The compound garden is used as an experimental area for trying out interesting plants collected from neighboring compounds or during trips further afield (Vermeer, 1976).

Semipermanent cultivation of varying durations of fallow exists in other field systems.

Land Use, Clearing, and Development

Particularly in relation to crop production, traditional African agricultural systems take full advantage of local topographic features, microrelief, and related peculiarities such as old home sites, termite mounds, hydromorphic soils, and valley bottoms. It must be stressed, however, that although sugarcane, fruits, and vegetables may be grown in valley bottoms and in locations that have high water tables such as in the savanna and in most areas close to urban centers, a major characteristic of African agriculture is its restriction to upland production systems. Thus there is limited use of highly fertile hydromorphic soils as in the rice culture of Asia. Although this characteristic may be the result of the presence of

TABLE 2.5 Food and Other Useful Plants Found in Crop Mixtures in Compound and Outlying Farms in Southeastern Nigeria

Crop Plant Group	Area of Sample										Mean Percentage Frequency
	Derived Savanna 0.003-0.45 Ha		Transition Zone/ Derived Savanna/Oil Palm Bush 0.04 Ha		Oil Palm Bush/ High Population Density 0.04-0.4 Ha		Oil Palm Bush/ Medium-High Population Density 0.05-0.5 Ha		Oil Palm Bush/ High Population Density 0.04-0.5 Ha		
	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	
1. Roots & tubers	1-12	5	4-6	5	5-8	7	1-8	4	7-9	8	47
2. Cereals & other starchy staples	0-3	1	1-2	1	2-3	2	0-4	2	2-3	2	38
3. Leafy vegetables	3-7	4	0-4	2	4-8	6	10-11	6	2-8	5	27
4. Fruit vegetables	4-6	4	1-3	2	5-6	5	0-6	2	3	3	44
5. Legumes	1-5	3	0-4	2	2-4	2	3-3	1	0-3	2	33
6. Fruits, nuts, & oil plants	1-14	5	0-1	1	10-11	10	2-15	7	5-12	9	20
7. Spices & beverages	0-3	1	0-1	1	2-6	4	0-9	4	1-7	4	18
8. Miscellaneous useful plants	0-7	2	0-1	0	10-14	13	1-29	11	4-18	12	11
Range in total number of species or cultivars	0-65		4-19		40-48		6-62		25-52		

SOURCE: Okigbo and Greenland (1976).

health hazards—such as schistosomiasis and simuliids—in other areas, cultural factors are also partly involved.

Most farming activities and cropping patterns and systems, as well as some aspects of livestock production, are dependent on the prevailing rainfall regime and amount. Irrigated agriculture of either the traditional or the modern type has made limited impact, especially in the Sahel where periods of drought spell havoc to man and stock.

There is widespread use of the slash and burn clearance system, with local variations of this system as well as preplanting cultivations. The latter are often minimal, however, and planting may be on the flat or involve the making of mounds, beds, ridges, and holes of various sizes to control the water table and drainage, concentrate the surface soil or organic residues, and aid in harvesting. Shortage of labor and large-scale agricultural production projects requiring mechanization have resulted in removal of forest cover, damage of soil structure, and continuous cultivation, which is causing serious soil erosion, irreversible degradation, and rapid decline in soil productivity.

Labor, Tools, and Mechanization

There is widespread reliance on simple tools and human labor for most of the farm work: in large areas where tsetse flies and trypanosomiasis are endemic, mechanization is minimal and use of animal power is limited.

Most farms in tropical Africa suffer from a shortage of labor, especially during peak periods of clearing, land preparation, planting, weeding, and harvesting. There are several factors in this shortage of labor: the division of labor between the sexes; the fact that most children are in school and unable to assist in farming; low returns to agricultural labor and drudgery in farming that encourage rural-urban migration; competition with industry in the labor market; and change in standards that has resulted in detestation of manual work. The overall result of this is that farming is increasingly left to old men and old women.

Soil Management and Fertility

The traditional farmer relies heavily on fallowing and nutrient cycling by plants for restoration of soil fertility lost during each cropping. This is an ecologically sound, low-input practice for extensive agriculture. The fallow period in some areas has been drastically shortened and as a result is unable, without fertilizers, to restore soil fertility.

Soil fertility in the compound garden and in certain systems of permanent cultivation is maintained by the use of such substances as household and kitchen refuse, ashes, farm residues, animal pen manure, human waste, and compost.

Use of Pesticides and Other Inputs

With the exception of some cash or export crops, there is very limited use of costly inputs such as fertilizers and pesticides. This is because

many farmers lack the credit or capital to purchase inputs and pay for services.

Cropping Systems and Rotations

Intercropping of various kinds (row, mixed, patch, or relay intercropping) is a rather common practice in all field systems. Growing crops in rows is more often associated with animal or tractor cultivation. Growing crops in pure culture is more often practiced with cash or plantation crops or crops grown in special environments, such as rice.

In the compound farm, annual staples, vegetables, and other food plants are grown alongside perennial trees and shrubs often in complex patterns of intercropping mixtures. Frequently in the rain forest area this practice produces a multistoried structure approaching a complex tropical forest ecosystem. Quite commonly on the periphery of the compound garden are short-term, one to two-year permanent fallow rotations in which tree crops are cultivated or protected in mixtures with annual staples and other crop plants, constituting a less complex agroecosystem.

In a given location, the most important staples, cash crops, or nitrophiles adapted to rich soils—such as maize and yams—are usually grown during the first year of the cropping phase after the clearing of forest, bush, or grassland fallow. The number of crop species usually also decreases as number of years of cropping before fallow increases. Crops less sensitive to soil fertility, such as cassava, are last in the sequence before bush fallow. Rotations of various field systems are characterized by (1) decreasing lengths of fallow with increasing population pressure; (2) decreasing number of species of tree-crops and vegetables, with staple food crops dominant at greater distances from the compound garden; and (3) heavy pruning of trees and shrubs in distant fields to reduce shade but leaving occasional stumps of varying heights to support climbers such as cucurbits and cowpeas. The latter practice facilitates early regeneration of fallow, and constitutes reserve fuelwood and the like.

Livestock Production Systems

In almost all traditional farming systems varying numbers of small livestock (especially poultry, goats, sheep, and pigs) are kept in compound farms and adjacent areas where they may be on free range or restricted during the cropping season. Small livestock are kept as (1) economical sources of protein, converting farm, compound, and kitchen refuse into meat; (2) sources of manure for maintenance of soil fertility and suitable levels of soil organic matter; (3) potential sources of cash in times of emergency; and/or (4) livestock tenancy by which female offspring of livestock are shared among relatives, thus minimizing the risk of losing a good breed of livestock as a result of disease or other causes (Uchendu, 1965).

Large animals such as cattle are kept in large numbers only in tsetse-free savanna and semiarid areas in which nomadic herdsmen such as the Fulani in west Africa and the Masai in east Africa are found. Various

efforts to settle these nomadic herdsmen on permanent ranges or pastures have rarely proved successful in Africa. Modern intensive livestock production involving cattle is restricted to favorable locations such as the White Highlands of Kenya and to other areas that have a relatively cool climate, such as Zambia and Zimbabwe. Close to urban centers, intensive poultry production is on the increase. But it is also quite common, in traditional livestock production, to keep animals as a sort of status symbol rather than for primarily commercial purposes.

In general, it may be concluded that traditional African agriculture is very complex, with each farmer often growing many crops and rearing many kinds of livestock, in addition to engaging in several nonfarm activities (see Figures 2.4, 2.5, and 2.6). Specialization in production is only just beginning, and the general objective of farming appears to be the sustained or yearly production, at minimal risk, of reasonable levels of a range of products so as to satisfy both subsistence and commercial needs. Traditional farmers rarely farm with the objective of maximizing production of any one commodity in their production systems solely for cash.

As a result of a number of factors—lack of adoption of improved technologies, absence of research, and/or lack of progress in solving specific agricultural production problems—the productivity of traditional farming systems remains low. In general, productivity is only a small fraction of what it could be in comparison with experiment station research. This situation is most pronounced in food crops, especially in legumes such as cowpeas.

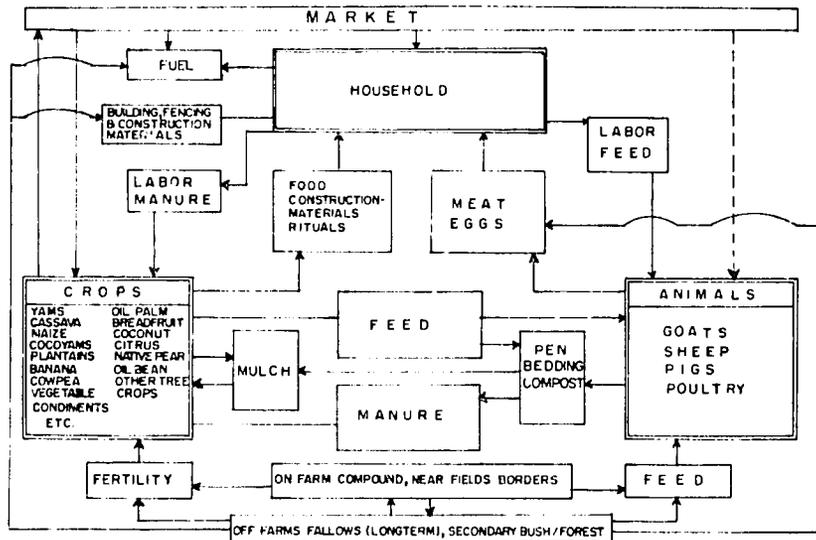


Fig. 2.4 Compound farming, intensive cultivation, and bush following in tropical rain forest region, Imo State, southeastern Nigeria. (Based on Lagemann, 1977; adapted from McDowell & Hildebrand, 1980)

Classification of Agricultural Systems

There is at present no generally accepted typology of tropical African farming systems. For convenience, however, an attempt is made here to present a conceptual framework for describing and classifying the traditional and transitional farming systems of Africa, based on Allan (1965), Miracle (1967), Morgan (1959, 1969), Morgan and Pugh (1969), Floyd (1969), Boserup (1970) White and Gleave (1971), Ruthenberg (1971), Benneh (1972), Greenland (1974), Grigg (1974), Okigbo and Greenland (1976), and McDowell and Hildebrand (1980). This framework is presented in Table 2.6. Table 2.7 outlines the main crops and livestock associated with the prevailing farming systems.

FOOD PRODUCTION AND NUTRITION

Food production in tropical Africa is the preoccupation of millions of small farmers, over 90 percent of whom farm less than five hectares. It is estimated also that over 90 percent of the food produced in tropical Africa

(continued on page 37)

TABLE 2.6 Farming Systems in Tropical Africa

A. *Traditional and Transitional Systems*

1. (a) Nomadic herding
(b) Shifting cultivation (Phase I), $L > 10^4$
2. Bush fallowing or land rotation:
shifting cultivation (Phase II), $L = 5 - 10$
3. Rudimentary sedentary agriculture:
shifting cultivation (Phase III), $L = 2 - 4$
4. Compound farming and extensive subsistence agriculture:
shifting cultivation (Phase IV), $L < 2$
 - (a) Highland agriculture (terraced or not)
5. Terrace farming and floodland agriculture
 - (b) Floodland or valley bottom agriculture

B. *Modern Farming Systems and their Local Adaptations*

1. Mixed farming
2. Livestock ranching
3. Intensive livestock production (poultry, pigs, dairying)
4. Large-scale farms and plantations
 - (a) Large-scale tree crop plantations
 - (b) Irrigation projects involving crop production
 - (c) Large-scale food and arable crop farms based on natural rainfall
5. Specialized horticulture
 - (a) Market gardening
 - (b) Truck gardening and fruit plantations
 - (c) Commercial fruit and vegetable production for processing.

SOURCE: Okigbo and Greenland (1976).

^a $L = C + F/C$ where C = cropping period, F = fallow period, and L = land use factors

TABLE 2.7 Prevailing Agricultural Production Systems and Associated Crop and Animal Components in Different Climatic Zones of Tropical Africa

Farming System	Major Crops	Major Animals	Main Regions	Feed Source
A. TRADITIONAL AND TRANSITIONAL SYSTEMS				
1. a. Nomadic or pastoral herding	Usually none; sometimes vegetables and early maturing crops near temporary huts.	Cattle, sheep, goats	Sudan, Sahel, Savannas; migration sometimes to northern Guinea savanna or to wetter areas in dry season	Natural range browse plants, forage, grasses, and legumes
b. Shifting cultivation Phase I, L ≥ 10	<i>Maize/yams/rice/plantains</i> Maize, rice, yams, cassava, plantains, cocoyams, vegetables, oil palms, citrus, and other tree crops	Goats, sheep, poultry	Humid to sub-humid tropics	Browse plants, fallow land, crop residues, kitchen/compound waste.
2. Bush fallow shifting cultivation Phase II, L = 5-10	<i>Sorghum/millet</i> Sorghum, millet, maize, cowpeas, cassava, sugarcane, vegetables, locust beans, sesame	Cattle, sheep, goats, horses, poultry, donkeys	Southern Guinea Savanna, Sudan Savanna, or equivalents in east Africa	Fallow, browse plants, crop residues, vines, straw, cull roots
	<i>Yams/rice/plantains</i> Yams, rice, plantains, or banana; cassava, maize, vegetables, tree crops, cocoyams	Goats, sheep, poultry, some swine	Humid-subhumid tropics	Fallow, browse trees and shrubs, crop & compound waste
	<i>Sorghum/millet</i> Sorghum, millet, maize, soybeans, sugarcane, vegetables, bananas, yams, tobacco, cowpea	Cattle, goats, sheep, poultry, horses, donkeys	Forest/savanna mosaic, southern & northern Guinea Savanna	Fallows, browse plants, pasture, crop residues, stover vines, cull roots.

Farming System	Major Crops	Major Animals	Main Regions	Feed Source
3. Rudimentary sedentary agriculture, shifting cultivation Phase III, L = 2-4	<i>Rice/yams/plantain</i> Yams, rice, maize, plantains and bananas, cassava, vegetables, tree crops (oil palm, rubber, cocoa, citrus, etc.), cocoyam	Goats, sheep, poultry, some swine	Humid and subhumid tropics	Fallow, browse plants, crop residues, compound house refuse
	<i>Sorghum/millet</i> Sorghum, millet, maize, vegetables, sesame, sugarcane, cotton, tobacco, groundnuts, bananas, cassava, locust beans, shea butter, mango, other tree crops.	Cattle, goats, sheep, poultry, donkeys, horses	Forest/savanna mosaic, Guinea, Sudan, and Sahel savanna	Fallows, pasture, crop residues, stover vines, cull roots, groundnut cake, bran, etc.
4. Compound farming and intensive subsistence agriculture, shifting cultivation Phase IV, L = <2.	<i>Yams/rice/plantain/tree crops</i> Yams, plantains, bananas, rice, tree crops, cassava, maize, vegetables, cocoyams	Goats, sheep, swine, poultry	Humid and subhumid tropics	Browse plants, crop residues, cull tubers and roots, tree crop byproducts, household refuse
	<i>Vegetables</i> Vegetables, sugarcane, maize, tobacco, sesame, groundnuts	Goats, sheep, poultry, swine	Forest/savanna	Browse, crop residues, tree crop byproducts, vines, kitchen refuse
	<i>Sorghum/millet</i> Sorghum, millet, maize, vegetables, cowpea, cassava, cotton, tobacco, melon	Cattle, goats, sheep	Savanna, northern Guinea, Sudan, and Sahel savanna	Fallow, browse plants, crop residues, vines, groundnuts, haulms

Farming System	Major Crops	Major Animals	Main Regions	Feed Source
5. Highland agriculture	<i>Maize/yams/rice/plantains</i> Maize, yams, rice, plantains, cocoyams, tea, coffee, tropical and subtropical vegetables	Goats, sheep, poultry, swine	Humid and subhumid tropical forest/savanna mosaic	Fallow, trees and shrubs as browse, crop residues
	<i>Sorghum/tef/wheat/maize</i> Sorghum, tef, wheat, maize, beans, cowpeas, millets, groundnuts, subtropical vegetables and fruits, coffee, tea, sugarcane, sesame	Cattle, sheep, goats, poultry, horses, donkeys	Savanna, montane climate	Fallow, pastures, crop residues
6. Floodland agriculture, valley bottoms	<i>Yam/rice/banana</i> Yams, rice, vegetables, bananas, sugarcane, maize, cocoyams, groundnuts	Goats, sheep in household gardens associated with fields systems	Humid and subhumid	Crop residues, some browse plants
	<i>Rice/banana/sugarcane</i> Rice, banana, maize, sugarcane, vegetables, yams, groundnuts, cowpeas, cocoyam	No animals except in associated field systems	Savanna—Guinea to Sahel.	Crop residues fed to animals in compound garden
B. "MODERN" SYSTEMS AND THEIR LOCAL ADAPTATIONS				
1. Mixed farming (Best developed as European-type farms in east Africa, Sudan, savanna area around Kano) <i>Note:</i> Most compound farms in the humid tropics are strictly mixed farms.	Sorghum, cotton, millets, vegetables, cowpeas, few tree crops (locust bean Acacia)	Cattle, sheep, goats, poultry, horses, donkeys	Sudan to Sahel—savanna	Pasture, fallow grass, crop residues

Farming System	Major Crops	Major Animals	Main Regions	Feed Source
2. Livestock ranching	None usually—based on grass/legume and range plants	Cattle	Sudan to Sahel savanna	Natural ranges with or without seeding of forage species
3. Intensive livestock production (dairy, poultry)	<i>Fodder grass/legume and pastures</i> Maize for silage, elephant grass (vegetables & fruit trees in compound)	Cattle, poultry	Humid to savanna, best in highland tropics, montane vegetation	Pasture, fodder grass/legumes, hay
4. Large-scale European type farms and plantations				
a. Plantations	<i>Coconut, cocoa, oil palms, rubber, tea</i>	Usually no livestock but sometimes with dairy & poultry	Humid and subhumid tropics & wetter savanna areas	Pasture of grasses and or legumes especially under coconuts
b. Irrigation projects	<i>Rice/cotton/maize</i> Sorghum; wheat; vegetables, e.g., tomato	Usually no animals except cattle	Savanna areas	Pasture if animals are present + fallow and crop residues
c. Large-scale field crops projects based on natural rainfall only	Maize, rice, cassava, groundnut	Usually no animals, may need cattle as draught animals in the tsetse-free areas	Humid to subhumid	Some pasture crop residues

Farming System	Major Crop	Major Animals	Main Regions	Feed Source
5. Specialized horticulture				
a. Market gardening	Vegetables, fruits, and ornamentals, local (e.g. okra, celosia) and subtropical exotic (e.g., lettuce, Indian spinach, citrus, papaya) vegetables & fruits	Usually no animals but occasionally such animals as poultry.	Humid tropics to Sahel savanna	Fallows or crop residues and animal by-products
b. Truck garden and fruit and vegetable plantations (mainly for export)	Tomatoes and vegetables, beans, peppers, pineapples, avocado, bananas	Usually no animals	Humid tropics to Sahel savanna. All tropic highland areas and savanna irrigation	Usually not required

SOURCE: Adapted from McDowell and Hildebrand (1980).

comes from small farmers. It is important to bear these facts in mind in considering the performance of the food sector and in planning and developing effective programs for solving African food production problems.

All available figures for the past 20 years indicate that in almost all African countries food production has increased steadily, albeit at a very slow pace. In many instances, however, per capita food production appears to be declining. Consequently, in many countries of tropical Africa there has been a steady rise in food imports at a time when these countries are confronted with rising energy bills due to the unprecedented high cost of petroleum. This situation, together with current worldwide inflation, does not augur well for the economic, nutritional, and general well-being of the peoples and countries of tropical Africa. Many of these countries are newly independent and thus preoccupied with maintaining peace and stability and building strength and prosperity in order to preserve their territorial integrity and sovereign status among nations. But with rising food and petroleum import bills it is impossible for most of these countries to finance educational and manpower development, industrialization, and health and general economic development programs. In this increasingly interdependent world of ours, the food situation in Africa now and for the next two decades is of major concern not only to Africans but to the developed countries as well.

In 1980 FAO reported that at least 20 countries, mostly African, were suffering acute food shortages. In the same year, 26 African states facing serious food problems requested food aid to supplement their meager resources. Drought, earthquakes, typhoons, and war have, during the past decade, decreased these resources and made many countries dependent on the World Food Programme. Stacey (1981) observes that Africa is the only region of the world where per capita food production has declined during the past 20 years. He notes that demand for food imports has soared at a time when foreign exchange and heavy debts are severely limiting commercial import possibilities for most African nations. Even an OPEC country like Nigeria has been suffering the heavy burden of rising food imports. In response to this situation, Nigeria has, during the last 10 years, launched three programs—the National Accelerated Food Production Program (NAFPP), Operation Feed the Nation (OFN), and the Green Revolution Program—all aimed at achieving self-sufficiency in food production and regaining the country's leading position as a producer of such items as cocoa, oil palm products, and groundnuts. Similar programs have been launched by Ghana, Liberia, and several other countries. Yet there is no indication that an effective solution to the problem of food shortages is in the offing.

Status of Food Production in Sub-Saharan Africa

Recent International Food Policy Research Institute (Paulino & Yeung, 1981) and FAO (Mazumdar, 1980) studies have highlighted various world

production problems based on analyses of production and consumption figures from 1961–1965 to the 1973–1977 periods for the former and 1972–1974 for the latter, including projections to 1985 and 2000. According to the 1977 IFPRI study (Paulino & Yeung, 1981), world production of major food crops was 1686 million tons and production of livestock and poultry products was 602 million tons (see Table 2.8). The food crops consisted of cereals (1476 million tons) and noncereal staples (210 million tons); the livestock and poultry products included meat (128 million tons), milk (449 million tons), and eggs (25 million tons), as shown in Table 2.8. In 1977 developing countries of the world, which contain about 75 percent of the world's population, provided only 48 percent of world cereal production but 72 percent of noncereal production. The same countries accounted for 35 percent of the world's meat production, 22 percent of its milk production, and 33 percent of its egg production. Among devel-

TABLE 2.8 World Population and Food Production, 1977

	World	Developed Countries	Developing Countries		
			Total	Sub-Saharan Africa	Other Regions
Population (millions)	4205 (100)	1139 (27)	3066 (73)	311 (7)	2755 (66)
Food production (million tons)					
Major staple food crops:					
Cereals	1476 (100)	771 (52)	705 (48)	36 (3)	669 (5)
Noncereals ^a	210 (100)	59 (23)	151 (72)	32 (15)	119 (57)
Livestock and poultry products:					
Meat ^b	128 (100)	84 (65)	44 (35)	3 (2)	41 (33)
Milk ^c	449 (100)	351 (78)	99 (22)	6 (1)	93 (21)
Eggs	25 (100)	17 (67)	8 (33)	d (2)	8 (31)

SOURCE: Paulino & Yeung, 1981.

NOTES: The FAO classification system was used in assigning countries to "developed" and "developing" categories.

Figures may not add up to totals because of rounding. Percentages of world totals are enclosed in parentheses.

^aAggregate of rootcrops, pulses, groundnuts, bananas, and plantains; in cereal equivalent.

^bAggregate meat of indigenous cattle, sheep, goats, pigs, and poultry; in carcass-weight equivalent.

^cAggregate for cow, sheep, and goat's milk, but excluding camel's milk.

^dLess than half a million tons.

oping countries, sub-Saharan Africa, with 7 percent of the world's population, contributed 3 percent of the world's cereals, 15 percent of noncereals, 2 percent each of meat and eggs, and one percent of milk.

Details of sub-Saharan Africa's food production and consumption in 1977 are presented in Table 2.9. Of the major staples produced in sub-Saharan Africa, cereals accounted for 53 percent, root crops for 31 percent, grain legumes (pulses) for 6 percent, groundnuts for 5 percent, and bananas and plantains for 5 percent. Of the cereals, sorghum and millets—currently, most of these are produced in the Sahel, which is subject to periodic droughts—accounted for about 23 percent and maize 20

TABLE 2.9 Composition of Sub-Saharan Food Production and Consumption, 1977

Commodity	Production		Consumption ^a	
	000 MT	Percent	000 MT	Percent ^b
Major staple food crops ^c	67,717	100.0	72,859	100.0
Cereals	36,149	53.4	42,221	57.9
Millet & sorghum	15,524	22.9	16,486	22.6
Maize	13,521	20.0	14,223	19.5
Rice (milled)	3,555	5.2	5,020	6.9
Wheat	1,051	1.6	3,821	5.2
Others	2,498	3.7	2,671	3.7
Noncereals	31,568	46.6	30,638	42.1
Rooterops	(20,857)	(30.8)	(21,170)	(29.1)
Pulses	(3,816)	(5.6)	(4,135)	(5.7)
Groundnuts	(3,529)	(5.2)	(2,330)	(3.2)
Bananas & plantains	(3,366)	(5.0)	(3.00)	(4.1)
Meat ^d	3,050.3	100.0	2,973.7	100.0
Cattle	1,733.1	56.8	1,660.9	55.9
Sheep & goat	631.5	20.7	611.2	20.6
Pig	230.9	7.6	242.9	8.2
Poultry	455.5	14.9	458.7	15.4
Milk ^e	5,849.5	100.0	7,437.4	100.0
Cow	4,556.0	77.9	6,077.1	81.7
Sheep	222.9	3.8	275.4	3.7
Goat	757.2	12.9	771.6	10.4
Camel	313.3	5.4	313.4	4.2
Eggs	414.1	100.0	424.2	100.0
Hen	408.2	98.6	418.3	98.6
Other	5.8	1.4	5.8	1.4

SOURCE: Paulino & Yeung, 1981.

NOTE: Figures may not add to totals because of rounding.

^aRefers to total domestic utilization, in terms of primary commodity equivalent.

^bOf major commodity group.

^cQuantities in cereal equivalent.

^dQuantities in carcass-weight equivalent; bovine, ovine, and pig meat production is from indigenous animals.

^eQuantities in whole milk equivalent.

percent, with rice 5 percent, wheat 2 percent, and others 4 percent. Wheat and rice constituted major items in the food import bill of most countries of the region. Consumption figures indicate that the region had serious shortfalls in the cereal component of staple foods amounting to 72 percent for wheat and 29 percent for rice of the total domestic requirement. Deficits in other cereal crops ranged from 5 to 7 percent of consumption, with overall cereal production amounting to 6.1 million tons, or about 14 percent of the domestic cereal needs in 1977. Small deficits were observed in root and tuber crops and grain legumes, but the region was more or less self-sufficient in the noncereal crops as a result of small surpluses of bananas, plantains, and groundnuts. On the basis of total domestic food utilization, total consumption amounted to 58 percent cereals and 42 percent noncereals, with maize, millet, sorghum, and root crops amounting to 70 percent of consumption. Thus Africa depends on several starchy staples other than rice, whereas rice is the main staple in most of Asia.

Of meat consumed, beef amounted to 56 percent, sheep and goats accounted for 21 percent, poultry 15 percent, and pigs 8 percent. Meat and egg production and consumption were in balance, but milk showed a deficit: 6 million tons were produced but 7 million were consumed. Milk was mainly from cows (82%) and goats (19%), and eggs came mainly from chickens (99%). The source of milk varied in different countries, however. In Nigeria, Malagasy, Uganda, and Zimbabwe cow's milk made up the bulk of production, whereas in Somalia goat's milk amounted to 35 or 40 percent and camel's milk 30 percent of total milk production.

The rate of increase in the production of major staples was 1.6 percent between 1961 and 1977, about one percent lower than the population growth rate. A detailed analysis of the data indicated that only Kenya, with a 3.6 percent population growth rate and a 5 percent annual food increase rate, and Zaïre, with a food increase rate of 2.7 percent and a population growth rate of 2.3 percent, recorded annual growth rates in food production higher than the population growth rate. Food crop output in the Sahel over this 16-year period grew at the very slow rate of 0.1 percent. This retarded development is attributed to the fact that a seriously declining trend in cereal production was offset by only a slight increase in the noncereal component of output. About 80 percent of the growth in food crop production resulted from expansion of areas under cultivation for both cereals and noncereals. This regional pattern was reflected in varying degrees by individual countries. Most commodities must be produced under rainfed conditions and are thus dependent on the weather. During the period in question, extreme weather variations caused marked fluctuations in output that magnified food problems in the region. The most serious fluctuations were observed in the Sahel, the Malagasy Republic, Tanzania, and Zaïre.

Total consumption of major staple food crops in sub-Saharan Africa between 1961-1965 and 1973-1977 increased at an annual rate of 2.3 percent (see Table 2.10). This rate was 0.4 percent lower than the esti-

TABLE 2.10 Mean Percent Annual Growth in Population and Consumption of Various Commodity Groups in Some Countries and Regions of Sub-Saharan Africa, 1961-65 to 1973-77

Country/Region	Population ^a	Cereals	Non-Cereals	Meat ^b	Milk ^c	Eggs
Ethiopia	2.5	1.5	1.8	-0.4	1.4	1.5
Kenya	3.6	2.6	1.5	1.4	-9.3	4.9
Nigeria	3.0	1.3	2.2	1.5	6.6	3.0
Tanzania	2.8	3.1	2.6	3.2	2.1	4.7
Zaire	3.1	5.3	2.6			
Zimbabwe	3.7			5.5	1.5	2.7
Sahel ^d	2.6	1.3	2.2	4.0	1.2	2.3
Sub-Saharan Africa ^e	2.7	2.3	2.3	2.0	2.1	3.5

SOURCE: Paulino & Yeung, 1981.

^aBased on United Nations population figures for 1963 and 1975.

^bIncludes cattle, sheep, goat, pig, and poultry meat, in carcass-weight equivalent.

^cIncludes sheep, goats, camel milk, milk products (whole milk equivalent).

^dIncludes Gambia, Chad, Mali, Mauritania, Niger, Senegal, and Upper Volta.

^eSub-Saharan averages based on more country values in survey than are listed.

mated population growth rate in the region, indicating a decline in the domestic use of these commodities. Although consumption of food crops increased faster than population growth in Ghana, Malagasy, and Zaire and just kept ahead of population growth in Uganda and Tanzania, it lagged behind in Ethiopia, Kenya, Nigeria, and the countries of the Sahel by one percent. In general, the average rate of growth of cereal consumption was high in such countries as Zaire (5.3%) and Ghana (4.9%). Except in Kenya, growth in consumption of noncereals was sustained where the rate of domestic use of food crops fell below the population growth rate. The amount of major food crops used for direct human consumption increased by 2.6 percent, that used for animal feed by 2.9 percent, and that used in other ways by 1.1 percent. Growth in the use of food crops for animal feed was related to the rate of growth in poultry development. Meat consumption increased annually by 2.1 percent as compared to 2 percent for milk and 3.5 percent for eggs. Thus meat and milk consumption lagged behind population growth whereas egg consumption increased faster than the population. Pork and poultry consumption outpaced the rate of population growth. Cow's milk consumption increased most rapidly or was highest in Nigeria; 13 percent was the highest rate of increase in the region.

Food Trade

Between 1961-1965 and 1973-1977 the sub-Saharan region changed from the status of a minor exporter of food crops to that of a major importer (see Table 2.11). Exports of food crops, consisting mainly of groundnuts, decreased by 56 percent and imports, consisting mainly of

TABLE 2.11 Exports, Imports, Net Trade, and Sufficiency Ratios of Major Staples and Livestock (including Poultry Products) in Selected Countries and Regions of Sub-Saharan Africa, 1961-65 and 1973-77

Country/ Region	Exports			Imports			Net Trade ^a (000MT)		Sufficiency Ratio ^b (percent)	
	1961/65 (000MT)	1973/77 (000MT)	Rate Change (%)	1961/65 (000MT)	1973/77 (000MT)	Rate Change (%)	1961/65	1973/77	1961/65	1973/77
	Ethiopia	89	119	+34	12	106	+818	77	13	1.02
Kenya	112	166	+36	90	46	-49	22	120	1.11	1.04
Nigeria	824	70	-91	123	787	+541	701	(77)	1.05	0.96
Tanzania	78	24	-69	109	267	+144	(31)	(243)	0.99	0.93
Zaire ^c	4	1	-88	158	414	+162	(154)	(413)	0.96	0.92
Sahel ^e	672	282	-58	337	838	+149	335	(556)	1.06	0.92
Sub-Sahara Africa ^d										
<i>Crops</i>	2543	1113	-56	2090	4640	+122	453	3527	1.01	0.95
<i>Livestock</i>										
Meat ^e	2615.5	301.2	14.3	195.2	209.2	9.2	68.3	92.0	1.032	1.034
Milk ^f	33.0	52.6	59.4	488.5	1254.1	156.7	(455.5)	(1201.4)	0.912	0.870
Eggs	1.1	0.6	-45.7	1.2	2.3	83.4	(0.1)	(1.6)	1.000	0.996

SOURCE: Paulino and Yeung, 1981.

^aExports minus imports; net import figures are in parentheses.

^bRatio of domestic supply; net imports to total domestic utilization.

^cIncludes Chad, Gambia, Mali, Mauritania, Niger, Senegal, and Upper Volta.

^dValues for sub-Saharan Africa row based on more countries surveyed than are listed.

^eIncludes goats, sheep, cattle, pigs, poultry, meat, adjusted for trade in animals (in carcass-weight equivalent).

^fIncludes sheep, goats, camel milk, milk products (whole milk equivalent).

cereals, increased by 122 percent. Average yearly net imports of the region in 1973–1977 amounted to 3.5 million metric tons, or about 5 percent of the average yearly consumption during the period. Only Ethiopia and Kenya retained their trade positions among major food crop producers and exporters in the region, which also included Nigeria and the Malagasy Republic. Nigeria underwent the most drastic change—from a largely agricultural country to one that depends mainly on petroleum exports. During 1961–1965 Nigeria was the largest exporter of a number of food commodities (e.g., groundnuts, oil palm products, cocoa), but in 1973–1977 Nigeria became the largest importer of food (see Table 2.12). This change is the result of slow growth in domestic food production and rapid growth in incomes.

Sub-Saharan self-sufficiency ratios indicate decline in 1973–1977 as compared to 1961–1965. This decline was more pronounced in milk; meat and eggs maintained their relatively balanced state. Meat exports rose 14 percent between 1961–1965 and 1973–1977, but imports rose by about half as much. Meat exports exceeded imports by 3 percent of production, with exports coming primarily from Ethiopia, Kenya, Malagasy, Zimbabwe, and the countries of the Sahel. Nigeria was the largest meat importer.

Sub-Saharan milk exports between 1961–1965 and 1973–1977 rose about 60 percent, whereas imports increased by more than 150 percent. Total sub-Saharan net milk imports rose by 9 percent of milk consumption in the early 1960s to about 18 percent of consumption by the mid-1970s. Most sub-Saharan countries are net milk importers; the largest importer, again, is Nigeria. Milk imports dropped in Kenya, Malagasy, and Zimbabwe between 1961–1965 and 1973–1977; Kenya remained the only net milk exporter of importance. Eggs are not much traded across wide distances without refrigeration, but most sub-Saharan countries exhibited *de facto* self-sufficiency.

TABLE 2.12 Petroleum Exports and Food Imports in Nigeria

Year	Total Exports (million \$)	Percentage of Total Exports Made up by Oil	Total Imports (million \$)	Value of Food Imports (million \$)	Food Imports as Percentage of 1969 Imports
1969	1,006.9	55	795.8	66.7	100
1970	1,403.4	67	1,210.2	92.3	138
1971	2,049.3	95	1,726.2	140.6	211
1972	2,238.6	85	1,592.0	152.2	228
1973	3,644.8	81	1,958.4	201.6	302
1974	9,219.2	94	2,744.0	248.0	372
1975	7,980.8	93	5,947.2	371.2	556
1976	10,596.8	94	8,224.0	706.9	1,059
1977	13,876.8	92	11,673.6	1,264.0	1,895 ^a

SOURCE: Okigbo, 1979.

NOTE: In 1977, GDP amounted to \$29,120 million; GDP/capita amounted to \$356.6.

^aEstimated

Nutritional Implications of Decline in Food Production

All available data indicate that the rate of increase in food production in tropical Africa is too slow to meet the demand for food resulting from rapid population growth. Per capita food supplies are actually declining. The situation is serious because the amount of food produced is insufficient to meet the demand not only of the increasing population but of such factors as rising incomes, animal feed requirements, and trade and industrial needs. Nigeria, for example, was the world's leading exporter of palm oil, a product that is used in cooking by a large segment of the country's own population of 80 million people. There is no evidence that the total amount of palm oil produced annually has actually declined. However, Nigeria is now a net importer of this oil probably because it cannot produce enough to meet the needs of its population for cooking oil nor of its industry for oil used in the manufacture of soaps, candles, and margarine and in tin smelting.

Not even the average national food requirement figures, which are used to determine the degree to which available food supplies ensure that the population of a country will be well fed and to make projections about future requirements, give us any real idea of the nutritional status of the population. Moreover, these figures do not take into account all the demands to be satisfied. Evaluation of national food self-sufficiency and projections of future food requirements are generally based on estimates of average per capita food supplies in relation to national average requirements. These values, in addition to food balance sheets that are also based on global figures, do not always reflect the extent of malnutrition that exists in the population. We need the latter information if we are to make meaningful projections of future food requirements and to comprehend the magnitude of the food production problem.

Mayer (1976) defines malnutrition as a condition, characterized by one of the following statements:

- A person does not ingest enough food and is thus undernourished.
- A diet lacks one or more essential nutrients, and thus causes deficiency diseases.
- A person has a condition or illness of genetic or environmental origin that prevents him or her from digesting or properly absorbing some food constituents.
- A person consumes too many calories or consumes an excess of one or more food components and as a result suffers from overnutrition.

Mazumdar (1980) observes that available data provide strong evidence that some degree of undernutrition exists even when average available per capita food supplies are in excess of calculated national average requirements. Usually, variations in income levels coupled with inadequate facilities for distribution and storage result in inequalities in the amount of food consumed by different segments of the population of a given country. Thus while a significant proportion of a country's population are

rich enough to purchase and consume food that makes them suffer from overnutrition, a large segment are unable to obtain enough of the available food and as a result suffer from undernutrition.

In its Fourth World Survey, FAO took a two-pronged approach to the problem of estimating future food requirements as well as the extent of undernutrition in the world (Mazumdar, 1980). This approach involves (1) establishing a critical per capita daily food intake and (2) establishing a relationship between proportion of food requirement available and extent of undernutrition.

First, the critical food intake is assumed to be 1.2 times the basic metabolic rate (BMR). Food intake below 1.2 BMR is regarded as insufficient for a normal, healthy life. Persons with a lower intake will manifest various types of malnutrition related to specific dietary deficiencies and depending on age, sex, activities, and environment. When this criterion was applied to 46 African states it was found that average available per capita daily food supplies amounted only to 2110 calories, or 90 percent of the required 2336 calories calculated on the basis of the critical 1.2 BMR. Analysis of data from the 25 states of the African region where reasonably adequate statistics were available revealed that the proportion of the underfed ranged from 8 percent in Ivory Coast and Morocco to 50 percent or more in such countries as Mali, Chad, and Mauritania.

Second, based on an almost linear relationship established between food availability as a percentage of total requirement and the proportion of the underfed in the population (Figure 2.7), it was found that for each 3 percent increase in the proportion of available food supplies as a percentage of the requirement, there was a 4 percent decrease in the proportion of the underfed. The linear relationship was found to hold up to the point of equality between food availability and food requirement. Above this point the ratio of availability to requirement must increase more per unit of decrease in proportion to the underfed. But study of data from Ivory Coast and Latin America indicate that a small proportion of the population remains underfed even when average food availability considerably exceeds requirements. Using Figure 2.7 to estimate the proportion of underfed people in 21 countries where relevant data are lacking, it was estimated that for the base period 1972–1974, about 100 million, or 32 percent, of the population of the African region were underfed.

Future Food Requirements: Need for a Regional Food Policy

With information on the proportion of the underfed in each African country, one can quantify a particular country's food deficit for a given period of time. With such data for all African countries, it is possible to construct a regional policy framework within which individual national frameworks can be established. Mazumdar (1980) used the FAO food survey data to formulate an African regional policy framework that holds that "in not a single African country shall the proportion of underfed

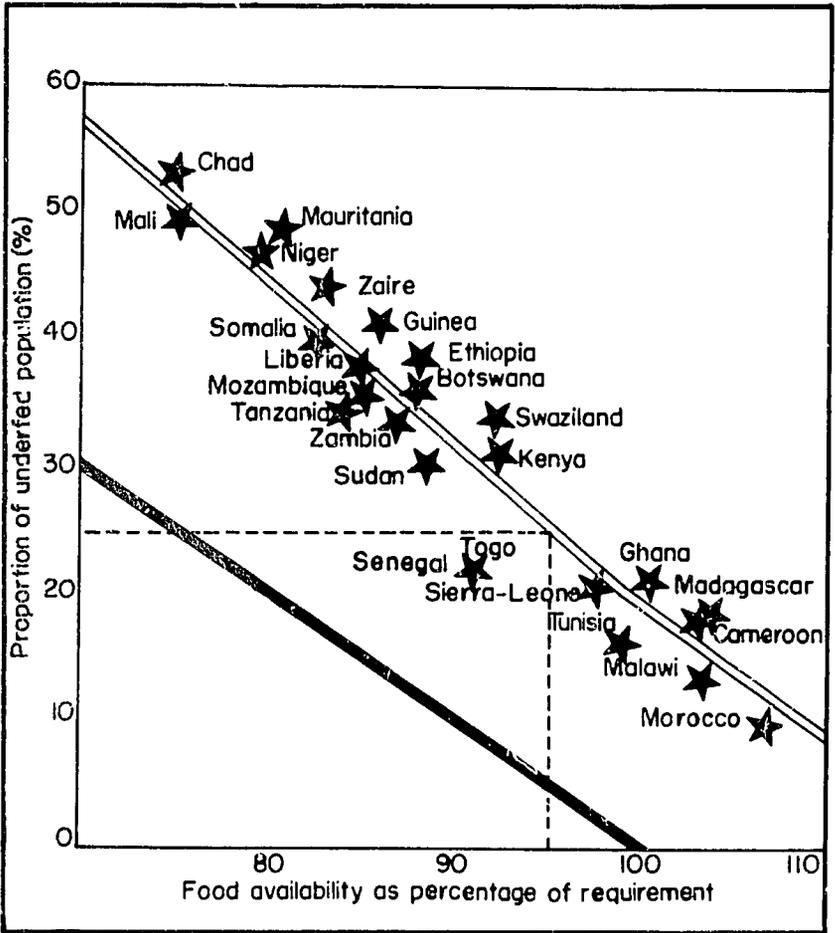


Fig. 2.7 Relationship between food availability as percentage of requirement and proportion of underfed in Africa.

population exceed 25 percent by the year 1985” (p. 37). With the 1972–1974 data, Mazundar found that the proportion of the underfed exceeded 25 percent in 23 of the 46 countries in the African region and that these 23 countries accounted for about 75 percent of the region’s population. He also observed that the 23 countries had 87 percent of the region’s underfed, with an average per capita calorie intake of 2010 calories. The remaining countries in the region had an average intake of 2392 calories. The proportion of the underfed in the 23 target countries was estimated at 37 percent; in the remaining 23 countries it was estimated at less than 16 percent. Moreover, the estimated average per capita food availability for the 23 target countries amounted to only 85 percent of the require-

ments whereas food availability was 3 percent above the requirement in the other countries.

A meaningful regional policy like that proposed by Mazumdar might be aimed at reducing the proportion of the underfed population in the 23 target countries from 32 percent in 1972–1974 to less than 22 percent in 1985, with the assumption that the remaining 23 countries would continue to improve their food situation. Figure 2.7 shows that the reduction of a country's underfed population to 25 percent would result in increasing the per capita availability to over 95 percent of requirements. If the regional framework is designed specifically "to ensure that in 1985, in no African country shall the per capita national food availability be less than 95 percent of its requirements" (p. 38), it should be possible to arrive at projections of future food requirements for each country. Calculations reported by Mazumdar (1980) indicate that food increases projected under the policy he proposes will, on the basis of the 1972–1974 figures, vary between 5 percent or less for Kenya, Rwanda, Sao Tome, and Principe to over 25 percent for Chad, Mali, and Upper Volta. It is necessary, therefore, for any such regional policies to take into account the varying populations and the socioeconomic conditions of the different countries. Above all there must be the political will for closer economic integration and for united action for the common good, as is being gradually ushered in to the countries of the Economic Community of West African States (ECOWAS). With the greater interdependence among countries and the recognition that no "single country can prosper alone unless the basic needs of the populations of all other countries in the region are met" (Mazumdar, 1980, p. 37), a regional policy like the above may work.

Again, with the 1972–1974 data it is possible to calculate not only the additional food availability for each country between 1972–1974 and 1985 but also the contributions of each commodity or group of commodities, such as cereals and roots and tubers (Table 2.13). And with the available information on food imports for the same period it is possible to calculate the contributions to the per capita daily food availability of domestic production and imports (Table 2.14). Assuming that within the short period from 1974 to 1985 very few changes in consumption of cereals relative to root crops will occur, calculations of extra amounts of calories from the various commodities can be calculated, taking into account the population growth rates of each country. The annual production growth rates and cumulative import figures required to meet the targets set by the above policy can then be calculated on the basis of calorie equivalents.

It is also necessary to determine the likely contributions relative to anticipated growth rates not only of cereals and roots and tubers but also of such products as fruits, nuts, vegetables, oils, and fats. Shortfalls in one product group should be made up from supplies of others. Allowance should also be made for the relative roles of imports as determined by such factors as policy, likely stock changes, animal feed and seed requirements, manufacturing industry requirements, and wastes (Mazumdar, 1980). With respect to imports, each country must determine what rela-

TABLE 2.13 Additional Food Availability Requirements for Selected Countries in Sub-Saharan Africa between 1972-74 and 1985 (in thousands of tons)

Country	Cereals	Roots and Tubers
Algeria	1,269	185
Angola	214	754
Benin	127	330
Botswana	46	3
Chad	308	53
Ethiopia	1,786	365
Guinea	259	226
Kenya	850	482
Liberia	768	1,575
Mali	551	49
Mauritania	71	4
Mozambique	322	1,128
Niger	398	96
Nigeria	3,517	9,890
Rwanda	80	452
Sao Tome & Principe	3	4
Somalia	208	18
Swaziland	27	4
Tanzania	649	1,832
Uganda	352	588
Upper Volta	540	61
Zaire	407	4,700
Zambia	405	107

SOURCE: Mazumdar (1980).

tive contributions of domestic production and imports should be. These contributions should be based realistically on existing socioeconomic conditions. For example, an agricultural country in the tropics that produces mainly roots and tubers but imports most of its calorie requirements in the form of wheat would be foolish to plan for self-sufficiency through production of both wheat (which may be uneconomical) and roots and tubers. Such a country should plan how to obtain foreign exchange to buy wheat and perhaps also how to reduce wheat imports by using easily produced starchy cereals and root crops to replace some of the wheat in the preparation of fortified bread. Such planning should minimize the amount of wheat imported for use in making bread.

Mazumdar (1980) has projected required growth rates for selected African countries based on the following alternative policy frameworks:

- I. Both domestic production and imports grow at the same annual rate in terms of the energy value of food. In 1985 the relative proportions of the energy value of an average food supply derived from domestic production and of a supply derived from imports remain the same as during the base period 1972-1974.

TABLE 2.14 Relative Contributions of Domestic Production and Imports to Per Capita Food Availability for Selected Countries in Sub-Saharan Africa, 1972-74 (in Kcal/day)

Country	Domestic Production	Imported Foodstuffs	Total	% Imported Foodstuffs
Algeria	1,656	409	2,065	19.8
Angola	1,823	174	1,997	8.7
Benin	1,915	125	2,040	6.2
Botswana	859	1,166	2,025	57.6
Chad	1,638	127	1,765	7.2
Ethiopia	2,041	10	2,051	0.5
Guinea	1,826	168	1,994	8.4
Kenya	2,025	112	2,137	5.2
Liberia	1,630	346	1,976	17.5
Mali	1,465	294	1,759	16.7
Mauritania	930	937	1,867	50.3
Mozambique	1,894	95	1,989	4.8
Niger	1,775	82	1,857	4.4
Nigeria	2,000	73	2,073	3.5
Rwanda	2,081	21	2,102	1.0
Sao Tome & Principe	902	1,228	2,130	57.6
Somalia	1,615	301	1,916	15.7
Swaziland	1,504	614	2,118	29.0
Tanzania	1,789	172	1,958	8.8
Uganda	2,094	47	2,141	2.2
Upper Volta	1,638	90	1,728	5.2
Zaire	1,739	109	1,848	5.9
Zambia	1,690	326	2,016	16.2

SOURCE: Mazumdar (1980)

- II. Per capita daily energy value derived from imported foods in 1985 remains the same as during the base period 1972-1974; that is, food imports in terms of energy value grow at the same rate as populations, and the remainder of a food requirement is met through increased domestic production.
- III. Per capita energy value derived from domestically produced food in 1985 remains the same as during the base period 1972-1974; that is, per capita food production in 1985 remains equal to that of 1972-1974, the remainder of food requirements being met through increased imports.
- IV. Half of the energy value of the incremental food requirement in 1985 is met through domestic production and half through imports.
- V. In 1985 there are no food imports; the entire food requirement is met through domestic production alone.

Projections based on alternatives I, II, and V are shown in Table 2.15.

Mazumdar (1980) further observed that "Figures for increased requirements refer to availability for human consumption. These can be different

TABLE 2.15 Projected Required Growth Rates (percent) Between 1972–74 and 1985 under Three Alternative Conditions for Selected Countries in Sub-Saharan Africa.

Country	Alternative I		Alternative II		Alternative V
	Annual Production	Cumulative Imports	Annual Production	Cumulative Imports	Annual Production
Algeria	4.3	66	4.5	49	6.2
Angola	3.6	53	3.7	35	4.4
Benin	3.4	50	3.5	39	4.0
Botswana	3.7	55	4.7	41	11.4
Chad	4.3	65	4.4	29	4.9
Ethiopia	3.2	46	3.2	34	3.3
Guinea	3.5	51	3.6	36	4.3
Kenya	3.7	54	3.7	49	4.1
Liberia	3.5	52	3.7	35	5.2
Mali	4.7	73	5.0	36	6.3
Mauritania	3.7	54	5.0	29	9.9
Mozambique	3.5	50	3.5	33	3.8
Niger	4.4	68	4.5	39	4.8
Nigeria	3.7	55	3.7	41	4.0
Rwanda	3.4	49	3.4	42	3.5
Sao Tome & Principe	3.2	46	3.8	39	10.9
Somalia	4.2	63	4.4	41	5.3
Swaziland	3.4	49	3.5	43	6.3
Tanzania	4.3	65	4.4	45	6.5
Uganda	3.4	49	3.4	44	3.5
Upper Volta	4.6	72	4.7	32	5.1
Zaire	3.9	58	3.9	38	4.4
Zambia	4.0	61	4.2	46	5.6

SOURCE: Mazumdar (1980).

from the increased production requirements due to the varying roles of imports, stock changes, and domestic utilization for animal food, seed, and manufacture and above all the importance of waste. In most African countries, there is practically no import or export of roots and tubers. Nor is there any substantial change in annual stocks” (p. 39). If the root and tuber availability for human consumption in 1972–1974 in Nigeria—the biggest root and tuber consuming country in the region—is considered, it is found that it amounted to only 69 percent of the domestic production. The remaining 31 percent includes products fed to livestock, wastage in processing, and so on. It is therefore necessary that the amount of cassava projected to be produced in the year 1985 be higher than the amount targeted to be produced for human consumption in 1985. In other words, the amount of cassava needed in Nigeria in 1985 for human consumption should be increased by at least 31 percent to make up for various other nonfood uses, waste, etc. It should be noted that the annual growth rates

called for in the three alternative policy frameworks illustrated in Table 2.15 are very high in relation to current annual growth rates of 1–2 percent, especially the rates based on Alternative V. Nigeria's current Green Revolution program calls for self-sufficiency in major food crops and livestock products by 1985. This goal demands annual production growth rates of about 6 percent for food crops, 7 percent for industrial crops or cash crops, and 11 percent for livestock, rates that would call for unprecedented efforts in production, management, and financial investment.

Determining Production Targets on the Basis of Nutritional Considerations

In setting production targets for the African region, a number of factors besides manufacturing, industry, seed requirements, animal feed, and others already mentioned must be taken into account. First, the very high rate of urbanization in tropical Africa—as we have noted, about twice the world average—the increased mobility in both rural and urban areas, and the changing roles and status of women have resulted in an unprecedented demand for convenience foods. Added to these factors is the high cost of fuel for cooking in urban areas, at a time when fuelwood is not only inconvenient to use but becoming increasingly scarce. It is very likely, therefore, that in addition to waste, industrial, and animal feed uses, the relatively low elasticity of demand for root and tuber crops that accompanies rising incomes may have contributed to only about 69 percent of total production being available for human consumption. Moreover, these commodities are inconvenient to transport and require much preparation before consumption. Consequently, increased production of root and tuber crops—and, in fact, of many indigenous food crops—must be associated with increased processing capabilities if demand for such products is to be enhanced. Rapid changes in tastes and food preferences are taking place in Africa. The large imports of rice and wheat are very closely related to the demand for convenience foods.

The most effective way of solving the problem of malnutrition is to produce enough foodstuffs on a continuing basis. If this is not possible, a way must be found to earn enough money to eliminate poverty and to buy enough food (Altschul, 1969). In addition to level of production and income, other factors that affect nutritional status include farming systems; local preferences and taboos; religious beliefs; extent of education about nutrition; ecological conditions (soils, climate, vegetation); biological factors, such as parasites or inborn errors of metabolism; and socioeconomic factors, including level of food technology, food industry, economic progress, urbanization, local customs, transportation, roads, and level of affluence (Okigbo, 1980). Consideration of these factors is important not only in predicting possible future changes in food requirements but in selecting priorities and strategies for finding effective solutions to the food problem in Africa.

THE POTENTIAL FOR INCREASING FOOD PRODUCTION IN AFRICA

There are several options for increasing food production available that can be adopted in tropical Africa. These options include expanding areas under cultivation; increasing the quantity and quality of production per unit area; introducing mechanization and/or appropriate technology; improving postharvest handling, transportation, storage, and processing; and obtaining more food from livestock or farm animals, water resources, forests, and other, nonconventional sources (Okigbo, 1980).

Expansion of Cultivated Areas

It was noted earlier that over 80 percent of increased food production in Africa is achieved by expanding cultivated areas. At present, cultivated land in Africa totals 0.48 hectares per capita; potentially, it is 1.71 hectares per capita. Comparable figures for some other areas are:

	Hectares Per Capita	
	Present	Potential
Australia and New Zealand	1.00	3.57
Asia	0.21	0.28
South America	0.43	1.79
North America	0.75	1.31

There is still great potential for increasing the area under cultivation in Africa, but there is also an acute shortage of labor for clearing. This labor shortage adds impetus to the current interest in introducing the highly mechanized farming systems of the temperate countries into the tropics especially with respect to the mechanization of forest clearing, preplanting land development, and tillage aimed at controlling weeds. Heavy mechanized forest clearing and conventional tillage of the highly fragile tropical soils often result in undesirable modifications of soil structure, erosion, irreversible degradation, and decline in soil productivity. A lot of care, special equipment, and ecologically sound techniques of clearing are necessary to maintain soil productivity on newly cleared land. More research is required in this area, since large-scale mechanized farms have been very disappointing in the tropics. Research is also needed on post-clearance management systems, including measures to control erosion, such as zero tillage and residue management. Of high potential in this regard is the development of fertile, hydromorphic, valley bottom soils—of which tropical Africa has about a million hectares—provided that the problems of high development costs and disease risk (e.g., schistosomiasis) are effectively tackled. Irrigation could be used to increase areas under cultivation, especially in semiarid areas. The potentials for increas-

ing such areas are greater in Africa than in Asia. Although Asia has more land suitable for irrigation, a greater proportion of that land has already been brought under irrigation than is the case in Africa (see Table 2.16).

TABLE 2.16 Land Resource Potentials and Use of Irrigation, Fertilizer, and Pesticides in Major Regions of the Developing World

Resource or Agricultural Activity	Africa	Asia	Latin America	Near East
Arable land use (ha per capita), 1980	0.55	0.21	0.52	0.39
Potential arable land (ha per capita), 1980	1.71	0.28	1.79	0.60
Potential arable land reserves (mill. ha), 1975	433	90	476	44
Potential arable land: % of Total Arable Area (mill. ha), 1980	68	25	73	34
Irrigated	4	66	14	20
Rainfed	200	198	177	65
Total	204	264	191	85
Harvested Area (mill. ha), 1980				
Irrigated	4	82	12	18
Rainfed	108	204	107	39
Total	112	286	119	57
Cropping intensity, 1980				
Irrigated	101	124	86	90
Rainfed	53	102	60	60
Total	55	108	62	68
Importance of Irrigation (%)	2	25	7	23
Fertilizer use (mill.t. N.P.K) ^a 1980	1	9.8	5.4	2.8
Pesticide use (U.S. \$ mill.), 1980	344	725	749	265

SOURCE: FAO, 1979.

^aMillion tonnes of nitrogen, phosphates, and potassium fertilizers.

Increase in Quantity and Quality of Production Per Unit Area

Several things are required to improve production per unit area:

- Improved crop varieties
- Improved soil management and conservation practices
- Use of fertilizers and soil conditioners
- More efficient use of water
- Timely use of cultural practices
- Multiple cropping and more intensive cropping systems
- Reduction of losses by weeds, pests, and diseases

For small farmers who lack credit, both improved plants that have higher yields and varieties that are disease and pest resistant and adapted to

environmental stresses are required to minimize the cost of fertilizers and pesticides. The more efficient use of fertilizers and the increased reliance on biological nitrogen fixation and nutrient cycling processes hold some promise. The development of continuous production systems with sustained yields remains rather unlikely in the humid and subhumid tropics, where fallows tie up land. The land could be released if cultivation could safely be made more continuous by shortening fallows. For small farmers, multiple cropping and various aspects of intercropping once regarded as primitive are imperative. Specialization in agriculture may also be used to increase production per unit area: crops may be grown only where they are best adapted. In this regard, agricultural production is not yet as intensified in Africa as it is in Asia (see Table 2.16).

Mechanization and Appropriate Technology

Mechanization and technological improvements have high potential for increasing yields, especially since reducing the drudgery of farming may help to counteract the rural-to-urban migration among the youth of Africa and the consequent shortage of labor. Because the mechanization of tropical food crops is still in its infancy, its potential has yet to be realized. The development of appropriate technological means that small farmers can use, rent, own, and/or repair and that are relevant to their needs yet still socially acceptable holds much promise at this transitional stage when tractorization—even when it is possible—may not be economically viable. With respect to mechanization and the use of intensive labor devices, Asia is far ahead of Africa (see Table 2.17). At present only partial mechanization is possible in the production of most food crops in Africa; the operations most likely to be mechanized are clearing and tillage.

TABLE 2.17 Sources of Energy for Agriculture (in billions of man-day equivalents)

Region	Total available power (hp/ha)	Share of available power (%)		
		Human	Animal	Mechanical
Africa	0.10	35	7	58
Asia ^a	0.22	26	51	23
Latin America	0.25	9	20	71
Total		24	26	50

SOURCE: FAO, 1976, p. 105.

^aExcluding China.

Improved Postharvest Handling, Transportation, Storage, and Processing

Postharvest losses range up to 60 percent for cereals and up to 100 percent for perishables. Clearly, minimization of these losses could considerably increase available food supplies. Moreover, as indicated earlier, processing can enhance the urban use of some foodstuffs by rendering them into convenience forms. Processing and storage minimize the inequalities in the availability of many seasonal foodstuffs. Processing also enhances distribution, transportation, and marketing. Asia is ahead of Africa in this regard.

Increase in Food from Nonstaple Crop Sources

Additional food supplies from *livestock* can be achieved by focusing on a number of aspects of the livestock production operation. For example, improvements can be made in genetic inheritance; nutrition; forage and pasture plants and their management; feed production (by reducing costs); range management; control of parasites and diseases; housing; and processing of animal products.

The possibility of obtaining additional food from *ponds, rivers, seas, and oceans* has hardly been explored, except by primitive fishing methods. At present, many non-African countries, such as Japan and the USSR, harvest most of the fish from the waters surrounding the African continent. Control of pollution and improved processing hold much promise. Considerable research is still needed to realize the potentials of fisheries and aquaculture in Africa.

Hunting and gathering food products from *forests* still augments food supplies from cultivated food and livestock production. But the potential for this food source is limited by both rapid population growth and rapid deforestation. With good management, game ranching in some areas of east Africa holds some promise. Competent wildlife management in countries such as Kenya is a good source of foreign exchange to support some food imports. Many useful and edible African plants that are still wild or protected need to be brought under cultivation. Efforts should be made in agroforestry research to minimize competition between agriculture and forestry. Improved agroforestry systems can enhance the availability of fuelwood, the shortage of which may constitute a major future crisis since 85 percent or more of the timber harvested in most African countries is still used for fuel.

Most *nonconventional sources* of food, such as synthetic foods, do not at present seem economically viable. Research is still far from making single-cell protein available for use in developing countries. Leaf protein and other nonconventional products are useful only in times of war or other disasters and even then in a very limited way.

Constraints to Increased Agricultural Production

Several physical (climatic and soil), biological, and socioeconomic constraints bedevil the traditional farmers of Africa (see Table 2.18). The only way to minimize these constraints—especially the physical and biological ones—or to bring them under increasing control is to undertake research on food crop production. In the tropics, this sort of research has had lower priority than research on cash or export crops.

Research to improve cropping systems in tropical Africa must be oriented to farming systems if it is to be increasingly relevant to the small farmer's needs and situation. Some attention must also be given to aspects of large-scale agricultural production. Many African governments are interested in the latter type of production even though it is often location specific and despite the fact that horizontal transfer of most technologies developed in temperate countries has proved ineffective to date. After all, large-scale and small-scale food production systems are complementary; neither should replace the other.

The farming systems research approach requires teamwork and interdisciplinary interaction. First, the approach usually calls for *upstream* research in which farmers' environments, existing farming systems, input-output relations, and constraints to improved productivity are studied as a basis for determining priorities in research and establishing strategies for development of improved technology. Second, the approach calls for *on-station* research to develop alternative production systems for improved crops and livestock based on an understanding of constraints to existing systems as well as of possible future trends. Typically, a few relevant production systems and their components are tested and evaluated, first at the main research station and then at stations in selected ecological, or benchmark, zones. Finally, through the *downstream* research component, proven technologies are tested and evaluated at the farm level under the farmer's control. Feedback from this adoption process and the changes that take place in it helps on-station researchers to design, modify, and develop new technology. Furthermore, the farming systems approach facilitates the development of packages of new technology rather than individual, disjointed, and sometimes irrelevant components.

The major problems for many developing African countries who want to adopt this research approach are: (1) the shortage of manpower at all levels in research and in most disciplines; (2) the need to encourage staff who are trained in specific disciplines to work as interdisciplinary teams; and (3) the need to begin to focus on socioeconomic research, neglected in the past or regarded as unnecessary. In addition, more basic research support for farming systems research is needed than has been recognized. Such support could be obtained by encouraging more cooperation with universities than is the norm in many African countries. The existence of many international agricultural research centers (IARCs) such as the International Institute of Tropical Agriculture (IITA) and the Inter-

TABLE 2.18 Constraints to Agricultural Production in Tropical Africa

PHYSICAL CONSTRAINTS

Unfavorable *climatic* conditions include

- Rainfall that is unreliable in onset, duration, and intensity
- Unpredictable periods of drought, floods, and environmental stresses
- Reduced effective rainfall in sandy soils and steep slopes
- High soil temperature for some crops and biological processes (N fixation)
- High rates of decomposition and low OM level
- Cloudiness and reduced photosynthetic efficiency

Most *soils* of the humid and subhumid tropics

- Are intensely weathered, sandy, and low in clay
- Have very low CEC and thus also less active colloidal complex
- Have very low inherent fertility (except on hydromorphic and young volcanic soils)
- Have very high acidity and sometimes high surface temperatures
- Are extremely subject to multiple nutrient deficiencies and toxicities under continuous cultivation
- Have very high P-fixation
- Are extremely leached, and thus at high risk of erosion under prevailing rainstorms
- Have serious salinity problems under poor irrigation management

BIOLOGICAL CONSTRAINTS

- Unimproved crops and livestock
- Low yields and low potential
- Susceptibility to disease and pests
- High incidence of disease, pests, and weeds owing to environment that favors these phenomena
- Drastic environmental changes, brought about by human activities that have adverse effects on ecological equilibrium

SOCIOECONOMIC CONSTRAINTS

- Small farm size, more drastically reduced by population pressure
- Unfavorable land tenure systems, often resulting in fragmentation of holdings
- Shortage of labor
- Lack of credit and low income
- Poor marketing facilities and pricing structure
- High cost and extreme scarcity of inputs
- Poor extension services
- Illiteracy and superstition that sometimes hamper adoption process
- Poor transportation
- Inappropriateness of inputs
- Lack of package approach to technology, development, and use

national Rice Research Institute (IRRI), which train professionals in farming systems research and production, has improved the chances of strengthening national capabilities in cropping systems research.

In addition to the foregoing constraints to increasing food crops and other agricultural production, a number of issues need attention in solving the food problem. Current research does not effectively identify relevant components of existing farming systems as targets for special research effort. For example, as such a target the compound farm system highlights the need for greater integration of crop production and livestock (small animals in humid areas and large ones in tsetse-free, drier areas) in research on mixed farming, with its potential for maintaining soil fertility while producing several commodities. Sometimes the system also involves the use of animals for work (see also McDowell & Hildebrand, 1980).

In the humid tropics, it is also important to strike a balance between tree and arable or field cash crops, on the one hand, and food crops, on the other. In addition, high priority must be given to the current energy crisis and to the concern about the environment in developing new technologies for sustained yields in the tropics. And the greater erosion hazard to which tropical soils under continuous cultivation are subjected demands greater interest in watershed development in the integration of technologies for rural development projects. All the foregoing needs call not only for changes in research policy and strategy but for new ways of thinking and new approaches on the part of Africa's research institute directors and program leaders.

Finally, the importance of political commitment in agricultural research and development must be recognized. To ensure such commitment, communication between research scholars and political policymakers must be facilitated and made more effective. It should also be realized that rapid agricultural development can be achieved if what Mosher (1970) designated as *essential factors* and *accelerators* of agricultural development are given due consideration in agricultural and rural development programs. Mosher's five essential factors are:

1. An effective marketing system for agricultural produce
2. Continuous and systematic research that generates new agricultural technology
3. The presence of adequate incentives for farmers to increase their output or for operators of agricultural services to perform their tasks efficiently
4. An effective transportation and communication system that reaches most farms
5. Local availability at reasonable prices, through manufacturing or importation, of equipment and farm inputs required by farmers

The effectiveness of these essential factors is enhanced by the following accelerators:

1. Adequate educational and training facilities for agricultural technicians and experts for all supporting services
2. The availability of production inputs
3. Opportunity for group action by farmers through such means as cooperatives and social organizations (In Africa, such opportunities are needed to give farmers more political voice and to free them from the clutches of middlemen.)
4. Means for improving and expanding agricultural land
5. A mechanism for planning and directing agricultural development programs as integral components of overall economic development

This final section would be incomplete without a reminder that bilateral and multilateral foreign assistance programs must give the highest priority to assisting African countries to develop the capabilities for rapidly achieving economically sound and culturally acceptable self-sufficiency in food and agricultural production. Unless such programs adopt this priority our chances of solving the current food problem will be minimal.

COMMENTS ON "STATEMENT ON AGRICULTURAL DEVELOPMENT IN ASIA AND AFRICA: SOME DIFFERENCES THAT AFFECT FOOD AID AND FOOD POLICY"*

1. *Agricultural development in Asia requires resources more than it requires knowledge; in Africa, development requires knowledge more than resources. The implication of this statement is that in Africa, as compared with Asia, food aid should be used to develop knowledge (agricultural research) rather than as a resource in and of itself.*

This statement is essentially correct. Agricultural development in many parts of Asia is generally more advanced than it is in Africa. The exceptions include parts of New Guinea; the rain forest area of Mindanao Island in the Philippines, inhabited by the Tasaday (the 28-member tribe of Stone Age people); and parts of Thailand that are under shifting cultivation, where agriculture is as traditional and outmoded as in many parts of tropical Africa or even more so. Asia has used more of its land and agricultural potential than Africa. The Asian wet rice production system is one of the most efficient production systems of continuous (permanent) agriculture in the world. It is widely used in Asia but of limited use in Africa. Africa specializes in upland agricultural production systems but as yet—with the exception of the homestead garden system—it has not developed any widespread system of permanent agriculture for sustained yields.

Agricultural production is more intensified in Asia than in Africa (see Table 2.17). Irrigation is more important in Asia, which has not only

*This statement was prepared for the Abidjan seminar. Each of the seven points it presented appears in this section in italics, followed by Dr. Okigbo's comments—Ed.

brought more cropland under irrigation but has put into use a higher proportion of its potentially irrigable land than has Africa. With the very high population density already attained in Asia and the associated socio-economic pressures, labor intensive technology is more widely used and is more culturally acceptable than in Africa, as shown in Table 2.17.

More knowledge is definitely required to improve African agriculture. High priority must be given to developing technologies that minimize drudgery and that are culturally acceptable in Africa. Asia is already exporting surplus manpower and has several strong national agricultural research institutions that are servicing some "green revolution" countries. Such institutions have yet to evolve in Africa.

2. *The time frame for increasing domestic food production is very different in Africa and in Asia. Africa is starting much later than Asia. This means that in Africa we need results within a shorter period of time than we had available in Asia. The question is whether or not food aid can help accelerate the pace.*

It is true that the available time for increasing food production in Africa is considerably shorter than it was in Asia because Africa has started late. Yet the task of achieving a reasonable measure of self-sufficiency in Africa is made even more formidable by the fact that Africa is now experiencing faster population growth than Asia. Whereas in Asia population pressure is lessening, after having stimulated Asians into more intensive food production, the millions of hectares of empty lands and the currently lower population pressure in Africa have resulted in some complacency on the latter continent. Africa has failed not only to give high priority to agricultural development but to integrate development with measures to curb the high rate of population growth. Food aid has the potential both to accelerate and to bring about disincentives in agricultural production, depending on how such aid is managed and on the response of policy-makers in recipient countries to the factors that brought about the need for food aid.

3. *United States food aid consists of commodities that are not normally produced in abundance in Africa, although some of these commodities are produced widely in Asia. We need to avoid creating new tastes (e.g., for wheat and rice) where none existed before.*

Food aid is often nothing more than an unavoidable or necessary palliative in situations of disaster such as earthquakes, typhoons, drought, and war. Food aid never constitutes a lasting solution to the problem. In times of disaster food aid consists of whatever foodstuffs are available; thus a country does not have much choice as to whether or not the commodities given will change local tastes.

In Africa commodities that make up food aid have often not been given in forms suited to foods that are traditionally preferred. Moreover, because of very high rates of urbanization, increased mobility, and the long periods of training many African intellectuals have undergone in Europe or North America, many urban and well-to-do Africans have already

developed new tastes for convenience or fast foods. Can food aid be given in such a way as to channel the "exotic" foods to those whose tastes have already changed while more traditional foods and preparations are directed to the rural masses? Is it possible to sell specific food aid items to countries or sectors that already consume large amounts of these items and use the proceeds for the purchase of traditional foods and for institutional support?

It is important that the foregoing questions be addressed in formulating guidelines for food aid. Culturally speaking, many religious and socioeconomic factors have polarized Asian food habits toward items and preparations that are not only closer to what is given in food aid but will not render recipients as easily changeable in tastes as in Africa.

However food aid is given, priority should be given to other forms of assistance whose direct and indirect effects can contribute significantly to recipient countries' development of the ability to feed themselves. Such assistance should also offer sufficient incentives, associated with infrastructural development, to ensure increased food production on a sustained basis. Capability for increased agricultural production that enables a country to import food with its own foreign exchange will have a similar effect. It is also necessary to consider the extent to which food aid may involve the dumping of surplus food items on developing countries without any effort to minimize the adverse effects such food aid may have on tastes and food production.

4. *Africa seems to be more drought prone than Asia. Thus sensitivity to the need for food security may be more acute in Africa than in Asia—though to be sure, such security is universally needed. Can food aid play a role here, as, for example, in stocking reserve systems?*

Africa does indeed seem more drought prone than Asia. Also, more African than Asian land has been subjected to the process of desertification: 16,600 square kilometers in Africa as compared with 15,230 square kilometers in Asia. Africa has made much less progress than Asia in developing and realizing its irrigation potential. As already mentioned in item (1) of this Appendix, Asia has slightly more potentially irrigable land and has already developed much of it (see Table 2.16).

A food reserve system is necessary, especially for the Sahel and other semiarid areas of Africa. The development of such a system is a long-term measure, and it can make use at least in part of commodities brought from the African region; not all the reserve need be made up of exotic food items. Countries having such a system could be helped, during favorable periods, to produce surpluses that could be stockpiled in improved storage structures. These supplies could then be used in times of disaster or in a climate unfavorable to food production.

5. *Intraregional trade may be both more of a problem and more of an opportunity in Africa than in Asia. The problem results from the smuggling that occurs across African borders: how can you justify a food aid program in country X when food is being smuggled out of X into Y?*

The opportunity arises out of the fact that some African countries are, or can be, food exporters: Zimbabwe, Kenya, Sudan. How can this opportunity for intraregional trade be recognized and furthered?

There is intraregional trade in Africa, but it is true that it constitutes a problem in some cases. Certain African countries often find it easier to trade, in some food commodities, with the developed countries than with each other or with other regions in Africa. Food aid could be managed so as to enhance interregional or intercountry trade.

The problem of smuggling is real. But there is already more smuggling of cash and export crops than food crops between African countries—because of varying economic conditions and trade barriers—than between African and non-African countries. If each country develops its full potential in respect to the commodities in which it has a definite economic advantage, formal trading can be developed across national frontiers, thus minimizing smuggling. In some cases smuggling is difficult to stop because it is secretly supported by influential people in high places. The government functionaries involved in food aid in recipient countries have the responsibility to take necessary action to minimize smuggling, but aid agencies should avoid getting involved in antismuggling control activities that may cost them more than the food aid they are giving a specific country. Items involved in smuggling are usually black-market items that are scarce in some countries. Smuggling can most effectively be stopped by making these items available more uniformly throughout all countries on the region. Trying to minimize the exchange of such items—which command premium prices in some countries because of real or artificial scarcity created by existing policies—is rarely successful.

6. *There is an abundance of food and a multiplicity of donors for Africa; this is not the case in Asia. How can this problem be handled?*

It is true that there is a multiplicity of donors for Africa. Sometimes these donors give food aid that is beyond the capacity of recipient countries to handle (store or distribute) efficiently. Stevens (1980) cites a situation in which in the 1972–1973 drought, Britain offered Lesotho 6,000 tons of wheat as against the 1,000 tons Lesotho indicated it could absorb, and Belgium offered 1,000 tons of wheat flour instead of the 662 tons Lesotho originally requested. Donors need clearing-house facilities, preferably both inside and outside recipient countries, in order to coordinate their activities and to avoid taking counterproductive measures or causing more problems than they are effectively solving.

7. *There is a difference in food demand between urban and rural sectors in Africa. How important is this in terms of food aid and food policy?*

There is a clear difference between urban and rural demands in Africa. But this is more marked with respect to convenience foods. Sometimes rural people are more ignorant about sanitation than urban masses, but the recently observed higher infant mortalities in urban areas among often educated classes where children are more bottle-fed as a result of

Nestle advertisements shows that urban masses may not be as enlightened as expected. Even if they are, it would appear that they are unable to practice what they know or to supervise their baby nurses well to ensure application of simple hygienic and sanitary measures. For example, it may make more sense to supply food to mothers in all areas, so that they can breastfeed their children more effectively, than to supply more tinned milk to urban women on the assumption that they are more likely to bottle-feed their babies.

There is some interdependence between urban and rural people. Directing food aid that consists of convenience foods to urban masses may minimize transfer of food to the cities from rural areas and minimize production even though it may also create a slump in the rural markets. Food aid assistance that enhances production in rural areas indirectly benefits urban populations. What is called for are policies that can benefit both parties. Food must be made available to both segments of the population when necessary. It is difficult for one who has nothing to pick and choose. At the same time, food aid should have built-in components that encourage rural people to produce food and perhaps that encourage urban people to work on infrastructural developments of agricultural relevance (such as roads and supply and distribution of farm inputs).

Food aid will continue to be given as long as there are disasters, natural and of other types, in the world. It is important, however, to collect adequate statistics on various aspects of food aid so that studies carried out on this topic will be of sufficient scope and will provide enough information to develop more effective policy guidelines and strategies.

What is most important is to recognize that food aid is a palliative. Aid of lasting value is that which embodies both the supply of food to the hungry when disaster strikes and measures to increase the development among recipient countries of meaningful self-sufficiency on a sustained basis. Above all, food aid should be given in such a way as not to have lasting adverse effects on agricultural production, especially the production of food, or on policies in recipient countries aimed at increasing agricultural and food production.

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Chapter 3

FOOD AID AS A COMPONENT OF GENERAL ECONOMIC AND DEVELOPMENT POLICY*

G. Edward Schuh

Food aid is an income transfer in kind. For the United States, its origin as an important policy instrument dates to the 1950s. (Public Law 480 was passed in 1954, formally establishing a U.S. program of food aid.) At that time the United States had excess production capacity at prevailing domestic price ratios and consequently accumulated large stocks of agricultural commodities in government hands. These stocks were costly and burdensome and, given political realities, had essentially zero value to the domestic economy. A logical way to dispose of them was to ship them abroad, as food aid. To policymakers this option seemed especially attractive in light of the prevailing cold war struggle and the double payoff these resources were perceived to offer in the form of food itself as well as the counterpart funds that would be generated by the sale of this food. These counterpart funds were used to further economic development and develop markets overseas.

The original legislative mandate for food aid assigned it four main purposes:

1. To provide humanitarian aid in the case of emergencies worldwide
2. To further the development of low-income countries
3. To develop markets for United States farm products
4. To further our international political or foreign policy interests

In the beginning, food aid was implemented primarily as a surplus disposal operation. Prior to 1965, PL 480 exports amounted to 25 percent or more of all United States agricultural exports. During the period covered by fiscal years 1956 through 1965, about two-thirds of all United States wheat exports and nearly one-half of all United States rice exports were shipped under PL 480 auspices.

The relative importance of food aid shipments as a share of total United States agricultural exports has since declined dramatically. During fiscal years 1973 through 1977, PL 480 exports were only about 5 percent of total farm exports. No longer primarily a disposal activity, food aid has shifted to become an important component of the United States foreign

*This chapter is drawn from a paper prepared for the U.S. Agency for International Development in late 1979.

aid budget, making up between 20 and 25 percent of the total foreign assistance budget in recent years.

Starting with the commodity boom and crop shortfalls of the period 1973–76, the United States food aid program has fluctuated dramatically. Prior to 1973, the PL 480 program averaged 13 million tons of agricultural commodities per year and, as noted above, was an important channel of export for United States wheat, feedgrains, and rice. In 1973, only 7 million tons were shipped, and in 1974 the total shipped was only 3 million tons. Needless to say, there was no reduction in need in these years of scarcity and high prices. With more abundant supplies in the period 1975–77, total annual shipments averaged 5 million tons—up from the low point of 1973, but still far below the peak of the pre-1973 period. Total annual shipments have remained at about that level since.

Associated with the change in circumstances surrounding United States food aid is an increase in the importation of agricultural products by many low-income countries. Some observers believe that a considerable proportion of the cereal imports of the poorer developing countries represents a structural deficit that cannot be financed on commercial terms. If this is the case, the United States and other developed countries face some major policy choices and challenges in the future.

The 1975 Foreign Assistance Act mandated that a larger share of food aid be used for development purposes. This legislation was a reaction to the heavy use of the food aid program for foreign policy purposes during the Vietnam War. Contrary to what some appear to believe, the Act was not an attempt to channel the program away from market development objectives. President Carter also directed that development priorities be emphasized in the PL 480 program. Despite these shifts in emphasis, the original Congressional mandates still apply, and at least the agricultural committees of Congress are still sensitive to market development objectives.

The United States is not the only country to provide food aid, of course. Other industrialized countries also contribute. The United States does remain the major source of food aid, and the remainder of this chapter will reflect a United States perspective.

A final point to note by way of background is that food aid has an inherent defect. As an income transfer in kind, it is generally viewed as inferior to income transfers in monetary form. Whether this argument is valid depends, of course, on the fungibility of food aid. This in turn depends on the conditions on which the aid is extended and the institutional arrangements by which it is handled in the recipient country. Income transfers in kind, however, tend to be more subject than other types of transfers to controls on the part of the donor.

Related to this issue, of course, are all the questions about foreign aid in general. Johnson (1967) has referred to aid as the “soft option.” It is “soft” for recipients because it enables policymakers in those countries to avoid the hard choice of a more rational economic policy. It is soft for donor countries because it enables policymakers in those countries to

rationalize trade restrictions that preclude imports from the recipient country. As a form of foreign aid, food aid is subject to all these criticisms.

Despite these problems, food aid is likely to continue as an important form of international assistance into the foreseeable future. The desire to use food as a form of aid or income transfer is quite robust, as can be seen in the domestic feeding programs in the United States. Despite all the caveats against such programs, the programs persist. The same will probably be the case at the international level as well. Despite all the reservations we have about food aid, countries will continue to use it. Hence, it behooves us to do what we can to improve this form of assistance. To improve food aid we need to understand it and the effects it might have.

There is a rather sizeable literature on food aid. This literature is of variable quality, however, and the lack of uniformity in research methodology makes it difficult to draw strong conclusions either about the effects of food aid in the past or about how it might be improved. Controversy still abounds about some of the key aspects of food aid.

The United States Congress has given a strong mandate that food aid be used for developmental purposes. To this end, in the mid-1970s Congress created a new title to the original legislation—"Title III"—which is dedicated to food aid for developmental purposes, and at the same time mandated specific targets in terms of the share of the food aid program that is to go for this purpose.

This chapter is directed to the issues of food aid as a component of general economic policy and the more effective use of food aid for developmental purposes. There are at least three aspects to these issues: (1) how can the generally recognized disincentive effects of food aid be reduced or eliminated entirely; (2) how can food aid be used more specifically for developmental purposes; and (3) how can the decision-making and bureaucratic processes with respect to food aid be improved? This chapter will concentrate on only the first two of these questions.

The chapter has a number of different themes. First, although food aid may have had some rather serious disincentive effects on the agriculture of other countries in the past, when it was used primarily as a means to dump excess production abroad, these effects have now been reduced substantially. Moreover, with sound policy, they can probably be totally eliminated. Second, despite its limitations as an income transfer in kind, food aid is still a rather flexible policy instrument and can be used in various ways and for various purposes. Third, in the past, not enough attention has been given to using food aid for what is most likely its highest payoff activity—the formation of human capital. Further use of food aid for this purpose will increase its overall contribution to long-term developmental goals.

The chapter is divided into two parts. The first part addresses the problem of managing the disincentive effects of food aid. This is an important aspect of using food aid as a component of general economic policy. The second part discusses the use of food aid for development

purposes. Each part ends with a section on recommendations, and some concluding comments are offered at the end.

MANAGING THE DISINCENTIVE EFFECTS OF FOOD AID

Food aid, as it originally began on a regular basis, was little more than a euphemism for dumping, despite the political rhetoric that surrounded it and the admirable development objectives that were assigned to it. It is for this reason that a few years ago food aid was almost universally condemned by academic economists.

Unquestionably, much of the early food aid had rather serious deleterious effects on producers in recipient countries. However, many of these negative effects have been attenuated or eliminated as program managers have responded to criticisms and as experience has grown with the program. These improvements in policy and the improved understanding of food aid and its possible effects on a host country have given rise to a more differentiated view of the potential impact of food aid. However, mistakes are still made in program implementation and in the making of policy decisions on country allocations. For these reasons the issue of the disincentive effects of food aid is a continuing one.

We will see below that the ultimate disincentive effects of food aid depend on how it is used, the terms or conditions on which it is given, and the institutional arrangements that govern it. The analysis in this part of the chapter is discussed under five headings: (1) direct disincentive effects; (2) indirect effects through the balance of payments; (3) indirect effects through induced changes in domestic policy; (4) the issue of supply displacement versus demand augmentation; and (5) the importance of institutional arrangements. Recommendations are offered in a final section.

Direct Disincentive Effects

Direct disincentive effects from food aid arise as a result of the introduction of concessional aid in kind into the local economy in competition with output produced by local producers. Viewed from one perspective, the food aid may represent an increase in supply that may benefit low-income groups. Viewed from another perspective, it may represent unfair competition to producers, since the increased supply and low prices are brought about by public means.

Whether there is a negative effect on agricultural prices in the recipient country will depend on at least five factors: (1) the conditions that gave rise to the food aid shipments in the first place; (2) the relative importance of food aid as compared to the domestic supply; (3) whether food aid displaces commercial exports or represents additional supply to the local economy; (4) how the food aid is introduced into the local economy; and (5) the institutional arrangements that prevail. The following paragraphs are devoted to a discussion of these factors.

The United States food aid program arose at a time when our agriculture was losing its competitive potential in international markets. This decline in competitiveness was associated in large part with the overvaluation of the United States dollar in international monetary markets, a phenomenon that appears to have started in 1949 but was masked for a time by the events of the Korean War (see Schuh, 1974, 1975).

In conjunction with the overvalued dollar (an implicit tax on exports), food aid can be given at least two interpretations, one that is fairly straightforward and another that is somewhat more sophisticated. The simple interpretation is that the overvalued dollar was in effect causing prices of agricultural products to be higher in other countries than they otherwise would have been (i.e., the export tax that the overvalued dollar represented could be passed on to consumers in other countries, with direct benefits to producers in other countries). The effect of the food aid, then, was to offset or annul this price-augmenting effect. Hence, in the aggregate, the food aid program may not have constituted a *net* export subsidy, and *in the aggregate* there may have been no negative price effects.

A more sophisticated view is that the United States was operating as a discriminating monopolist and charging two prices in two (differentiated) markets. On this interpretation, the United States was extracting a monopoly rent from the world economy, and in the process imposing seriously deleterious consequences on the producers in countries that were major recipients of food aid.

Unfortunately, we do not know which of these two views is correct or the extent to which food aid and other explicit export subsidies offset the distortion in exchange rates. However, it seems clear that in the absence of an overvalued dollar, world prices for United States agricultural exports would have been lower than they in fact were, and the United States would have been selling abroad a great deal more of its output. It also seems clear that in the aggregate the discrimination against the agriculture of other countries as a consequence of the food aid program was less than is generally believed to be the case. And finally, it seems clear that some individual countries may have suffered serious negative effects from food aid, even though in the aggregate the program may have done little more than offset the effects of the implicit export tax.

The second factor that determines whether food aid creates disincentives to producers in the recipient country is the relative importance of the aid compared to the domestic supply. If aid is small compared to the total supply, the negative price effect will be small, other things being equal. If it is large, the reverse will apply.

There have been cases where food aid has been sufficiently important—compared to the domestic food supply—to lower prices, especially for individual commodities. Lancaster (n.d.), for example, documents the cases of Egypt, Jordan, and Bangladesh where PL 480 made up 19, 21, and 24 percent, respectively, of total domestic wheat consumption. When food aid is that important, it obviously can have a sizeable negative effect

on price if it is just sold into the market. Dudley and Sandilands (1975) also document the case of Colombia, in which PL 480 wheat virtually eliminated the domestic wheat industry. (A more favorable view of food aid is given in Isenman & Singer, 1977.)

To the extent that food aid merely displaces commercial imports, of course, prices will be no lower than they will be in the absence of the food aid, if other things remain equal. This is the third factor affecting the disincentive effects. In principle, of course, food aid is supposed to be above and beyond regular commercial imports. It is for that reason that a "usual marketing requirement" (UMR) condition is imposed on food aid.¹ However, most authorities will admit that fulfillment of this requirement is tenuous at best. The fact that this requirement is not rigorously adhered to tends to reduce the potential disincentive effect.

Perhaps the most important determinant of the disincentive effect of food aid is the manner in which the food aid is introduced into the economy. If it is simply sold into commercial markets, the likelihood of a disincentive effect is rather strong. However, if it is distributed by other means, especially in such a way as to go to those who would not otherwise be purchasing food, its disincentive effects can be minimized or eliminated entirely. One such mechanism is the system of fair price shops in India, where in principle only the poor have access to food aid and at prices lower than in commercial markets. In this case there is an income transfer to the poor, and this can produce an income effect that may either partially compensate or completely negate any disincentive effect. The principle, of course, is that the more food aid can be introduced into the system as direct income transfer to the poor, the less is the likelihood that there will be negative price effects.²

An important issue in this case, of course, is whether the food aid does in fact get to the targeted groups, and in the form of income transfers. With institutional arrangements such as the fair price shops, there can be a great deal of "leakage." To the extent that the more well-to-do co-opt the system—and they often do when the institutional mechanism is pseudo market in nature—the aid can displace production of local producers and be an income transfer to the upper income groups rather than to the poor.

Finally, institutional arrangements are important. The use of systems such as India's fair price shops is an important example. Another example occurs when governments operate particular kinds of procurement policies. Under such a policy, a government procures a certain amount of grain at prices lower than those prevailing in the open market. Once

¹It should be noted that the UMR condition was imposed to protect export markets of third world countries and the commercial export sector in the United States. At the time it was developed, there was little concern for the producer in the importing country.

²Providing the food aid as income transfers to the poor in effect vitiates the partial equilibrium conclusion that an increase in supply will lower sectoral prices. The point is that "all other things" are not being held constant, and the increase in income, at least in part, counters the supply effect.

procurement needs have been met, the producer can sell his remaining surplus at the higher market price. The availability of food aid will reduce the amount of grains the government has to procure, which in turn will increase the amount the producer can sell at the higher world price. Under these circumstances, the food aid may actually result in higher average prices to the producer than would otherwise obtain.

Indirect Disincentive Effects Through the Balance of Payments

The indirect or policy effects of food aid are now well recognized. In its simplest form the argument is that the availability of food aid enables governments to avoid facing up to the development problems of its agricultural sector. Rural people therefore fail to receive their appropriate share of development resources, and the sector lags behind the rest of the economy.

One rather neglected means by which this inducement effect operates is through the balance of payments. Food aid is often provided as a means of helping a country deal with its balance of payments problems. Less often do food aid policymakers ask the question, "Why is this country having a balance of payments problem in the first place?"

Balance of payment problems may occur as a result of a natural disaster that affects agriculture or other sectors of the economy. More frequently, especially among the low-income countries, such problems occur as a result of inappropriate policies. An overvalued currency is a convenient means to tax the agricultural sector in low income countries. (For insights into this issue, see Lopes & Schuh, 1979, and Thompson & Schuh, 1978.)³ The consequence of an overvalued currency is to make domestic prices lower than they otherwise would be. This increases the quantity demanded of agricultural products in the domestic economy, but reduces the quantity supplied, since the overvalued currency under a wide range of conditions is an export tax that is paid by the domestic producer.

It should be noted that an important reason why many countries shift from being net exporters of agricultural products to being net importers is the pursuit of such policies. An overvalued currency is an import subsidy when a country is an importer. Thus, one can see why pursuing such policies gets many countries into balance of payments difficulties.

The important point in the present context is that the provision of food aid enables the government of the recipient country to continue to tax its local producers by this means. Since in most low-income countries the poor are located primarily in the agricultural sector, the policies in effect transfer income from the low-income groups in the society to the upper-income groups. Ironically, the effect of food aid—which may with good intentions be dedicated to improving the lot of the poor—may in fact be

³Other barriers to exports often exist in such countries, including export quotas, licensing provisions, marketing boards, and explicit export taxes. To simplify the exposition we will discuss primarily the overvalued currency, but the other policies are often equally important.

to make the lot of the poor worse, while at the same time enabling policymakers to continue to err in their decisions.

The moral, of course, is not necessarily to do away with food aid. The moral is to recognize that food aid can have these indirect and subtle effects, and to be sure that sufficient analytical capability is at hand to avoid these indirect consequences.

Indirect Effects through Induced Changes in Domestic Policies

The most widely recognized way in which food aid leads to disincentive effects for producers is through induced changes in domestic policies. There are a number of versions of the argument and, of course, various means by which policy changes can be induced (or motivated) through the use of food aid. For example, Lancaster (n.d.) has suggested that a country's dependence on counterpart funds for budget support may cause it to fail purposely to develop its agricultural sector in order to continue to receive this "cheap" form of budget support.

One does not have to postulate devious policymakers, of course, to imagine other forms of linkage between food aid and domestic policies. The availability of food aid enables the governments of many recipient countries to deal with the food problems of their urban constituents.⁴ Because they can deal with these problems by this means, the government can neglect its agricultural production sector. Rural people therefore fail to receive a socially efficient share of development resources, and the sector tends to lag behind the rest of the economy.

A completely contrary view can be taken, with food aid providing the means whereby improved policy can be obtained for local producers. It is somewhat surprising that this perspective has not been more widely recognized in the literature. Discriminatory policies toward agriculture are often motivated by income-distribution considerations, such as in the case of the desire to keep food prices to urban consumers low. The availability of food aid could reduce or eliminate the need to make such implicit income transfers and therefore reduce or eliminate the need for such discriminatory policies. To be effective in this sense the food aid would have to be channeled directly to the targeted groups, not just sold into the market. Something like a food stamp program or fair price shops would probably be needed.

There is great merit in disconnecting price and trade policies from their popular use in attaining income distribution goals. Prices and price policy are an efficient means of guiding the allocation of resources. In general, they are an inefficient means of redistributing income. It is not that price (and trade) policy is ineffective in redistributing income. To the contrary, this policy is a powerful means of redistributing income from

⁴These groups typically have the most political clout, if for no other reason than that they are highly concentrated and close to the center of government power.

one group in society to another. The problem is that such a policy frequently takes income away from unintended groups (for example, the local producer), and at the same time transfers it to unintended groups (in this case, the upper-income, urban consumer).

Experience with United States farm price policy provides an important lesson. That policy helped the rural poor only marginally at best, while it resulted in substantial benefit to large, efficient producers—those least in need. Price policies designed to help the urban poor in many countries have many of the same counterproductive effects.

When used as suggested above, food aid can lead to an improvement in economic policy rather than serve as the means of discriminating against the local producer. Unfortunately, not enough attention has been given to the creative use of food aid for such purposes.

Supply Displacement Versus Demand Augmentation

An important conclusion from the above analysis is that the nature and size of the disincentive effects of food aid are closely associated with whether the food aid is used only to augment domestic supplies, in which case it often serves merely to displace local supplies and reduce domestic prices, or whether it is used to increase the incomes of target groups and thereby to augment demand, perhaps with positive price incentives to local producers. In general, if food aid is to be used effectively for development purposes, its use in ways that lead to displacement of domestic supplies in the recipient country should be avoided. Instead, it should be used in ways that lead to an increase in the quantity of agricultural output demanded.

Demand can be augmented in two ways. The first is by means of direct income transfers, as when food aid is distributed, for example, by means of a food stamp program. To the extent that the income transfer is channeled to lower income groups, the demand-augmenting effect will be larger.

Second, to the extent that food aid is used effectively in promoting development, such aid will lead to increases in per capita income and hence to demand augmentation. Suggestions as to how food aid can be used to promote long-term development without displacing local supplies will be provided in the next section.

The Importance of Institutional Arrangements

A second important conclusion from the preceding discussion is that local institutional arrangements have considerable significance. Whether food aid has negative or positive incentive depends in large part on the institutional means by which it is implemented. More important, if food aid were used in a constructive way to develop improved local institutions, its contribution to policy might indeed be great.

Important examples of the relevance of local institutional arrangements

to the disincentive effects of food aid are the fair price shops in countries such as India and procurement policies designed to acquire stocks of food for urban consumers at less than market prices. Fair price shops may provide a means of channeling food aid to low-income groups without disrupting local markets. Similarly, the availability of food aid may reduce procurement needs, thereby enabling local producers to sell a larger share of their output at higher market prices.⁵

On a still more positive note, food aid can be used to promote institutional change that will lead to improved policy and more rapid development. The example cited above was the use of food aid to develop institutional means (such as the food stamp system) of transferring income to low-income groups, thereby freeing price and trade policies from their rather common income distribution objectives and permitting their use for more effective resource allocation objectives.

The use of food aid to facilitate such institutional change and development requires an adequate understanding of the local economy, close integration with local policymakers, and a considerable degree of expertise and ingenuity. Such uses of food aid would not be appropriate in all countries or in all situations. Where possible, however, institutional changes that lead to improved economic policy may be a powerful force for economic and social development.

Recommendations

The challenge to policymakers is to avoid negative incentive effects, whether they be direct or indirect; to use food aid to induce appropriate changes in policy whenever that is possible; and to use food aid for demand augmentation and developmental purposes. More specific recommendations are as follows:

1. To avoid the disincentive effects of food aid, it is important to understand the conditions that give rise to food aid in the donor country. If aid arises as a means of offsetting domestic export taxes, either explicit or implicit, it may have only minimal disincentive effects on the recipient country. If aid represents dumping and thus an implicit export subsidy, the tendency to use food aid for this purpose should be resisted unless specific measures to avoid disincentive effects in the recipient country can be employed.
2. Next, determine why a flow of food aid is needed in the recipient country. If it is because of inappropriate policies in that country, the food aid either should be used to induce appropriate changes in policy or should be withheld until such policies change.

Recommendations (1) and (2) imply the need for a strong analytical capa-

⁵Perspective on the role of procurement policies can be obtained by understanding them as a system of taxation. Often, they are in lieu of more formal income or land tax systems.

bility to guide the use of food aid, with part of that analytical capability needed in the donor country and part needed in-country.

3. Avoid the simple selling of food aid into the local economy. The likelihood of strong disincentive effects in this case will be great.
4. To the extent possible, channel the food aid into the hands of low-income groups, as income supplements.
5. When appropriate, use food aid as a displacement for domestic procurement policies in the recipient countries. It will then provide a means of alleviating the disincentive effects of domestic policies, while at the same time providing food that can be supplied to low-income groups.
6. Use food aid as balance of payment support only to offset domestic shortfalls created by natural disasters such as hurricanes, typhoons, earthquakes, and droughts.
7. Avoid the use of food aid to deal with inadequate domestic production and to provide a politically easy means of supplying urban consumers. This does not mean that self-sufficiency should be the policy goal. It does mean that care should be taken to avoid the use of food aid to support and sustain price and trade policies that discriminate against the agricultural sector.
8. Use food aid positively to induce the development of institutional arrangements that will reduce the incentive to use price and trade policies as a means to redistribute income. The development of food stamp programs is an important example. But not all countries will have the administrative talents and arrangements to manage such a program effectively. Discretion will be required.
9. Recognize the diversity in level of development and in institutional arrangements among countries. This means that simple-minded panaceas and fads should be avoided since, in general, different programs and policies will be required for different countries. It also means that adequate knowledge of the economy and system in the recipient country is required as a basis for sound policy.
10. Finally, recognize that there is a great deal we do not know about the economies of recipient countries and about how food aid can be used effectively. The support of research that adds to our knowledge will have a high payoff in terms of improved policies.

FOOD AID FOR DEVELOPMENT PURPOSES

In contrast to the preceding section, in which the issues were disincentive effects and the way food aid could be used to induce more appropriate price and trade policies, this section discusses the way food aid can be used more directly for developmental purposes. These objectives are not completely independent, of course; in fact, in some cases they are highly complementary. It is only for expositional purposes that they are treated separately.

Balance of Payment Support

The original "magic" of food aid, of course, was that it could alleviate balance of payments constraints, thereby freeing foreign exchange for development purposes; that it could do this with resources that had essentially zero value to the donor country; and that in addition it would generate counterpart funds in the recipient country that would make a second contribution to the recipient. Our current thinking, of course, has moved substantially beyond that original conception.

One of the key issues under this heading is the question of additionality. As typically posed from the donor side, this question has to do with whether the food aid represents a transfer of resources that would not otherwise have occurred and thus is additional to other resources. In the case of the United States, the answer to this question would appear to be in the affirmative. With the exception of the food crisis in 1973-75, the political support for food aid has held up better than for other kinds of foreign assistance.

The additionality question also needs to be applied to the recipient country, although in a slightly different form. In this case, the question revolves around the nominal terms on which the food aid is offered. If food aid and financial aid are offered on the same terms, financial aid is obviously preferable. That happy state of affairs rarely prevails, however. The key issue for the recipient country, therefore, is whether it is able to use food aid in place of more "expensive" financial aid, in whatever terms "expensive" is defined. A useful hypothesis, however, is that the softer loan terms that generally prevail for food aid are in effect compensation for the disadvantages of aid in kind.

Tweeten and Pinstруп-Andersen (1971) point to a somewhat different problem. They argue that the concessional terms on which food aid is provided cause the recipient government to place a lower value on the resources so acquired, and in turn to use them less productively. If that is the case, whatever additionality there may be is frittered away, at least in part, in poor policies and programs, thereby leading to a lesser contribution to development than the nominal value of the resources might suggest.

An important strength of food aid as a form of foreign economic assistance is that political support for it is easier to sustain than support for financial assistance. If one believes that upper-income countries should provide resource transfers to the low-income countries, then food aid can be an effective means of doing it, especially for countries with an efficient agricultural sector that tends to be in a natural exporter status.

For reasons outlined above and in the previous section, the general use of food aid for balance of payments support would appear to be ill-advised. The one advantage of using food aid for this purpose is that it is simple to administer and manage and therefore requires a minimum of bureaucratic infrastructure. But when used primarily for this purpose, it can reward inappropriate domestic and trade policies and at the same time induce laxness in the use of foreign assistance resources. The more

appropriate guidelines would appear to be to use food aid to alleviate balance of payments problems only in the case of natural disasters that cause a domestic shortfall.

Realistically speaking, the amount of food aid now available is not adequate to provide very extensive balance of payment support. To pursue such a policy as a general rule would limit the number of countries to which food aid could be provided.

Domestic Budget Support

A second contribution that food aid can make to development is the greater command over domestic resources it gives to the recipient government. The counterpart funds generated by the local sale of the commodities become a potentially important source of budget support for the local government. For example, it has been estimated that United States food aid alone financed 25 percent of the Bangladesh budget in 1976 (Lancaster, n.d.). And of course food aid financed a significant share of the budget of India's central government during the 1960s.

The view one takes on this issue depends importantly on the ideological perspective one takes with respect to the degree to which control over local resources should pass to the control of the public sector and the way those resources are used. Clearly, food aid that goes through government hands does give the recipient government more control over local resources. If one believes that government programs are necessary in order to obtain a higher rate of development, then this may be a positive gain. If one believes in a more market-oriented development policy, with less direct government intervention, the conclusion may be rather different.

An institutional question does arise here, however. Dependence on this relatively easy way of mobilizing local resources can result in a failure to develop an effective fiscal system. This in turn can have long-run deleterious consequences and can create serious political and economic difficulties if and when food aid is shut off.

Beyond these issues, the effect of food aid on development depends on how the resources are used. If they are used to support a bloated bureaucracy, for example, their contribution to development is likely to be small. If they are used for high-payoff investments, their contribution can be substantial.

Past experience with food aid programs would suggest that the counterpart funds can lead to complacency in developing appropriate domestic fiscal instruments for mobilizing domestic resources, and that they can and are often used to support bloated bureaucracies. If they also induce an excessive dependence on counterpart funds for domestic development programs, these programs may become dependent on the vagaries of food aid flows, and the donor country may find itself entangled in political difficulties if, for other reasons, it is forced to reduce the flow of food aid.

The main point is to avoid justifying food aid on the basis of the value of the counterpart funds. Moreover, attention should be given to avoiding

dependency (see a later section) and to assuring that the resources provided in this form are used for productive purposes.

Food for Work

The idea behind the food-for-work program was that food aid would mobilize resources (labor in particular) that would not otherwise be employed or used and produce physical infrastructure that would promote development, and that it would do these things while providing income transfers to the really poor, since the food would be distributed directly to target groups. The growing skepticism about these programs suggests that they have been less than successful in attaining these multiple objectives. This may be because they have not focused on alleviating the key bottleneck. It may also be because one policy instrument can seldom satisfy multiple policy objectives.

Without depreciating the considerable effort that has gone into developing successful food-for-work projects, it would appear that high-payoff investments for food aid would be those that lead to the production of human capital, not physical capital. The social rate of return to the formation of human capital is demonstrably high. Moreover, food aid lends itself well to the formation of human capital if it is used to improve the nutrition of the nutritionally disadvantaged and to increase participation of low-income groups in formal schooling and in vocational training programs. This use of food aid will be discussed in more detail below.

Improving the Distribution of Income

The recent emphasis on basic needs and income distribution has given rise to a more favorable attitude toward food aid. In fact, this new emphasis has helped to bring food aid back to respectability from the depths of skepticism that resulted from the academics' criticisms of disincentive effects. As with the issue of disincentive effects, however, the contribution of food aid to improving the distribution of income depends in large part on how the food aid is used.

Unfortunately, the popular image is that it is the rich and wealthy who benefit from food aid, and not the poor. This image appears to have come about in large part from the episodic events associated with the use of food aid for emergency purposes. Under those circumstances, the lack of local administrative and institutional capability to handle the large inflow of food results either in the food not being used or in it being channeled to those less in need. This does not deny, of course, the existence of corruption at the local level in the administration of the food aid programs.

Interestingly enough, the simple dumping of the commodities in the local market, with sizeable negative price effects and large disincentive effects to producers, may lead to an improvement in the distribution of

income.⁶ Low-income families spend a larger fraction of their budgets on food, and therefore would benefit in a relative sense from food aid programs. In this case there is a clear tradeoff between efficiency and equity goals.

Such a proposition has to be qualified with a number of caveats, however. Whether the distribution of income improves or not depends a great deal on the product, who consumes it and who produces it, and on the distribution of income between producers and consumers and among each of the two groups individually. One can easily imagine circumstances in which the distribution of income can even be worsened by such a simple policy, especially if rural incomes are substantially less than those in urban centers, as they generally are.

Greater emphasis on improving the lot of the poor and on improving the distribution of income caused there to be a greater emphasis on targeting food aid and a shift from program uses to project uses of food aid. Although well-intentioned, this shift in emphasis entails a number of difficulties. First, the data base in the really poor countries is usually inadequate to do much in the way of fine-tuning the programs. Second, there is generally a lack of administrative and professional capability in such countries to make the programs very effective. And third, such targeted programs typically require complementary resources other than food aid.

The food-for-work program evolved in part as a means of assuring that food aid reached the really poor, as did such programs as school lunches and food for pregnant and lactating mothers. The recent literature suggests that there is a certain amount of frustration with each of these programs. Stevens (1978), for example, argues that it may be worthwhile to abandon the official goals (nutritional improvement and the creation of physical infrastructure) of both maternity and child health and food-for-work programs and to consider both schemes simply as methods of providing income in kind to poor people. The frustration with school lunch programs is that they often do not reach the poorest groups of the population since these groups typically are not in school.

The effect of food aid on income distribution is obviously tied to its use as a development investment. A distinction does have to be made, however, between strict income transfers to the poor and the use of food aid in development programs designed to improve the long-term income potential of these groups.

A more efficient way to use food aid would appear to be to maximize its developmental impact, focusing the developmental programs on low-income groups and on particular kinds of investments. There is little doubt that food aid *can* be used to alter the distribution of income. However, well-intentioned programs often have effects counter to those expected (Schuh, 1978). In the final analysis, appropriate development

⁶Since food is a wage good, such a policy can have direct developmental effects as well, since it enables firms in the nonfarm sector to maintain low nominal wage, thereby increasing the profitability of their enterprises.

policies can improve the distribution of income without explicitly attempting to alter the distribution of income. By the same token, programs that have explicit income distribution goals often have strong disincentive effects and therefore deleterious consequences for development.

Support for Stabilization Programs

Food aid can contribute to stabilization in at least two ways, both of which are important in furthering developmental objectives. In the short run, food aid can attenuate inflationary pressures that arise due to a crop shortfall. To attain this goal, timeliness is an important criterion. Bureaucratic delays and red tape make this criterion difficult to satisfy through regular food aid channels.

Recently, however, a number of innovative ideas have been suggested with respect to how food aid might be used as a means to build stocks for use when a country suffers a shortfall in its domestic agricultural output or when prices are high in international markets. (For example, see Johnson, 1977. The International Food Policy Research Institute in Washington has also been a strong advocate of such a policy.) In fact, Johnson would restrict the use of food aid entirely to offsetting crop shortfalls in recipient countries (Johnson, 1973; for a more general discussion of the food security problem, see Valdés, 1981).

To date, there has been little practical experience with such programs. They appear to offer considerable potential, however, especially in the absence of more general commodity agreements that might help to stabilize international grain markets. In the absence of more general stabilization programs, they might enable individual low-income countries to isolate themselves from the vagaries of international markets.

Food aid can also be used to help stabilize long-term development efforts. The most obvious case is the use of food aid to offset an annual crop shortfall. In the absence of such aid, foreign exchange would have to be channeled to commercial imports, thereby reducing the imports of raw materials and capital goods used for development purposes.

The use of food aid for general balance of payment support appears to have declined in importance over time. The reduction in availability of food aid in the 1970s has itself reduced the resources for such purposes. In addition, the increased emphasis on development objectives has given more impetus to long-term commitments of food aid. Moreover, there are a growing number of financial facilities to provide short-term balance of payment support, and an increasingly well-developed international capital market to which countries can turn in times of stress.

For these reasons it appears useful to restrict the use of food aid for balance of payment support to those cases in which the balance of payment problem is due to a domestic crop shortfall caused by a natural disaster. The decision variable will be more obvious in this case, and the potential for reinforcing and sustaining inappropriate policies will be less.

The various formal insurance schemes for the use of food aid to offset

balance of payment problems have typically proposed to use the reserve stocks accumulated as part of the program both as a means to offset fluctuations in domestic output and to assist countries when prices in international markets are quite high. It is questionable whether food aid should be used for this more ambitious purpose. The definition of an appropriate decision variable will be difficult, in part because in the context of international markets it is difficult to distinguish between a short-term phenomenon and the beginning of a long-term trend.

The Formation of Human Capital

One of the major challenges in making more effective use of food aid is to discover means whereby the poor and hungry can be fed, while at the same time the long-term investments that lead to sustained economic and social development can be made. Providing food for the poor and hungry is consistent with the motivations of those who provide political support for food aid programs. Promoting long-term development goals is the key to solving the problems of the poor and hungry over the longer term. It is also in our best national interests in an international climate in which economies are increasingly interdependent.

Unfortunately, food aid programs are still dominated by a short-term perspective, despite the mandates of the Title III programs. Moreover, the use of resources provided through food aid is still strongly oriented toward the formation of physical capital and the construction of infrastructure.

In taking such perspectives, both practitioners and analysts of food aid programs have neglected two important bodies of economic literature: the new household economics and the theory of human capital on which this new discipline is based. The lesson from the theory of human capital is that such forms of investment are as important as investments in physical capital—perhaps more important. Moreover, the stock of human capital is increased by investments in improved nutrition, health, formal schooling, and training programs. The lesson from the new household economics is that what goes on in the household is as important to a society, even for developmental purposes, as what goes on in private firms and as whatever physical infrastructure that society may develop.

Food aid lends itself especially well to the development of human capital. Moreover, food aid is a striking example of means whereby the short-term use of food to deal with problems of human hunger can in fact lead to the formation of human capital that will yield benefits into the future.

In reviewing past programs, improved nutrition has been an important program goal. School lunch programs have also been an important use of food aid, as have day care centers and the use of food for pregnant women and lactating mothers. Paradoxically, such uses of food aid have been viewed primarily as forms of humanitarian aid, with the programs perceived as vehicles for getting the food aid to the poor. Seldom have these

uses of food aid been perceived as means of increasing the stock of human capital in the society.

As long as such uses of food aid are perceived as welfare programs, they will not likely be efficient in promoting the formation of human capital. The theory of human capital provides a useful guide to policy and to program development. Until we use food aid for this purpose, we will not really capitalize on what is unique about food aid as a form of development assistance.

The payoff from food aid in furthering development objectives could be quite high if as large a part of it as is feasible were shifted to making investments in human capital. This need not imply the abandonment of a concern for basic needs. What it does require is that the welfare mentality behind such programs be abandoned and the emphasis shifted toward the formation of human capital, with this shift viewed as the investment decision that it most certainly is. Relevant programs, when focused on the poor, will both improve the distribution of income in the recipient country and provide the basis for a more rapid rate of growth. In effect, the frequently presumed dichotomy between equity and efficiency disappears.

Two lessons from the new household economics provide additional guides for making effective use of food aid for development purposes. The first is that children are often required to earn income for the family, thereby making the family's opportunity costs of schooling and training programs quite high. School lunch programs provide an important means of dealing with this problem. The income transfer such programs represent in effect pays the family for sending the child to school or to training programs.⁷ Rather than a welfare transfer, it becomes a long-term investment both for the family and for society.

The second lesson from the new household economics is the importance of the woman in influencing the development of the child. This suggests that food aid programs can contribute to the formation of human capital if they are structured so as to relieve the wife from work activities, giving her more time to work with the children. The particular form such programs take will depend on the individual country and on the role of its women, both in the household and in society. This is an important gap in our knowledge in most countries.

To summarize, if food aid is to be used for the formation of human capital, it should be directed to improving the nutrition of the young, of pregnant women, and of lactating mothers; to creating the means whereby children can participate in formal schooling and training programs; and to enabling mothers to withdraw from the labor force, especially during their children's formative years. Although some of these uses of food aid are recognized in the food aid literature, they should be put on center

⁷Past frustrations with this use of food aid may have arisen because school lunches were not designed specifically to reduce the opportunity costs of schooling and training programs.

stage for policy purposes and the emphasis shifted from welfare to investment in human capital if food aid is to be used more effectively to attain its developmental objectives. (For a more detailed discussion of how food aid can be used for this purpose, see Schuh, 1980.)

Food Aid and Dependency

A frequent criticism of food aid is that it nurtures dependency on the part of the recipient country. Presumably, this is more likely with food aid than with regular financial assistance because of the institutional arrangements that evolve around payment-in-kind programs and because of the perceived disincentive effects of food aid. If food aid does in fact enable a country to put off the development of its agricultural sector, clearly the country will continue to be dependent on food aid.

Countries also may become dependent because of the contribution that counterpart funds make to the domestic budget. It is well recognized, for example, that in the 1960s India became concerned about its growing dependence on this budget support and that, as a consequence, it was failing to develop its own taxing instruments.

An evaluation of dependency is rather difficult. About all that one can say is that the list of graduates from food aid is rather long. That at least suggests that whatever dependency there may be is not irrevocable.

It should also be noted that there is another form of dependency that is less recognized in the literature. Interestingly enough, donor countries can also become dependent on food aid programs. Food aid becomes a substitute for domestic adjustment policies. One need go back no further in time than late 1978, when Senator Dole introduced a bill to raise the United States food aid commitment to 7 million tons a year. The objective of that bill, of course, was to expand exports and thereby raise prices to farmers. More generally, support for food aid strengthened in 1977 and 1978 as agricultural prices plunged from their commodity-boom peaks of 1973-76.

Recommendations

1. Food aid should be used to alleviate balance of payments problems only to offset the effects of natural disasters that cause a shortfall in domestic agricultural output.
2. Food aid should not be justified on the basis of the counterpart funds it provides. Moreover, care should be taken that the recipient country not be dependent on these funds in lieu of a domestic fiscal capability, and that the resources provided in this form be used for productive purposes.
3. The use of food aid in food-for-work programs should be deemphasized unless it is tied to means of increasing the investments in human capital in the recipient households.
4. The use of food aid should clearly be directed to improving the lot of

the poor in low-income countries. Programs based on simple income transfers should be deemphasized, however, and the emphasis shifted to improving the productivity and income-earning potential of low income families. Improving the lot of the poor is not inconsistent with high-payoff investment programs if the programs are well conceived.

5. The use of food aid to offset shortfalls in domestic output caused by natural disasters can help to stabilize domestic development programs in the recipient countries and thereby help to promote more sustained development. The use of food aid to offset fluctuations in international commodity markets is more questionable. Other institutional means should be found for dealing with that problem.
6. As large a proportion of food aid as is possible should be shifted to the formation of human capital. That means that food aid should be used to improve the human nutrition of the young, of pregnant women, and of lactating mothers; to enable children to participate in formal schooling and training programs; and to enable mothers to withdraw from the labor force in their children's formative years. Moreover, the existing welfare mentality of many programs consistent with these objectives should be changed to an investment mentality and the programs altered accordingly.

Concluding Comments

The challenge in the use of food aid is to convert it into an investment rather than use it as a short-run response to current problems. With ingenuity, food aid can be used for both purposes with the same action. All too often, however, we fail to take the long-term perspective.

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Chapter 4

FOOD AID AND FOOD SECURITY IN SUB-SAHARAN AFRICA

Edward J. Clay

Food security is a convenient phrase for drawing together food system interventions at a subnational, national, or international level that are conceived as a response to food insecurity. Households, communities, nations (and not only low-income countries) are confronted with food insecurity risks to their *target* levels of food consumption (Siamwalla & Valdés, 1980). *Food security* as a code word can also be something of a trap because it is implicitly used very often in connection with only one dimension of food insecurity—risks of year to year fluctuations in aggregate (national) consumption of basic food staples around long-term trends. The possibilities of food aid contributing to increased food security cannot be fully explored within this restricted framework of discussion.

Food insecurity is a problem of specific groups within society, but it may also have regional and seasonal dimensions. The primary impact of food aid, which represents only a small proportion of international trade in cereals, is at the national level and within recipient countries. Food aid also includes dairy products and vegetable oils. It would seem appropriate therefore to consider the role of food aid in relation to a broader definition of the problem of food insecurity.

The first major section of this chapter presents a disaggregated view of the problem of food security as it affects specific groups and regions. This approach provides an opportunity to look for distinctive African dimensions to the problem. The next section briefly reviews the state of play on national and international food security issues. Finally, the limited progress to date in this area is seen as another reason for thinking specifically about ways of making food aid a more effective means to increased food security.

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A DISAGGREGATED APPROACH TO FOOD SECURITY¹

"Whose Food Security?"

The treatment of food security as essentially a macro phenomenon leads logically to a focus on a restricted set of interventions in food systems at the international and national level. An alternative approach to the question of food security is to make the problem of food insecurity as it exists at the individual, household, community, class, and regional levels, the focus of analysis. In preparing a set of background papers for the World Bank's *World Development Report 1981*, the author and colleagues at the Institute of Development Studies (IDS) adopted this alternative, disaggregated approach in order to explore the policy issues raised by the problem of food security in low-income countries. We both drew on the experiences of a small number of case study countries and made use of the evidence on food security and food policy from a wider set of country situations (Clay et al., 1981).

Our starting point was to indicate the dimensions of the problems of poverty, malnutrition, and food insecurity within a low-income country. These terms are frequently used very loosely, and there is a need to be specific in talking about malnutrition and food insecurity at national, regional, or individual levels. Within this context, we have looked at three sets of issues:

1. The problem of adjustments to instability in domestic production, and the extent to which problems of malnutrition and food insecurity are essentially issues within the national economy resulting from the structure of that economy and from fluctuations in food supply
2. The role of external economic pressures from the international economy—in particular, adjustments to events such as the substantial rises in oil prices and problems of foodgrain supply
3. The role of public policy, both domestic and international, in either worsening or ameliorating the problems of malnutrition and food insecurity

In undertaking this structured review of problems, the question we have had most in mind is the extent to which common themes and problems transcend wide differences in the economic structures of low-income countries. Are all problems of food insecurity country—and region—specific, reflecting different structural problems? To what extent are the issues problems of policy? What are the problems to be tackled? To what extent must policy prescriptions be modified for different con-

¹This section draws on two food policy issue papers by colleagues at the Institute of Development Studies: Lipton (1981) and, especially, Chambers and Singer (1981) on Zambia. The disaggregated approach to the problem of food security owes much to Lipton's continued insistence on the question, "Whose food security are we discussing?"

texts and different periods? For example, Schultz (1978) and others have suggested that the problems of poor food-sector performances have been severely aggravated by public interventions. If problems are country-specific and region-specific rather than general in character, does this specificity have implications for the forms of assistance the international community should provide for low-income countries and the appropriate forms of international food security? For example, international food security buffer stocks represent an attempt to improve simultaneously the international environment of all low-income countries, whereas a food-financing facility is more obviously a mechanism that can be tailored to a variety of circumstances.²

Some Common Themes of Poverty and Food Insecurity

Food insecurity, when conceptualized as a problem of individuals and households, is about the inability of people to ensure the continuity of their own basic food supplies. As a human problem, food insecurity is primarily one of the welfare and vulnerability of distinctive categories of people within the population. The case study approach reveals the importance of clearly recognizing the distinct poverty problems and sources of vulnerability of these groups.

First, it is important to differentiate between the problems of the urban poor and those of the rural poor. The majority of urban households in low-income countries spend a high proportion of income on basic foods. The effects of fluctuations in food prices on income are therefore significant for most urban households, and such fluctuations cause severe difficulties in obtaining food for those on fixed incomes. The problems, however, are most acute for the poor: low wages, irregular employment or unemployment, and disabilities make them especially vulnerable. Their access to capital markets is relatively restricted, and they pay more for credit. The poorest urban dwellers are also likely to be the people who are most directly affected by crisis in the countryside, which produces an influx of migrants who will compete for unskilled and casual employment. When compensating measures are absent, higher food prices have direct and adverse effects on the welfare of the urban poor.

The major sources of rural poverty, malnutrition, and food insecurity lie in the structure of domestic agricultural production. Characteristically, poverty and malnutrition have a well-defined regional, seasonal, demographic, and social structural character. However, there is a considerable difference between the structure of asset-holding and production in South

²"The IMF [International Monetary Fund] has recently modified its compensatory financing facility so as to explicitly allow compensatory drawings for countries which may suffer additional balance of payments difficulties because of extra food import costs for reasons beyond government control. This improvement will be very useful for these developing countries that periodically face crop failures. It would also be of assistance in times of high international prices, allowing countries with exchange difficulties to continue importing their normal grain requirements." (Williams, 1981, p. 16) See also Green & Kirkpatrick, 1981.

Asian peasant economies and in the less densely settled countries of sub-Saharan Africa.

In terms of their access to and control over productive assets, the poor in South and Southeast Asia are differentiated in three broad categories: the rural landless, near-subsistence households, and poor farmers producing marketable surpluses. The poverty and food insecurity problems of each group have distinctive features. The specific structure of production and distribution also imparts a distinctive character to the markets for food staples. The high levels of landlessness, secular patterns of commutation of wage payments (traditionally paid in kind), and the seasonal food deficits of marginal producers all contribute to make the rural poor an important segment of the market for food staples.

In contrast, almost all rural people in Africa are engaged in subsistence production. Where there is evidence of structural transformation that is creating new categories of landless labor and households unable to engage in subsistence production in economies with high proportions of labor migration, substantial peasant production, and a significant and large farm sector, the numbers are as yet small.³ However, the proportion of rural households that is unable to meet staple requirements throughout the year from their own production may be much higher. For example, Kydd and Christiansen (1981) estimate that in Malawi this proportion varies between 30 and 70 percent, depending on the harvest. For the moment, and in contrast to Asia, it probably remains broadly true that agricultural markets impinge on rural households to the extent that the latter are surplus producers of commodities (Chambers & Singer, 1981). But too little is known quantitatively about the dynamics of rural change, particularly about the growth of rural landlessness and the decline of autoconsumption.

Nomadic pastoralists are an important group in many African societies. Their distinctive food security problems are centered on the difficulties of and the length of time required for rebuilding herds and flocks after these have been decimated by disease or drought. Losses during drought may also result from sales to buy grain or to avoid expected losses. The significance of high protein dairy products in the diet of pastoralists can also present a further problem where nutritional programs are organized to provide food security. The traditional response of nomads to food supply difficulties—short-term or permanent migration—resulted in open conflicts of interest with agriculturalists. The boundaries of the modern nation state and the formalization of land rights and land improvement—for example, irrigation—increase the difficulties of the pastoralists by restricting their capacity to respond to food insecurity in traditional ways. The special problems of pastoralists—which do not receive extensive consideration in this paper—have become the focus of important inter-

³Kydd (J. Kydd, personal communication, 1981) estimates that for Malawi the proportion of households in these categories is 5 percent. Dibaba and Hecht report similar developments in Gambia and Ivory Coast (Y. Dibaba & R. Hecht, personal communications, 1981).

national activities such as those of the International Livestock Centre for Africa and the International Laboratory for Research on Animal Diseases.

These differences of economic structure have significantly different implications in terms of the trade-offs involved in price policy. In Africa the short-term distributional conflict involved in price policy is essentially between rural producer and urban consumers. For example, Chambers and Singer (1981) see the conflict of interests involved in price policy in Zambia as rural-urban, complicated by discrimination between commodities. In many Asian countries there is also a potential short-term conflict of interest between surplus and potential surplus agricultural producers on one hand and the rural poor on the other. The problem is well summarized by Timmer & Goldinan (1980, p. 7): "This skewing effect of high food price policy is not unique to Sri Lanka; it is quite characteristic of any market-oriented society at low levels of per capita income. In such societies low food prices have a strong equalizing effect on the distribution of calories while high food prices cause an inevitable skewing in the absence of alternative policy initiatives or programme interventions."

In Zambia—and probably in many other African economies that are still only partially integrated into wider markets—the problem has an additional regional dimension. Increasing the supply of commodities for which a substantial demand exists—say, maize—will have a significant impact on the incomes of maize-surplus producing households in the major maize-growing regions. Areas of subsistence production, where marketed crops are insignificant, would be little influenced by the growth of marketed output. These poorly articulated markets are also likely to be extremely "thin," with regionalized food shortage and threat of famine followed by short-term glut and oversupply.⁴

It is important to recognize the significance of this tension, the potential in food policy, and the potential trade-offs implied by "cheap" food or incentive price policies. The price of cheap calories today is probably some combination of food import dependence and lower rates of agricultural growth. The costs of an incentive price policy are immediate pressures on the real incomes of politically influential urban consumers as well as on the nutritional status of the most vulnerable groups, if there are no *effective compensatory interventions*.

Poverty, malnutrition, and food insecurity have clearly defined seasonal and regional dimensions. However, these problems of seasonality and regional imbalance are country-specific, reflecting variations in environmental conditions and the demographic and economic structure of the society. For example, in Zambia (Chambers & Singer, 1981) the problem of seasonality is closely linked to the pattern of rainfed cultivation under a unimodal tropical rainfall regime. Seasonal stress on rural households also reflects the demographic and social structure of different rural societies. In Zambia the most vulnerable households are typically those headed by females.

⁴I owe this point to a comment by Ed Hogan at the Abidjan Conference.

The problem of regional imbalance reflects classic problems of location and remoteness from the metropolis. Environmental and technological factors limit agricultural productivity growth and market demand for agricultural commodities. For example, in thinly peopled Zambia, it is the remoter rural regions—where marketed production of maize, the major staple, is least important and a high proportion of households are within the subsistence sector—that experience the most severe poverty and malnutrition.

The discussion of the problem of food insecurity is broadened by recognition of the seasonal and regional patterns of involvement of poor rural households in agricultural markets. Interventions that reduce the amplitude of interharvest fluctuations in agricultural prices are likely to benefit the rural poor. Similarly, the improved articulation of marketing systems and reductions in transport costs from interior areas to major marketing centers would benefit producers and consumers disadvantaged by location. Measures that narrow the intertemporal and spatial range of price outcomes are likely to have strong anti-poverty implications. The seasonal and regional dimensions of food insecurity also have implications for the management of food imports including food aid (see the last section of this chapter).

Domestic Sources of Food Insecurity

The regional, social, and seasonal profile of malnutrition and food insecurity varies among countries. However, the major cause of short-term food insecurity is fluctuation in regional or national agricultural production.⁵ In Zambia, which was subject to severe adjustment problems resulting from a 40 percent fall in the purchasing power of its major export (copper) and the effects of war in neighboring Zimbabwe, it was the disastrous fall in maize production over the last two years that led to a "food-system crisis." The latter term describes a situation in which the food supplies of significant sections of the population are threatened, typically provoking emergency response by government.

Food system crises develop rapidly. In part this is because of the high degree of individual food insecurity and vulnerability of disaster-prone regions. The risk of considerable crop damage until the harvest is completed also makes it difficult, even with a reliable crop forecasting system in place, to anticipate the magnitude of a shortfall in production.⁶ However, the rapidity with which a crisis can develop is frequently also a reflection on the weakness of the monitoring and management of food systems in low-income countries.

⁵Sen (1981) focuses on the failure of "exchange entitlement" as the cause of famine. In practically all situations of rural food insecurity, failures of "exchange entitlement" and reductions in availability occur together.

⁶The problem Soviet authorities, as well as international agencies like the International Wheat Council, seem to have faced in estimating the 1980 wheat crop in the USSR is a reminder of the universality of these problems.

The circumstances that may precipitate food crises are varied. Where rainfed cultivation predominates, drought or untimely rainfall are the most widespread causes of serious shortfalls in production. In deltaic and floodplain regions a food crisis can also be precipitated by abnormal flooding.⁷ Other sources of falls in production are cyclones and political instability.

Another potential but difficult to predict source of instability is genetic vulnerability. The risks of significant crop losses (including total crop failure) from disease or pest attack will increase where yield improvements are achieved by the extensive cultivation of varietal types with a narrow genetic base. The seriousness of the problems created by genetic vulnerability is indicated by recent experiences in Indonesia, Pakistan, and Cuba. In Bali and parts of Java in the mid-1970s rice crops were devastated by the brown plant hopper infestation after non-resistant semi-dwarf varieties had been widely adopted. In 1978 the Pakistan wheat crop was severely reduced by widespread rust attacks. In 1980 both the sugar and tobacco crops in Cuba were devastated by fungus attack. The number and scale of the recent production problems created by genetic vulnerability are an example of food insecurity problems that raise issues of science and production policy rather than food system management (see Biggs & Clay, 1981).

Finally, one must recognize the role of domestic food policy. In almost all countries, there is massive public intervention in the operation of domestic food systems. This can either considerably aggravate or ameliorate the effects of fluctuations in domestic production that are primarily a consequence of short-term variations in environmental conditions.

Adjustment to External Economic Pressures

The rapid rise in energy prices, as well as problems of supply of fossil-energy-based products, created serious economic adjustment problems for low-income countries in the early 1970s. A second energy crisis is once again placing these economies under severe pressure. During the early 1970s sharp upward price movements were coupled with the reduction in availability of concessional food aid supplies, placing further pressures on low-income food-importing economies (World Food Council, 1979). These external pressures unquestionably aggravate agricultural production and food supply problems in many low-income countries. For example, the coincidence of a domestic food production crisis in Bangladesh with a tight international cereal market compounded problems of food import supply by intensifying severe short-term balance of payments problems (Clay, 1981).

External economic pressures are not likely to be the cause of a serious

⁷The cropping patterns of floodplains are adapted to seasonal flooding. Disasters result from abnormal flood conditions in terms of the timing and duration of the floods as well as maximum water levels.

aggregate food supply problem except for the small number of African countries that are structurally dependent on imports of food staples, for example, Cape Verde and Mauritania (see Table 4.1). At the same time, most countries in Africa are structurally dependent on imports for the supply of rice and wheat, which play a secondary role in total supply of calories. External pressures such as those experienced by the Zambian economy during the late 1970s resulted in adjustment problems that weakened the capacity of the agricultural production and food supply systems to cope with the problems that resulted from shortfalls in domestic supply.⁸ External economic pressures can also contribute indirectly to domestic food system problems when the adjustment process is characterized by shortages and inflation. In these circumstances, food system management becomes an important policy instrument in seeking to assure economic and political stability. Public food system management is used to cushion the real incomes of urban consumers and groups essential to the functioning of the state against effects of price inflation. Even if the external economic environment is not the major factor contributing to instability in domestic food supply, international measures could ameliorate the problems of food insecurity.

Domestic Food Policy and Food Security

There is massive intervention by governments in the food systems of virtually all low-income countries. Problems of food insecurity at regional and national levels make Government intervention necessary and inevitable. But the characteristic forms of intervention raise many policy issues. First, a virtually universal objective of public intervention would appear to be to provide food security and to stabilize real incomes of urban consumers. Such intervention, therefore, apart from questions of operational efficiency or leakages, is only partially targeted at one poor and nutritionally vulnerable category—the urban poor.

In some Asian countries governments have attempted to extend a food security and welfare safety net to wider segments of the population. For example, until recent reform, the ration system in Sri Lanka was extended to provide guaranteed and subsidized food supplies to *rural* consumers. Recent studies of the operation of such distribution systems have shown that significant nutritional effects can be achieved.⁹ Scandizzo (1979, 1980) and others have found distribution programs to have positive cost ratios. These results are important in providing a much needed balance to discussion of public ration system programs otherwise severely criticized for weakening incentives to agricultural producers. Public food system interventions nevertheless raise many questions.

⁸For example, Chambers and Singer (1981) document how adjustment pressures led to the deterioration in agricultural extension and other services provided to agriculture.

⁹See Gavan (1979) and George (1979) on distribution systems in Sri Lanka and Kerala. Mencher, (1980) has contested the findings of George, arguing that lower rates of mortality and morbidity in Kerala reflect improvements in public health.

TABLE 4.1 Contribution of Major Staples to Domestic Production of Food Staples and of Cereal Imports to Supply of Staples: Sub-Saharan Africa (MSA/FP Countries), 1976/77-1978/79.

	Cereals	Cassava	Other Roots	Bananas & Plantains	Total Staple Production	Cereal Imports: % Contribution to GIS ^a
... Percent of Total Staple Production ...						
Angola	31	57	5	7	100	11
Benin	41	35	24	1	100	7
Burundi	20	30	27	23	100	1
Cameroon	42	19	22	17	100	5
Cape Verde	28	18	34	20	100	79
Central African Republic	14	67	12	7	100	1
Chad	81	11	8		100	5
Comoros	17	42	5	36	100	20
Djibouti						100
Ethiopia	90		9	1	100	5
Gambia	96	4			100	35
Ghana	27	33	25	15	100	11
Guinea	66	20	5	9	100	6
Guinea-Bissau	67		20	13	100	35
Ivory Coast	37	15	33	15	100	12
Kenya	82	8	6	3	100	1
Lesotho	99		1		100	38
Madagascar	79	15	4	2	100	5
Malawi	95	2	2	1	100	1
Mali	97	2	1		100	5
Mauritania	94		6		100	73
Mozambique	34	53	1	1	100	14
Niger	94	6	1		100	4
Rwanda	17	14	23	47	100	1
Sao Tome, etc.		33	60	7	100	59
Senegal	91	8	^b	^b	100	33
Sierra Leone	87	10	2	1	100	14
Somalia	80	35	^b	15	100	34
Sudan	95	2	2	1	100	6
Tanzania	39	46	3	12	100	3
Uganda	43	15	9	33	100	^b
Upper Volta	96	2	2		100	5
Zambia	91	8	1	^b	100	10
Total	63	19	9	9	100	7

SOURCE: FAO *Production Yearbook*; FAO *Trade Yearbook*

NOTE: Due to rounding, percentages may not sum to 100.

^aGross incremental supply (GIS) = production + recorded imports. In the absence of reliable estimates of opening or closing (year-end) levels of public or private stocks of basic staples, and taking account of unrecorded private trade (smuggling), production + imports provides a crude measure of the annual level of supply. This level is defined as "gross incremental supply" to distinguish it from an estimate of supply including opening stocks and unrecorded trade. Production and imports of staples are converted to calorie equivalents.

^bLess than 0.5 percent.

First, there is a tension between guaranteeing consumption and sustaining real income levels on the one hand and the disincentives to domestic agricultural production resulting from low food prices and a ration system sustained by imported concessional supplies of food on the other. Second, the costs of public distribution are a direct function of the size of the target group covered. The burden of a general ration system on a low-income country may in the end be difficult to sustain. Such factors point to the need for more narrowly targeted, more cost-effective distribution measures.

Close analysis of public food systems indicates other problems besides cost-effectiveness. In virtually all countries, public food interventions are used first and foremost as a way of providing food security and a cushion against inflation to urban consumers. In Zambia the zone of distribution of imported and price-controlled domestic food staples is coterminous with the areas of urban consumption. However, because access to limited supplies of price-controlled staples is restricted in practice to certain favored categories of urban residents, the urban poor are often those least likely to acquire food at controlled prices.

The consumption characteristics of basic food staples can provide some operational flexibility. In Zambia, roller meal is noted as the important staple of the urban poor, whereas cassava and millet are important for consumers in relatively poorer rural regions. Supply manipulation and differential price policies for major food staples can, therefore, offer some opportunity for a cheap calories policy for the poor. There are also implications for agricultural science and production policies in raising productivity of previously neglected staples of poorer consumers in poor regions (Lipton, 1981; Chambers & Singer, 1981).

However, the implementation of policies discriminating among commodities should be recognized as raising complex problems. In many African countries, where imports now account for a significant proportion of marketed supply of food staples, the imported commodities—especially rice and wheat—that are directly available to government for use in food operations, are superior goods, especially significant in consumption by high-income urban households. The prevailing patterns of subsidization and imports indicate that there could be problems of finding political support for targeting subsidies to the poorer consumer.

Another way of increasing the effectiveness of direct distribution programs is to restrict the target group through the choice of intervention. For example, the experimental food stamp program in Sri Lanka is an attempt to limit food subsidies to a narrower, nutritionally vulnerable group of low-income households while food prices can be raised for other parts of the population to provide increased incentives for domestic producers. This bold experiment provides valuable insights into the complex issues raised by a shift from general food subsidies to a more narrowly targeted system (Food and Nutrition Policy Planning Division, 1980). For example, the introduction of eligibility criteria based on money income and money-income equivalent raises problems of comparability between

households receiving cash incomes, such as those of plantation workers, and cultivating households. There are severe problems of verification where what is at stake is entitlement to an income supplement. Another problem is that imputation of money values to incomes in kind from a range of sources (for example paddy production, vegetable gardens, and coconut trees) is likely to be downward biased. The criterion, an annual household income of Rs 300, resulted in the inclusion of half of the population but the near exclusion of plantation workers, a relatively vulnerable group within the rural population as evidenced by the high incidence of child malnutrition, morbidity, and mortality. Difficulties in establishing satisfactory eligibility criteria, as in the case of a food stamp program, or leakages from direct distribution activities such as food-for-work, are indications of the considerable problems for the organization and implementation of what are potentially more cost-effective forms of intervention.

There are equally difficult policy choices in macro food system management. The build-up of domestic food security stocks offers a way of combining consumption stabilization with price support for domestic producers. Experience in India shows how domestic stockpiles can play such a dual role effectively, but at a high cost. Where countries use imports to stabilize food supplies, this introduces additional complexities because food supply management must take account of the external environment as well as the domestic situation. Food supply management, when faced with difficult-to-anticipate and substantial fluctuations in domestic production, would be made easier by levels of domestic stocks that could sustain supply for more than three to four months. Otherwise, the lags between the onset of domestic supply difficulties, recognition, and response and the scheduling and deliveries of imports will create severe problems of macro system control. These are circumstances in which food insecurity results in pressures and short-term responses that divert attention from long-term priorities of agricultural development. These problems of macro food supply management bring us again to the question of the potential role of external assistance. What are the ways in which assistance from the international community can contribute to more effective food system management as well as attack the problems of instability in domestic production that contribute so much to the problem of food insecurity?

NATIONAL FOOD SECURITY

Food insecurity is typically considered a macroeconomic phenomenon. A widely adopted empirical formulation is to measure food insecurity as the risk (probability) of national consumption of cereals—or more broadly, all basic food staples—falling below, say, 95 percent of trend levels of consumption (see Siamwalla & Valdés, 1980; Valdés & Konandreas, 1981). The major source of instability is fluctuation in domestic production. In addition, there are possibilities of reduction in supply through price

movements on international grain markets which force low-income countries to reduce the quantity of imports below planned levels, that is, levels that could balance out fluctuations in domestic supply. Food insecurity in this sense has been explored extensively. It should be noted, however, that the macro analysis of fluctuations in consumption and components of total supply is very much a "black box" approach to the problems of food insecurity. It is implicitly assumed that reducing fluctuations in aggregate consumption on a year-to-year basis means combatting problems of food insecurity at an individual, community, or regional level. This restricted view of food insecurity could potentially exclude from discussion interventions in food systems and forms of external assistance that may be important in reducing food insecurity of the more vulnerable communities, classes, and regions within the nation state.

National food security has been a dominant theme in all international food policy discussions since the food crisis in 1972–1974. There has been disagreement about the precise magnitude and distribution of adjustment costs of a combination of a sharp rise in prices and a rapid reduction in concessional supplies of food aid during that period. Such disagreements apart, the focus on national food security has resulted in a rich empirical literature that analyzes the instability of production and the behavior of international grain markets. The range of possible international responses to national food security has been widely explored. Through such discussions two major options in terms of international food security mechanisms have been identified:

1. Financial mechanisms that would enable low-income countries to meet food import requirements independently of the state of the grain market (e.g., Konandreas, Huddleston, & Ramangkura, 1978; Goreux, 1981; Green & Kirkpatrick, 1981)
2. International food reserves and buffer stock operation that would be used for either of the following:
 - a) Classical buffer stock operations to restrict grain price movements
 - b) Supplying low-income countries in predetermined market conditions (e.g., Williams, 1981) with indirect impact on market prices through increasing the level of supply

National food security mechanisms have also been explored with the focus on variability in aggregate consumption. These explorations have involved analysis of the relative cost-effectiveness of buffer stocks and grain reserves as compared with trade policies for dampening fluctuations in food consumption (see, e.g., Reutlinger & Knapp, 1980).

Finally, regional-level discussions have been initiated among developing countries with the aim of exploring possibilities of cooperation in the area of food security (see, e.g., Southern African Development Coordination Conference, 1980). All the discussions referred to in this section

are evidence of one important development discernible since 1974: a significant increase in awareness of the problems of food insecurity. This greater awareness in itself may make it less likely that there could be an exact repetition of events such as those of 1972-1974. And this awareness is reflected in the increased attention given to food system planning in many developing countries. In some cases this new emphasis has been given additional impetus by FAO-sponsored food security reviews and by food strategy exercises facilitated by the World Food Council (WFC). There is also a small number of conspicuous examples of countries that have made significant progress toward food security through domestic measures to increase production and build up grain reserves.

At the international level the 1980 Food Aid Convention (FAC), with an enhanced commitment of 7.6 million tons of grain equivalent from a wider group of donor countries, provides an assurance that concessional supplies will not fall away in a tight market situation to the extent that they did in 1972-1974 (see Table 4.2). The inclusion of food import problems as an additional reason for IMF compensatory financing also makes possible more flexible responses to food insecurity problems of individual countries.

In contrast, there has been little progress toward putting in place a food security mechanism of the more ambitious type discussed above. In attempting to do this, two serious problems must be faced. First, the benefits and costs of any specific mechanism are potentially unequally distributed among both the developed and the developing countries, just as they are among producers and consumers within developing countries. The distribution of cost and benefits is in addition likely to be different for any particular mechanism (Castillo, Kost, & Holland, n.d.). For example, a food financing facility would probably raise the average level of international grain prices. This benefits food exporters and inflicts costs on food importers, including the many middle-income developing countries who may not be eligible to draw upon such a facility. Castillo, Kost, and Holland (n.d.) estimate that the United States would be a net beneficiary from the operation of such a mechanism. The implications are less clear for a trading group such as the European Economic Community (EEC), and probably such a facility would be costly for other developed-country net food importers. In contrast, depending on the distribution of costs of initial stockpiling and replenishment, some form of reserve would probably result in a net cost to the United States.

Establishing a food financing facility or some other form of reserve system would also raise serious problems of eligibility and of obtaining information about the performance of food systems. These problems would present greater practical difficulties than would the operation of a restricted-export income-guaranteed scheme such as STABEX. If access to sizeable concessional food supplies or financing of imports were to depend on criteria such as the Most Seriously Affected (MSA) or Food Priority (FP) designations employed by the FAO, then the criteria for such classifications would raise serious problems for many countries that

TABLE 4.2 Cereal Food Aid Shipments, 1975/76–1979/80, and Commitments under 1980 Food Aid Convention (FAC)

Donor Countries	Commitments, 1980 FAC (000 MT)	5-Year Average, 1975/76–1979/80 ^a (000 MT)	1980/81 Commitments or Allocations (000 MT)	1980/81 Commitments as Percentage of FAC Commitments	1980/81 Commitments as Percentage of 5-Year Average
Argentina	35	24	48	137	200
Australia	400	273	400	100	147
Austria	20	4	20	100	500
Canada	600	906	600	100	66
China		34	(25) ^b		74
European Economic Community ^c	1650	1157	1650	100	143
Finland	20	26	20	100	77
India		95	50		53
Japan	300	251	567	189	226
Norway	30	15	40	133	267
Saudi Arabia		11	(10)		91
Spain	20		20	100	
Sweden	40	95	90	225	95
Switzerland	27	33	27	100	82
Turkey		9	10		111
United States	4470	5616	5262 ^d	118	94
World Food Programme		47	(50)		106
Others		131	(165)		126
Total	7612	8727	9054	119	104

SOURCE: FAO *Food Aid Bulletin*, No. 2, 1981; Food Aid Convention, 1980.

^aFigures relate to shipments between July 1975 and June 1980

^bParentheses indicate figures are provisional.

^cIncludes shipments in wheat equivalent by member nations, "national action" as well as "community action."

^dIncludes the grain equivalent of the budgetary allocation for fiscal year 1981 (October 1980–September 1981), as well as the estimated grain equivalent of the supplemental allocations of US\$142 million for fiscal year 1980, approved by the Congress in July 1980.

are marginal in terms of inclusion or exclusion.¹⁰ There is the further problem of establishing eligibility in the absence of reliable and timely information on the performance of food production systems. There are already doubts concerning the independence and objectivity of crop production estimates in quite a number of countries.

To summarize, if there is, as the Brandt Commission has suggested, "a commonality of interests" that should provide an impetus toward attaining international food security, there are direct but complex conflicts of interests that arise in relation to any specific mechanism. These will not

¹⁰An example of this type of problem is the practice of the EEC in providing cereals food aid on an f.a.s. or c.i.f. basis depending on certain eligibility criteria. The position of countries can change from year to year; for example, Gambia.

be easy to resolve except in a crisis situation. Second, there are problems of instrumentation or implementability. It would be tempting but wrong to relegate these problems to technical discussions after the basic choice of mechanism has been made. Implementability is a criterion for discriminating between alternative mechanisms. Considering, therefore, the fate of recent negotiations on an international grains agreement, it may be worthwhile to consider less ambitious possibilities. For example, is there scope within the context of the 1980 FAC and tighter grain markets for making food aid more effective as an instrument for increasing food security at the national level?

FOOD AID AND FOOD INSECURITY

The 1980 FAC has been an important step toward stabilizing the flow of concessional supplies of grains, especially in the face of tight grain market conditions. Nevertheless, there is still considerable scope for improvement in the management of the flow of food aid. In part this is because problems have arisen with the changing food aid situation of the past decade. Some of these problems are particularly serious in relation to food aid for Africa, which is characterized by a multi-donor situation and relatively small shipments of many commodities to a very large number of recipients (see Table 4.3).

First, the FAC covers only cereals. Noncereal food aid has received little attention in the food aid literature, in part because no equivalent to the FAC has established internationally agreed elements of a policy for such food aid. Second, because the growth in supply of noncereal food aid from Europe (which is approximately twice the value of EEC cereal

TABLE 4.3 Wheat Imports of Selected Sub-Saharan African Countries, on a Concessional Basis, by Source, 1978-1979 (in wheat equivalent, 000 metric tons)

Importing Country	EEC*	Australia	Canada	USA	Sweden	Total
Ethiopia	55.2 (43)	10.0 (8)	14.4 (11)	48.4 (38)		128.0 (100)
Gambia				0.6 (100)		0.6 (100)
Kenya		6.0 (85)		1.1 (15)		7.1 (00)
Lesotho	1.6 (30)		0.4 (8)	3.3 (62)		5.3 (100)
Mauritania	6.0 (95)			0.3 (5)		6.3 (100)
Mozambique	38.0 (56)	1.4 (2)	11.0 (16)		18.0 (26)	68.4 (100)
Somalia	16.5 (46)		5.0 (14)	14.5 (40)		36.0 (100)
Tanzania	5.0 (16)		24.5 (81)	0.9 (3)		30.4 (100)
Zambia		2.0 (6)	30.7 (94)			32.7 (100)

SOURCE: International Wheat Council.

NOTES:

Wheat equivalent includes durum wheat and wheat flour.

Percentages of total concessional wheat imports are given in parentheses.

*Includes shipments by member nations as "national action" as well as "community action" organized by the European Economic Community Commission.

food aid costed at traded prices) is a recent phenomenon, there has been a lag in recognition of the importance of these commodities. Noncereal food aid may have potentially greater significance in Africa than elsewhere, because of the special problems of such groups as the pastoralists and because of the widespread incidence of malnutrition among children and nursing mothers.

The actual flow of grain and cereal products covered by the FAC—which is probably nearer to seven million tons a year, taking into account the grain equivalents for rice, flour, etc.—is still less than the average level of cereals allocations for the last six years (Table 4.2). In a tighter market situation where some donors—for example, the United States—make advance financial commitments under Title I rather than quantitative commitments to recipient countries, there is still a potential for a significant fall in the level of food aid allocations. This has serious food security implications.

There are wide intercountry variations in the contribution that food aid makes to total cereal imports in sub-Saharan Africa (see Table 4.4). In all cases the amounts of aid are small in relation to total FAC commitments or in comparison to the concessional supplies to major food aid recipients, such as Bangladesh and Egypt. The food import levels of individual sub-Saharan countries for a region such as the Sahel, as well as potential levels in the face of a regional shortfall in production, could be satisfied without major implications for international food markets and the level of stocks in food exporting countries. The size of the problem, except during a wider global food crisis, does not preclude effective responses within the context of existing levels of concessional supply. The problems are those of managing the flow of food aid from a small group of donors to a large number of recipients.

Unfortunately, the allocation of concessional supply reflects the history of the relationships between individual donors and recipient countries and the food aid priorities of each donor (Table 4.3). This pattern of supplies is suboptimal in terms of the value of the resource transfer as well as of the costs of food aid to donor countries. The size of many individual donor commitments precludes low transport cost of relatively low value, bulk commodities.¹¹ This is a far more serious problem in the African context than elsewhere because of the large number of small allocations of a wide range of commodities to the many different recipients. When food aid is given on a c.i.f. basis, this pattern of allocations increases both the noncommodity costs of food aid to donors and management problems. For food aid on an f.o.b. basis, substituting for commercial imports, the value of the food aid can fall below the f.o.b. value of the commodities. This occurs when recipients are obliged to make more costly transport arrangements for smaller shipments than would be made in the case of commercial supplies.

¹¹Minimum size of charter shipment to sub-Saharan Africa is probably around 12,000 tons.

There are additional costs and risks in the existing pattern of food aid. It is increasingly difficult to ensure that the timing of many small shipments can be fitted into the pattern of recipient country requirements. First, recipient countries confront problems of programming shipments from several sources. Second, as suggested above, food insecurity and food system operations are likely to be highly seasonal. The existing

TABLE 4.4 Cereal Imports and Food Aid in Food Priority Countries of Sub-Saharan Africa, 1976/77-1978/79 (three-year averages, 000 metric tons)

Country	Total Cereal Imports	Portion of Cereal Imports Made Up By Food Aid	
		Amount	Percent
Angola*	164.9	9.7	5.9
Benin	69.7	6.6	9.4
Burundi	16.4	10.3	62.8
Cameroon	107.8	4.8	4.4
Cape Verde	53.5	40.4	75.5
Central African Republic	9.3	2.1	22.5
Chad	37.3	37.1	99.4
Comoros*	23.0	4.5	19.5
Djibouti*	19.8	4.5	22.7
Ethiopia	239.6	112.3	46.8
Gambia	39.0	10.7	27.4
Ghana	306.5	76.4	24.9
Guinea	72.2	32.0	44.3
Guinea-Bissau	33.5	22.7	67.7
Ivory Coast	300.0	0.1	0.0
Kenya	48.2	9.3	19.2
Lesotho	144.4	15.9	11.0
Madagascar	234.3	8.3	3.5
Malawi	16.6	0.1	0.6
Mali	55.5	34.2	61.6
Mauritania	110.0	44.2	40.1
Mozambique	301.6	168.4	55.8
Niger	63.2	30.1	47.6
Rwanda	14.6	11.8	80.8
Sao Tome, etc.*	6.5	4.2	64.6
Senegal	376.0	90.2	23.9
Sierra Leone	69.7	9.6	13.7
Somalia	149.3	94.6	63.3
Sudan	209.2	80.4	38.4
Tanzania	117.8	95.4	80.9
Uganda	6.6	0.0	0.0
Upper Volta	68.1	41.1	60.3
Zambia*	111.8	42.3	37.8
Total	3595.9	1154.3	32.1

SOURCE: FAO.

*Two-year average only.

pattern of flows makes it less likely that the food aid will arrive when required. Untimely imports create storage problems and can be destabilizing in their impact on domestic food systems. Coordinating food aid flows within the FAC, as financial flows are coordinated through donor consortia, would open up the possibility of simplified, lower cost, better programmed food aid.

The food import and food aid patterns of landlocked African countries are quite distinctive. Food aid comprises a high proportion of all recorded food imports, except where the level of recorded trade is also negligible.¹² Transport costs, which are frequently a multiple of the traded values of the commodities concerned, tend to restrict commercial imports from major exporting countries. Third, regional trade is likely to be informal and not entered into trade accounts. In the absence of food aid the level of recorded food trade is negligible (cf. Central African Republic and landlocked countries of the Sahelian zone in the late 1970s). The cost of both ocean shipping and land transport, as well as the lengthy periods required for their organization, would suggest that present patterns of small food aid shipments to these countries are likely to be costly and, in terms of timing, unlikely to meet regular or emergency food aid requirements. Regional stockpiles and triangular transactions are alternatives to the present pattern of food aid, which would run counter to any likely trade based on comparative advantage.¹³ For example, maize could be purchased in Kenya for shipment to Burundi or Rwanda to be made good in terms of wheat imports or cash payments.

The lesser significance of widely traded cereals—rice and wheat—in the consumption of low-income, vulnerable groups in sub-Saharan Africa limits the usefulness of the present basket of food aid commodities, particularly for emergency situations in rural areas (Table 4.1). The pattern of concessional imports reflects the availability of exportable surpluses rather than food import requirements. The purchase of commodities by the World Food Programme (WFP), in addition to commitments of commodities by major food exporters, can be seen as a crude indicator of which commodities within the food aid basket have the highest shadow values (see Table 4.5).

In the countries of the Southern African Development Coordination Conference (SADCC), the importance of maize as a basic staple adds a further politically difficult dimension to the problem of food security, one

¹²The level of recorded cereal imports was less than 0.5 percent of staple supply for the Central African Republic, Malawi, and Uganda (Table 4.1), and the proportions of these cereal imports accounted for by food aid were 22.5, 0.6, and zero percent, respectively. The proportion of imports accounted for by food aid ranged from 47.6 to 99.4 percent for the other landlocked countries where recorded cereal imports exceeded 0.5 percent of staples supply: Burundi, Chad, Niger, Rwanda, and Upper Volta (Table 4.4).

¹³Johnson (1981) sees the creation of national or international stockpiles as the most effective contribution that food aid can make to food security. The redistribution of title to stocks involves a redistribution in favor of developing countries of the capacity that stocks provide to reduce food insecurity.

that has surfaced in discussions of triangular transactions involving exports from Zimbabwe. In general, levels of food import dependence are low in sub-Saharan Africa (Table 4.1) but, in relation to marketed supply, they are probably much larger than those in other countries. Such import dependence is frequently seen as carrying political risks. The latter need also to be taken into account in discussions of food security, which otherwise might be conducted only in terms of cost effectiveness.

Some readers may prefer to maintain the same degree of skepticism in discussing improvements in the programming of food aid as in considering the prospects for more ambitious international food security mechanisms. But the 1980 FAC is an indication that something can be achieved on a narrower front. Given the commitments within the FAC and the desire to make total assistance packages to low-income countries more effective, food aid at the individual country level could be brought more fully within the compass of wider aid discussions. The growing willingness of donors to consider multi-annual programming of food aid of necessity raises the question of the relationship between this important form of assistance, with significant balance of payments and budgetary support implications, and the programming of other assistance. A common move away from year-by-year commitments by a sometimes changing group of donors toward a single, consistent, cost-minimizing package of commodity assistance could make a significant contribution to food security. It would also be consistent with the current realities of economizing and cost cutting in most development assistance programs.

TABLE 4.5 World Food Programme Commodity Purchases by Source of Finance, 1980 (Percentage of total expenditure by source)

Commodity	From Cash Provided By					Commodity Total as Percentage of Annual Total
	Regular Cash Resources	Food Aid Convention	IEFR Contributors	UN Agencies	Bilateral Donors	
Wheat and wheat flour	3.3	100.0			8.1	7.9
Rice	28.7		79.6	76.3	78.1	73.7
Maize and maize meal	14.8			8.4		2.3
Millet			2.3			0.4
Sorghum	3.8					0.1
<i>Total grains</i>	<i>50.6</i>	<i>100.0</i>	<i>81.9</i>	<i>84.7</i>	<i>86.2</i>	<i>84.4</i>
Pulses	47.7		14.8	1.4	5.2	7.1
Milk products				0.6	2.3	1.3
Vegetable oil				1.8	1.2	1.0
Canned and dried fish	1.5		3.1	4.5	4.8	4.2
Other (tea, salt, sugar)	0.03			6.6		1.5
<i>Total, all commodities</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>

SOURCE: Adapted from World Food Programme (WFP/CFA: 11/4 Addl, Table VIII).

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NATIONAL DECISION MAKING AND MANAGEMENT OF FOOD AID AND FOOD POLICY: SOME ISSUES FROM EAST AFRICAN EXPERIENCE

John W. Thomas

Increasing attention is being given to the food needs of Africa. This concern derives from two sources. First are the well-publicized emergencies, such as the Sahelian drought of the 1970s or the current food shortages in Somalia, that have dramatized both the vulnerability of some parts of the continent to the vagaries of weather or civil conflict and the limited buffer against such unexpected events. Second, less publicized but potentially more serious are the accumulating data suggesting that the production of basic food commodities is growing more slowly on the African continent than in either Asia or Latin America, and that Africa is the only one of these three areas in which food availability per capita has declined over the last decade (International Food Policy Research Institute, 1980; *New York Times*, 1981). If present trends continue, Africa will become a food deficit area in this decade. Limited foreign exchange reserves and earning power curtail the capacity of a number of African countries to purchase food in deficit situations and thus exacerbate these trends.

The response to emergencies is a difficult but specialized topic, on which there is a growing body of literature (see, e.g., Kelly, 1981). However, the concern of this chapter is the long-term food deficit problem. Recognition of the problem of declining food availability per capita has led many nations in Africa and their aid donors to debate the possibilities for altering the trend. Efforts to deal with the food problem have focused on production (or availability: production plus imports) and consumption. Policies to accelerate production, campaigns to grow more food, and agricultural projects are common. Food aid may play a role both in increasing production and in filling the gap between production and consumption requirements until domestic production grows sufficiently to meet demand. On the consumption side there have been substantial efforts to estimate food demand and nutritional requirements. Many nations, sometimes with donor assistance, have undertaken projections of the long-term food requirements for meeting the nutritional needs of their populations. This represents an important advance in thinking about food needs. As a result, the nature of the need and the requirements to meet that need are beginning to emerge quite clearly.

The links between production and consumption—determining and implementing food policies—are, however, generally neglected. Processing, marketing, and transport are discussed, but the key linkages are the institutions that control these functions, and we know very little about them. These systems are almost universally in the public sector in African countries and are designed and managed by public sector institutions. This gap in our knowledge and inquiries exists partly because these institutions vary from country to country and partly because they are political, and politics does not seem an appropriate realm of inquiry for development planner or donors.

Most planners, technical experts, and donors—trained in a literature based on neo-classical principles of resource allocation—believe that the links between production and consumption are free market mechanisms governed by a competitive pricing system. Therefore, their recommendations tend to encourage countries to make more use of prices and to rely more heavily on the private sector. Contrary to this advice, the evidence quite broadly across Africa suggests that as the pressures on food availability become more severe, government involvement in the food system increases rather than declines. With shortages, government projects proliferate. Marketing boards and agricultural parastatals are not disbanded but strengthened. Subsidies are instituted and prices carefully regulated.

It is the aim of this chapter to try to point out and illuminate the reasons for these differences in approach. A central thesis is that much of the literature on which recommendations on food policy are based is not completely applicable to the current situation in east Africa. The first step toward strengthening these systems for establishing and managing food policy is a clearer understanding of the specific environment in which they operate. Established economic and management principles may suggest appropriate directions in the long run, but such recommendations are not likely to be adopted and implemented in the short to medium run, the period in which Africa will begin to face real food shortage if present circumstances hold. If we are to assist in creating effective food policies in African countries, we must first gain a greater understanding of how public sector intervention in the food system takes place as well as of the institutions involved, the reasons they were established, their objectives, and the reasons for their durability. An initial investigation of these issues is the focus of this chapter. It examines factors that influence how food decisions are made and how food policy is managed. It draws on individual country experience in east Africa and tries to suggest where broader generalizations may be possible. It suggests where further knowledge and research might be important.

The chapter is divided into three major sections. The first explores both current and historical factors as well as resource endowments that are considered crucial, in the eastern African setting, in influencing food policy management. Some comparisons are made with the agriculture of Asia, an area in which the author has had first-hand experience. These

factors suggest that in the short to middle run—the decade of the 1980s—food policy in most eastern African countries will be managed to a significant degree by governmental or quasi-governmental agencies. This suggests the importance of examining the ways in which decisions relating to food are made and carried out. The second section—decision-making and management of food aid and food policy—explores the three levels of public sector management of food policy: the decision-making process, the structure and organization of management, and the role and performance of implementing agencies. In each of these sections the chapter contends that the literature relevant to the area gives us little basis for understanding reality and, in many cases, gives an incorrect view of how these three levels of the public sector work, the issues they respond to, and their appropriateness for food policy. The third section considers ways to strengthen the management of food aid and food policy in the future and considers possible strategies for east African nations in the 1980s.

This chapter presents evidence from eastern Africa and attempts some generalizations about countries in that area—primarily Kenya, Uganda, and Tanzania but including Ethiopia, Sudan, Somalia, Zambia, Rwanda, Burundi, and Malawi.¹ The diversities of that region make this hazardous, but some generalization is necessary.

HISTORICAL FACTORS AND RESOURCE ENDOWMENTS THAT INFLUENCE FOOD POLICY MANAGEMENT IN EAST AFRICA

To understand choices in the management of food policy in eastern Africa today, it is necessary to understand the historical factors and resource endowments that set the context. (For an attempt to summarize the factors that influence development in all of Africa, see Acharya, 1981.)

Traditional Agriculture

The history of eastern African agriculture is documented in great detail in a variety of sources.² Several aspects of the historical development of agriculture are pertinent to present-day food policy. In much of east Africa, sedentary agriculture was the exception until the nineteenth and early twentieth century. Nomadic pastoralism and hunting and gathering economies evolved in different areas. Crop raising was generally on a slash-and-burn basis. Unlike Asian rice cultivation, which began many centuries ago, African crop production is relatively recent. In Sri Lanka, Java, and the Indus River Basin irrigation was practiced extensively many centuries ago. Today the visitor to Lake Victoria or other east African

¹Regional definitions vary. This chapter does not try to establish clear-cut definitions but to draw on relevant experience from the eastern portions of the African continent.

²The literature is not comprehensive and tends to be focused on particular countries or topics. However, selective review of the following will provide an appropriate grounding: Anthony, Johnston, James & Uchendu, 1979; de Wilde, 1967; Goody, 1971; Heyer, Maitha & Senga, 1976; Wrigley, 1959; and Yudelman, 1964.

lakes and rivers sees no small-scale irrigation with hand or mechanized pumps or indigenous irrigation systems. Irrigation is limited to large, capital-intensive schemes constructed by outside engineering firms. Whereas the Singalese or Javanese had to organize "hydraulic societies" and develop the organization and basic engineering skills required just to get food, the rich natural resources of the African continent, with its abundant game, ample rainfall, fertile soil and limited population, allowed the Africans to live comfortably without the same degree of social organization.

African Institutions and Outside Intervention

African traditional political and social organization grew around relatively small and dispersed ethnic groups, and was highly adapted to its particular environment (see Mair, 1979). There was, however, no counterpart to the large-scale Chinese dynasties, the Javanese societies, or the Moghul empire with these groups' complex bureaucratic systems. Uganda, Ethiopia, and Zimbabwe did develop local kingdoms that were distinctive and effective, but these did not need to develop the complex social organizations and local and hierarchal governments that typified Asia. What did emerge was an effective, small-scale tribal government, much of it highly egalitarian. However, the units were much smaller than modern nation states. In view of the requirements for building larger states today, traditional African forms of governance must be rejected as having less relevance to the present nations of Africa. Some present African governments such as Uganda's are attempting to eliminate these traditional organizations, whereas in parts of Asia traditional organizations are converted to serve national development ends.

Outside intervention in these traditional systems came in two forms, the Arab and European slave traders and the Arab and later Asian mercantile traders. Both groups were exploiters of the African continent. For present purposes, the commercial trader is of primary interest. As Yudelman (1964) points out, "Prior to the advent of the Europeans and the introduction of the exchange economy, African production in most of southern, central, and east Africa was almost entirely for direct consumption" (p. 174).

Trading, specifically in food commodities, was not part of the east African tradition. Precolonial African society was highly adapted to its environment. Ecological diversity led to small groups who lived effectively in the micro-areas they inhabited. Many such groups were quite self-sufficient, particularly in food. Some trade, particularly in nonfood items, took place between tribes. However, this was mostly a barter trade. There was no class or group of African traders. The traders who did operate in Africa were Arabs who worked along the coast and made forays inland. These traders provided a valuable service to the Africans who traded with them, but in the long run they were outsiders and often exploiters.

Today the non-African trader is a phenomenon throughout eastern Africa. It is Asians in east Africa who dominate the small-scale and medium-scale trade; in colonial times Europeans managed larger business and parastatal organizations. More recently, the European or American multinational commercial firm has replaced the colonial business, and African entrepreneurship is burgeoning. Nevertheless, African commerce is still to a substantial degree in the hands of non-Africans. This has immense implications for food policy, as we will explore later. The necessity to gain control over the economy and the desire to be rid of exploitative traders is a recurrent theme and one that has affected policymaking.

Colonial Experience

Colonial rule has many different characteristics in different parts of the world. The British colonialism in Kenya and Zimbabwe—white settler regimes—bears little resemblance to the civil and military rule of India, with its broad goal of commercial exploitation. British objectives in these two African states were to remove Africans from high-potential agricultural land, to structure the economy so as to ensure a supply of cheap African labor, to avoid competition with large-scale agricultural production, and to deny any opportunity for education or leadership that might allow an African to question the dominance of white settlers. The whole process of independence, which came to most Asian countries in the late 1940s or early 1950s after considerable planning and preparation, came to the majority of African nations ten years later, in the 1960s. This crucial fact must be remembered when considering the function of the state in eastern Africa: these nations are by far the newest in the world. Most east African nations achieved independence between 1961 and 1965. The exceptions are Ethiopia, which has never been formally colonized, and the Sudan, which achieved independence in 1956. The eight remaining countries of east Africa have been independent for less than twenty years. Furthermore, in most cases there was little preparation for national independence. This overwhelming fact of relatively few years of independent nationhood must be kept in focus when discussing the affairs of public policy in east Africa.

For all the newly independent nations of Africa, the avowed purpose of redressing racial inequality by placing Africans in the positions of power and influence previously occupied by non-Africans has been paramount. Kenya's first president, Jomo Kenyatta, was quite explicit about this objective. Kenya and other east African nations have openly used the power of the state and explicitly shaped its institutions to foster this objective.

Resource Endowments

Africa has been blessed with substantial quantities of natural resources. Mineral resources are found in important quantities in many parts of east Africa. Copper in Zambia, diamonds in Botswana, oil in Sudan, and

chrome in Zimbabwe are a few of the more prominent examples. Agricultural exports are common: cocoa, coffee, tea, tobacco, phrethrum, cotton, palm oil, sisal and groundnuts are examples of crops that tend to be of great importance to one or more national economies. Natural resources extracted by foreigners, high-quality agricultural land cultivated by white settlers, and small-scale trade dominated by non-Africans were the dominant patterns through the first half of this century in east Africa.

The transition to western-style, "modernizing" economies is a phenomenon of the present century. Human resource development is recent. East Africa was still being explored, and substantial portions of its geography were still unknown in Europe at approximately the same time that the first Indian was inducted into the Indian Civil Service. The explorers who came to Africa around the turn of the century came to explore and exploit, and thoughts of educating Africans were left to missionaries in the early twentieth century. One hundred years after the Macauley's Commission on Public Instruction in India, education in east Africa was reaching a similar stage. Gordon College (now the University of Khartoum) was founded in Sudan in the 1920s and Makerere College in 1922. But these were the exceptions. The University of Nairobi granted its first bachelors' degrees in 1964. The educational system in east Africa began to develop some 75 to 100 years later than such systems in Asia.

The parents of today's east African leaders remember the days of early settlers, the coming of the railroads, and the traditional systems of Africa. Today's leaders are the first generation of the college educated. It is clear that in no other region of the world has society changed so rapidly or a people modernized so fast. The extent of progress disguises this fact, but it is a reality that must be remembered when trying to understand and interpret how east Africa will deal with current policy problems.

Today, financial resources are still comparatively more plentiful than human resources, despite growing foreign exchange shortages. Natural resource and agricultural export earnings have provided east Africa with a cushion that many Asian nations do not have. Foreign aid has been plentiful. Kenya and Zimbabwe have been favored aid recipients. In the late 1970s, Tanzania was the highest per capita recipient of aid on the continent. Sudan has received considerable assistance from the Middle East. For most eastern African nations, human resources are the constraint. Implementation skills, more than budget allocations, are in short supply.

Physical and Human Diversity

There is probably greater physical and human diversity within short distances in eastern Africa than in Asia or most other regions of the world. Tribal organization has been a prominent aspect of social organization in Africa. Many different ethnic groups populate the region. Geographically, the continent varies enormously, from desert terrain to some of the rich-

est agricultural land in the world. The great variation in climate, rainfall, soil type, and vegetation within a relatively small area that is typical of a country like Kenya is not a common feature of Asia.

Whereas some African land is highly productive and has predictable rainfall and dense settlement, contiguous areas are often just the opposite: for example, they may have poor soils and minimal, unpredictable rainfall and may be suitable for only sparse settlement. This phenomenon, in part, explains the recurring drought and food problems of Africa. Africans have adapted very well to their environment, but it is this diversity that makes nation building difficult. Most nations of eastern Africa are the creations of recent colonial governments. Their boundaries are generally accepted by current governments, but these nations do encompass peoples of highly diverse ethnic loyalties and backgrounds. The result is that national integration and political stability have been paramount political objectives of most nations. If the nation cannot function as a nation state, then to think about national food policy is meaningless. The rapid and unpredictable changes in leadership in many African countries are ample evidence of the paramount nature of political concerns and suggest why national policies have been subordinated to political considerations.

Natural endowments have made food plentiful and agriculture a sector whose requirements could easily be subordinated to larger national political goals. As a result, many institutions serving agriculture were shaped to serve very different and key political purposes. Only very recently, with rapid population growth, has the question of adequate food supply become an issue. As food becomes a topic of concern to governments, there may have to be a reshaping, reorientation, and replacing of some institutions currently functioning in the agricultural sector.

These historical and environmental factors have shaped the food systems of African nations. Awareness of these factors is necessary to an understanding of the management of food policy. For food policy does not stand alone. Nor in many countries is it even the primary policy objective, although in a number of countries it may well become so in the near future. Thus, it is important to see the other goals to which management of the food system may have been secondary. Will food supply take precedence over these other goals in the future? That question underlies much of the discussion that follows.

DECISION MAKING AND MANAGEMENT OF FOOD AID AND FOOD POLICY

Having explored the historical legacy that influences public choice and national objectives, we can now turn to the specific topic of managing food policy, which is the principal focus of this chapter.

The Decision-Making Process

It is the national decision-making process that determines what food policy will be in African countries. Decisions on production priorities, how resources will be allocated, what policies shall be adopted to determine the nutritional impact across income groups, crop and input prices, and whether food is imported on a commercial or aid basis are generally made by governments. Such decisions are made at a central level in virtually all African and many other countries. At this level, decisions are highly influenced by national political priorities. This is not unique to Africa. In the introduction to a book of seven country studies, from Latin America and Asia, on political investment in food, Griffin (1979) comments:

It should be clear . . . that in the domain of food, governments have not been at all reluctant to intervene in markets. Taxes, subsidies, quotas, and rationing through administrative arrangements proliferate everywhere. Most prices that matter in the food sector are political prices, not prices determined exclusively by economic forces (p. x).

Perhaps the nature and priorities of decision making can be illustrated by the experience of an imaginary foreign adviser in an east African country:

Early in his assignment he sat through a meeting in the Ministry of Finance and Development to discuss the final elements of a large regional rural development project which was to be financed by one of the country's largest aid donors. He took careful notes and his perplexity grew as the hours passed. The meeting started on peripheral issues: How many vehicles and what type should be imported? What category of officers and of what job grade should be assigned to the project? The discussion moved on to reporting requirements, whose office should make certain decisions, and what was the division of responsibility between ministries. The adviser was uncomfortable; time was passing. When was the meeting going to get to the real issues: How are the limited financial resources to be allocated? What would be the return on the project? How did it compare economically with other projects? What was the anticipated distribution of benefits? How would the various sectoral programs be coordinated? What was the underlying concept of change and development? Yet these questions were not addressed. The meeting went on. Who would chair the inter-ministerial coordinating committee? Who should sit on it? What level officer? How often would it meet? Should there be an inter-ministerial working committee? Should there be special project manager or should the regional agricultural officer or the District Commissioner be in charge? How much foreign technical assistance was needed? The donor had budgeted for ten. Somebody pointed out that the advisers would exceed the project staff. The number was reduced to five and the adviser was amazed that the issue of the specific functions of the advisers was never discussed. Shortly thereafter the meeting was adjourned.

One can imagine this adviser as he pondered the meeting. None of the "right" issues had been discussed, according to the theories of resource allocation and techniques for decision making in which he had been trained. No one had asked about marginal returns, alternative investments, or trade-offs or whether the project was consistent with national

development priorities. Instead, the questions were along the lines of, What did this region get last year? Do they really need three land rovers? Who is going to run the program? Who is going to establish the budget? These all appear to be minor questions in view of what is taught in courses in microeconomics or in decision theory. Sooner or later, the adviser must modify his assumptions about what is central to project performance. As he does, the reality behind the policy discussions—a set of conditions, personalities, and circumstances crucial in the particular environment affecting the outcome of Government programs—will become clear. After that, the decision-making process will become comprehensible and rational.

As our hypothetical adviser must conclude, most training and the literature on project decision making and resource allocation suggest that decisions should turn on analysis of costs and returns, on an assessment of potential benefits, on comparisons of returns between competing projects, and on trade-offs. The objectives for this decision process are usually set forth in a development plan that emphasizes goals such as growth, equity, and employment. For east Africa (and for the rest of the developing and industrial world) the decisions often turn on very different issues. The following discussion of decision making is divided into three parts for the sake of clarity: process, constraints, and objectives. These are of course integrated in the actual decision process.

Process

There has been a rapid proliferation of actors in decision making in the last decade. Political systems in east African countries have become stronger. Specific interests have emerged, and new means have been found for articulating those interests. Therefore, decision making is less and less a technocratic exercise; increasingly, it is based on the interplay of multiple bureaucratic and political forces. Virtually every east African nation has a parliament that plays an influential role in public affairs. As a result, members of parliament, as well as the cabinet, must be included in major discussions of food issues.

In addition, aid donors often have an important role in food policy decisions because of their extensive involvement in agricultural programs. There has also been a proliferation of donors. A recent count of organizations registered to work in developing countries included 33 bilateral donors, 60 multinational development agencies or funds, and—from the United States alone—a total of 366 private organizations. In addition, the International Monetary Fund (IMF) has become a more important factor in economic policy decisions, particularly as foreign exchange management has become important.

What this means is that there are now many competitive interests in the decision-making process. The decision makers must consider these interests and how to balance them and must also undertake a technical analysis of development in reaching a decision. The process of deciding becomes formidable, and sometimes reaching a working consensus on a

program becomes more important than the details of the outcome of that decision.

A specific system for giving and receiving aid has evolved in many east African countries. With the presence of so many donors and the desire of most developing countries to maximize donor assistance, particularly at a time of foreign exchange shortage, this system tends to take on a *raison d'être* of its own. This tends to skew development priorities. There are agencies in most governments that are charged with dealing with donors and facilitating the system. Sometimes they are planning agencies; sometimes they are external affairs sections of a Ministry of Finance or Ministry of Foreign Affairs. Nonetheless, it is their responsibility to facilitate aid and to provide the donors with information and projects that will increase the aid flow. The objective of these agencies then becomes that of meeting donor demand and facilitating aid flows. In this process it is very easy for recipient countries to promise donors what they know the donors want and for donors to be satisfied with assurances even though they may be well aware that these assurances have little chance of becoming reality.

Most donor agencies have formalized their procedures to the point where they have annual budgets for each country in which they have programs. The donor's office in each country is responsible for seeing that those funds are spent. Donors often require that projects in which they invest have a distinct identity and visibility. They also expect to monitor progress, and to recommend changes to achieve their objectives. Developing countries are often willing to shape their own development programs to meet donors' requirements. So, for both recipients and donors, the giving and receiving process becomes extremely important.

An example of how donors can influence national development is provided by a recent area development project in an east African country that involved the rapid settling of seminomadic people as sedentary agriculturalists on ecologically fragile lands. The land was to be plowed by tractor at the outset of the project and then families were to move in to farm the land. The project had been discussed in the government for many years, but its inherent difficulties had always led to its being shelved. However, a donor agency, which had unexpended funds near the end of its fiscal year, discovered the project and found that it met some of the agency's criteria for rural development. The agency urged the government to submit the project to it by the end of the donor's financial year. The immediate pressures of foreign exchange in the country and the necessity to take advantage of available donor funds meant that legitimate internal reservations were set aside, and the project was put forward despite serious misgivings on the part of many in the government. In such a way, donor requirements and the need for foreign aid can distort national priorities.

The ability to plan exceeds the ability to implement projects. Every east African nation has a planning office. Many of them have developed impressive competence. However, numerous planning office reports and

studies of specific projects suggest that the ability to do macro planning—to design projects and allocate resources between them—far exceeds the country's ability to carry out those programs and projects to achieve their stated objectives.

Projects dominate the approach to development in much of Africa. Given the distrust of price and free market systems and the extensive involvement of aid donors in African countries, projects tend to be the building blocks of development programs. Frequently planning for projects is undertaken with the primary objective of getting money committed by donors. There is not necessarily a realistic assessment of what implementation capabilities are. This is a system in which aid donors are willing participants, as we explore later. In any case, planning and analyzing projects have become highly developed techniques, and new projects have proliferated to meet the objectives of various donors. Equal emphasis must be given to training people to manage projects and to enhancing the understanding of what is involved in bringing these projects to successful completion.

Constraints

Several constraints limit the freedom of choice for decision makers on food policy in development projects. Obviously both formal and informal goals (dealt with later) are influential in determining outcomes and constraining the range of decisions. In addition, two other factors merit mention. Policies and projects must constantly take into account the fact that human resources can put more of a constraint on decision making than financial resources. This accounts in part for the fact that the decision process focuses on positions, people, and organizational responsibilities. Because of staffing limitations, an activity's success or failure may well depend on its managers. Sometimes it is less important to make logical organizational arrangements than to tailor the activity specifically to the managerial talents available. Similarly, adopting policies and selecting projects that conserve this critically scarce resource can be an essential criterion in deciding on undertaking an activity.

A second constraint on the range of choice is ideology. This is not a universal constraint, but it may be an important one. In Tanzania, with its strongly established ideology, choosing development activities that are consistent with that ideology is critical. Few other nations of the region have as clearly articulated an ideology. Nevertheless, strongly held views—for example, a commitment to food self-sufficiency or to specific concepts of modernization such as mechanization—may serve as a constraint on the decision process. Another constraint of particular relevance for food policy is the distrust of private markets. As Lele (1975) points out in her study of rural development in Africa, there is “a widespread belief that traditional trade channels are inefficient, exploitative, and generally anti-social” (p. 101).

Although foreign aid is not specifically a constraint, its importance must be mentioned again. Activities with assured donor financing move through

both the decision process and the budget process with far fewer questions asked than do those that must be financed from domestic resources.

Objectives

Often a project or program has real but informal goals that differ significantly from its stated objectives. A quick review of these internal goals may be an appropriate reminder of the need to look carefully at a nation's real objectives. For historical reasons already stressed, *Africanization* is an important objective. The systematic exclusion of Africans from key positions within their own societies before independence has made this a strongly held, though infrequently articulated, goal in many countries.

For many states, *national integration* is a top priority. Balance between various groups comprising the state, and a real distribution of the benefits and responsibilities of nationhood, is of great importance. Balance between regions and ethnic groups is essential and must at times take precedence over performance criteria. Thus, in many countries, there must be enough cabinet positions or managerial positions on marketing boards to allow each major group to be represented. There is a perverse side to this same issue. If balance is not maintained, if performance criteria supersede ascriptive criteria, then if decisions appear to leave out or hurt the representative of a particular group, the decision makers may be accused of ethnic bias.

In addition to staffing considerations, it is necessary to seek, on a macro basis, an equitable distribution of other resources. Thus balance between groups and areas becomes an important consideration. Decision makers must insure that regions are not neglected or regularly bypassed.

The desire to *control* the development activities they fund is almost universal on the part of both central governments and aid donors. Because they consider themselves accountable, they are averse to risk taking. Central organizational forms, known technologies, and systems that allow for supervision and monitoring are almost always preferred.

The desire to *maximize donor funds* has been mentioned. So has *ideology*, which can be both a constraint and a goal. Finally, although the unarticulated objectives have been stressed, because they are likely to be overlooked, it is important to point out that these countries have a real commitment to the *explicit goals of development*, and these are always critical to any decision process. These goals, however, are not exclusive, and they must compete in the decision-making process with the equally important unarticulated goals of all governments.

In understanding the decision-making process in developing countries, one must recognize the process itself, the constraints, and the multiple goals that drive it. These phenomena are very different from techniques, such as cost-benefit analysis, that are sometimes assumed to be the basis of decision. Such techniques assume scarce capital and are designed to allocate resources between competing investments in terms of the greatest allocative efficiency. More recently, in response to development pri-

orities of the 1970s, such as poverty, unemployment, or foreign exchange shortage, techniques have been developed to weight systems of project analysis for different objectives. These techniques have developed into a highly sophisticated system and one that is frequently required by aid donors as a justification for investment in a particular project. The techniques, however, are rarely an important factor in actual decisions, but are used to justify decisions made on the basis of other criteria.

The Structure and Organization of Public Management

Government and quasi-governmental agencies managing the components of food policy in Africa were not established on the basis of implementing a systematic food policy. In general, they developed in response to pressures and problems of the period in which they were created. Food shortage is a relatively new problem in Africa. The problem is illustrated by the experience of the head of a donor agency newly assigned to an east African country in the middle 1970s:

One of the donor's early calls was on the Minister of Agriculture. Noting that the morning's paper had stated that the year to date had the lowest rainfall of any year since the country began collecting such statistics, and having recently been involved in the drought relief program in Ethiopia, the donor asked if the Ministry had taken any steps to monitor food availability. The Minister's relaxed answer was, "No. Relief is the responsibility of the Prime Minister's Department." The donor went on to inquire about what agencies were involved in what is now called food policy. The Minister began to enumerate. In addition to the Ministry of Agriculture, which was responsible for crop production, and the Prime Minister's office, there was a Ministry of Animal Production. There were also separate parastatal bodies for maize, wheat, dairy products and beef, and there were three others dealing with minor food products. The donor asked, "What if either relief imports, food aid imports, or commercial imports were needed?" "The necessary action, if it were a food-grain to be imported," responded the Minister, "would have to be worked out between the Ministry of Agriculture, the Prime Minister's Office, the Ministry of Economic Planning, and the Ministry of Finance. Data that would indicate the need for food imports would either have to come from the National Statistical Office or from District field officers."

Today, five years later, the same country has experienced food shortages. In response it has developed an official national food policy that projects production and requirements to 1990. The policy provides for a wide range of programs to increase production through accelerated agricultural research, improved supply and distribution of inputs, and improved extension. Food import requirements are estimated, and priorities are established. Yet the complex structure of decision making and management of food policy is virtually the same as that described in the mid-1970s. In neither period did market forces have a substantial role. So while policy was established, the powers and responsibilities for managing it were not rationalized.

This case is generally representative of the situation in many African nations, and it is necessary to understand how these complex structures came into being, what perpetuates their roles, and to what degree we have a literature that helps us understand their functioning. Until we do that, it is not possible to be confident that food policies will really be implemented or to prescribe methods of strengthening implementing capacity.

The diffusion of management responsibilities in the food policy sector has several causes. Many of the marketing boards were established in colonial times to stabilize prices and to minimize fluctuation in food production. Control was also an important objective of colonial governments, and such parastatal bodies afforded the opportunity to achieve it. Maximizing production was not always a goal, but stability and control almost always were among the objectives.

Newly independent governments inherited these institutions and soon discovered that they served the purposes of independent governments well.³ They provided an opportunity to meet numerous objectives that continued to be important in the decision-making process. In the preceding section some of those objectives were enumerated. These objectives have led to the formation of additional parastatal organizations to pursue the various functions of agriculture. These include marketing boards for both food crops and export crops. In addition, parastatals have even been formed to promote production of specific crops to undertake agricultural research, to provide extension services, and to assume virtually every function in agriculture.

It is not principles of rational and efficient management that have led to the pervasive use of parastatals. These entities have provided a means to achieve the goals of Africanization, regional balance in the interests of national integration, employment creation, and political stability by maintaining control over prices of basic food commodities, creating special implementation structures, and meeting elite obligations to family and extended family groups.

Some parastatals have emerged after independence, often at the insistence of aid donors. Frustration with regular bureaucracy, a desire to avoid its procedures, low salaries, poor budgeting, and inadequate purchasing systems led many donors to advocate the semi-autonomous agency that could bypass the inadequate existing bureaucracy. Donors have also liked the idea that new agencies that they could hold accountable would be set up to administer programs that they could support.

Once established, such agencies take on a life of their own. They develop links with specific donors who support and finance them. They are headed by powerful political leaders, and they become important sources of employment. For example, in Zambia parastatals provide 28 percent of the total wage employment in the country (Halset, 1976). In

³This point and many others touched on in this chapter are also discussed in Bates (1980). Bates' paper makes valuable reading for anyone interested in the topics covered in the present chapter.

Kenya, by 1979, parastatals provided almost 50 percent of the public sector employment (Republic of Kenya, 1979). Organizations with such large numbers of employees tend to be quite effective at resisting suggestions that they be abolished.

Other agencies, in addition to the agriculture ministries, have come into the food area. As the preceding example illustrates, food is such an important topic and the political implications of food are so important that presidents' and prime ministers' offices have frequently become involved, particularly in dealing with food emergency situations. The objective has not usually been a rationalizing of management structures but the demonstration of priority and political commitment to insuring adequate food supply.

If responsibility is not clear between these agencies, this is not necessarily a disadvantage in some countries. In those with rich agricultural production, food has been plentiful, and there have not been serious concerns about it. Thus agriculture that could be relied on was harnessed to serve broader political objectives. In other countries with rich natural resource bases, there were adequate funds to purchase food externally. It is only recently that food availability has become a widespread concern in Africa. Thus most systems for food management were set up to serve goals that differed from those now emerging for food policy.

In concluding this discussion of the structure and organization of food policy management, it is important to look to the literature of management to assess its relevance to the topic. In brief, this literature has limited value and must be used cautiously. Some of the management techniques recently fashionable in the West, such as matrix organization, program budgeting, or systems analysis, have been tried and shown to have very little real value in the east African context (see, e.g., Davey, 1967). More broadly, we must ask about the relevance of western management concepts to the management of food policy. Although, as we will see, the transferability of these concepts has been seriously and effectively questioned, they provide the only foundation we have; thus we must build on and adapt from them. We need more work like Leonard's (1977) examination of the value and relevance of organization theory to the extension system in Kenya or Heginbotham's (1975) study of the various and sometimes conflicting models of management within Indian bureaucracy.

The most effective discussion of the transferability of western management concepts to east Africa is a paper presented by Jon Moris to a Bellagio conference in 1976 (Moris, 1976). Moris goes farther than I would in questioning the value of western concepts, but his work is valuable as a reminder of the serious limits of transferability. Moris looks at the cultural norms that underlie western management theory and practice and compares these norms with African norms in similar circumstances. He concludes that in a series of critical functions, norms of the area of implementation alter the outcomes of the management system substantially. It is not necessary to summarize his argument here but it

should be read and carefully considered by anyone seriously concerned with management effectiveness in east Africa.

Although western management literature and concepts offer the basic principles on which present African management systems are designed and from which they have departed to some degree, they cannot be expected to work in Africa as we would expect in Europe or America. Careful study, experimentation, and adaptation are needed; indeed, more effective African government managers are engaged in just such endeavors. Structuring effective food management systems is therefore not just a matter of designing "rational" systems, but of testing and discovering what will best serve a society's multiple goals in a particular environment.

The Role and Performance of Implementing Agencies

The phone rang in the office of the Principal Secretary of Agriculture. As he answered it, the voice on the other end said to hold on for the President. When the President came on he said that he had just had word from a district commissioner in a distant district reporting food shortages. "Is it true?" the President demanded. "If so, how did the Ministry of Agriculture fail in its responsibilities, and what is it now doing about the situation?" Because the Secretary was unable to provide any facts in reply, he was asked to come to Government House that afternoon with a complete reply.

The distraught Principal Secretary turned to his Deputy, who was in his office, and lamented, "When something goes wrong, the President calls me to account. Yet, how can I know, and what can I do? Information of this sort is reported to him directly, or to the National Statistical Office. The marketing board for maize is supposed to maintain emergency stocks but has obviously failed to do so. I can't even get annual accounts out of them, much less ensure their effective performance. The President appoints the Managing Directors, and they listen to his wishes, not mine. This Ministry doesn't control their budget; they come to us only when they have a deficit and need help. Furthermore, those Boards are so incompetent they can't even do their job in normal times, let alone deal with unusual or unexpected situations. If they fail in their duties, why doesn't the President disband them? How can the President expect me to ensure that everybody in the country has sufficient food?"

The Principal Secretary's concerns are quite valid. We must ask how well the agencies charged with implementing food policy fulfill this responsibility. For several reasons, the short answer is, "Very poorly." First, macroeconomic factors prevent agencies from accomplishing this task. In most of the states of eastern Africa agriculture is the largest sector of the economy, and the terms of trade are heavily skewed in favor of the urban manufacturing sector. (For a discussion on Kenya, see Sharpley, 1977; for material on Tanzania, see Clark, 1974, and Hill, 1973.) Even in a country like Tanzania, where official objectives place highest priority on rural development, economic statistics show that agriculture includes 94 percent of the population yet has received only 55 percent of government investment. When the economic system of many countries is biased against agriculture and economic policies are adverse to the interests of

farmers, it is not reasonable to expect the performance of agencies implementing food policy to offset these biases.

Second, the shortage of implementation capacity has already been emphasized. These agencies simply are unable to obtain the capacity to carry out the complex tasks given to them. Many of the key shortcomings are in very simple, straightforward functions. For example, credit is not provided until well into the crop season. Fertilizer is not available when needed. Farmers are not paid until nine months after crops are delivered to the marketing board. Planners who design complex programs such as administratively integrated projects simply are unaware of the capacity of their systems. There is no possibility that they will work. All efforts need to be focused on eliminating all possible administrative responsibilities and paying full attention to the few that are absolutely necessary.

Even in the United States, which generally takes pride in its managerial capacity, implementation is exceedingly difficult, and the probabilities of success as planned are much lower than generally realized. Pressman and Wildavsky's (1979) study of the Oakland, California project leads them to the following conclusion:

Failure to recognize that these perfectly ordinary circumstances present serious obstacles to implementation inhibits learning. If one is always looking for unusual circumstances and dramatic events, he cannot appreciate how difficult it is to make the ordinary happen. (p. xviii)

Third, as we have already seen, the real underlying objectives for which many of the implementing agencies were designed may be very different from the explicit goals of food policy. Many of these agencies may have been very effective in achieving the political goals (which may in fact have been more important requirements of the state than the food policy goals) which underlay their establishment and maintenance.

In this area, the literature on marketing boards appears of little value in furthering our understanding of their functioning.⁴ A review of this literature suggests five major development functions of agricultural marketing boards and several indicators of success for each function. We will go through each of these functions and compare the success indicators with actual experience in east Africa.⁵

- | | |
|---------------------------|--------------------------|
| 1. <i>Function:</i> | Raising fiscal resources |
| <i>Success indicator:</i> | Amount of revenue raised |

In this function marketing boards have been notably unsuccessful. The vast majority of food commodity boards have incurred substantial deficits. (This appears to be much less true for boards dealing in export crops.)

⁴I am indebted to Jay Rosengard for his assistance with this section. His review of marketing board data (1981) brought the points in this section to our attention.

⁵These functions and indicators were developed by Rosengard in his literature review. The principal works from which they are drawn are Aldington & Smith, 1968; Giddings, 1974; Jones, 1972; Kriesberg, 1974; Kriesel, 1970; Lele, 1971; Mellor, 1970; FAO, 1962, 1966a,b; Whetham, 1972.

Throughout east Africa, food marketing boards require either annual budget allocations or periodic appropriations to allow them to pay off debt.

2. *Function:* Stabilizing prices
Success indicator: Producer price and income stability and consumer price stability over time

In this area agricultural marketing boards have encountered some success. However, boards are frequently not assigned this function. Prices are most commonly set by government, not boards. Decisions on prices have sometimes been timed to insure producer price stability, but the objective that has been given higher priority has been consumer price stability. Governments often vacillate over setting prices in the interests of the producer or consumer and do a poor job of serving the interests of either. On balance, boards or governments setting prices have probably managed to avoid the largest fluctuations but have not fine-tuned prices as needed to provide the continuous production incentives that are the goal of most food policies.

3. *Function:* Increasing market efficiency
Success indicators: Price variability, food availability, and marketing margins over time

In this area price variability has not been achieved nor even really sought. As indicated in (2) above, price setting is usually not even a function of boards. On food availability, performance has been poor. In times of surplus there is little problem, but in times of shortage, boards have not managed supplies well. On the indicator of marketing margins, performance has been poor as indicated in point (1). It must be said in defense of boards, however, that one reason for the losses suffered is the additional number of functions required of boards by government, usually at a financial cost.

4. *Function:* Formulating and implementing overall agricultural policy
Success indicators: Rates of producer technological adaptation, accessibility of market information, effectiveness at regulating markets, and degree of research, extension, and training

Many food marketing boards are simply not given these functions. They buy and sell to processors or to wholesalers but do not promote production. In promoting production through marketing efficiency, their record is poor. They often do not buy all that is offered in times of surplus, and they are slow to respond to shortages. Their own market information is often very poor, to say nothing of what they are able to transmit to producers. They often delay payments to farmers for unconscionable periods, thus providing a disincentive to producers. Their performance is probably best judged by the fact that in most countries where there is a food marketing board with monopsonistic powers there are usually black

market traders who operate at a profit, despite the costs of avoiding legal restrictions. In summary, food marketing boards are frequently not given many functions of development by sponsoring governments. Those they are given in marketing, they do not manage well.

- 5. *Function:* Participating in national development programs
- Success indicator:* Amount invested in self-generated funds

In this area we have already seen that boards are consumers, not producers of development funds. Rarely do the food boards play a real developmental function.

This comparison of the literature and the formal functions of the agricultural marketing boards suggests, as has evidence in previous sections, that boards are established and maintained for purposes other than those generally ascribed to them. Some of these real purposes have already been explored. They do not generally meet the objectives of food policy: marketing efficiency, price stabilization, promotion of production, and revenue generation. If these are the goals of food policy, boards will have to be either radically reformed or replaced by other institutions. Available literature gives us little guidance on which of these courses to follow.

STRENGTHENING PUBLIC MANAGEMENT OF FOOD AID AND POLICY

This chapter so far has attempted to provide insights into the real objectives and the determinants of effectiveness of the institutions deciding upon and implementing food policy in east African countries. This has been done because there is general agreement that these processes and institutions are not now working sufficiently well to allow the countries they serve to deal with the growing problem of food supply. Simplistic proposals that these institutions be disbanded and replaced by market and price systems fail to recognize the complexities of the situation. Only as we understand the reasons for the current system and the real motivations for its maintenance is it possible to think realistically about how food policy management can be strengthened.

This chapter has emphasized that both decision makers and the institutions implementing food policy have many other objectives in addition to efficient management of food policy. Many of these are very important functions for the well-being of the society, a fact we must understand if we are to prescribe ways to make them more effective in food policy. The growing problem of food supply, which in many east African countries is becoming critical for governments for the first time, creates a situation in which real change may be possible. As governments assign much higher priority to effective food policy than they have had to in the past, they will think seriously about more substantial measures to strengthen management of food policy.

In this situation careful thought about the process and direction of change is crucial. For donors or outsiders to press for major changes that require too sharp a break with past practice and existing views can severely set back the process of change and improvement. The recent experience of Tanzania is a case in point. The IMF has been recommending a major devaluation as a first step in a fundamental reorientation to deal with current economic problems. Its pressure on Tanzania to take this step has been so substantial as to force President Nyerere to publicly repudiate devaluation as a policy measure. There have been public demonstrations in support of this position. Thus, whether or not devaluation is an appropriate policy measure for Tanzania, the issue has become so politicized that it will be impossible to make such a change for some time to come. As a result, Tanzania's policy options are limited. This type of confrontation, sometimes resulting from intense pressure from donors, can be counterproductive and should be carefully avoided in the realm of food policy.

How then should change be facilitated? What strategies should be adopted for strengthening the management of food policy? The first step is to recognize the difficulties of implementation and the shortage of this particular capacity in east Africa. This should lead to a consolidation of responsibilities, a limiting of public sector management to essential functions, and carefully establishing priorities. In this area governments must be much stronger in setting their priorities and must allow donors to support them rather than try to accommodate donors' interests. As one experienced and effective Kenyan administrator told his staff in a recent meeting, "Don't worry about funding. If it's a program we need, design it right and make sure it will work. In 15 years of agricultural administration, I've never seen a good, well-designed program that couldn't attract donor funding." Such an attitude on the part of African governments will not lead donors to reduce their country budgets. Those budgets will still have to be spent. They will simply be spent more in line with a carefully considered set of national priorities.

This is an important but not sufficient step. It is necessary to consider what means might be used to strengthen specific management institutions. First, it is probably necessary to accept that in food marketing, boards will continue to play a role in food policy implementation over the next several years. Therefore, how can they be made more effective? As we have seen, there is no established body of literature to which we can turn for guidance. Recognizing the limits of their capacity, perhaps a progressive reduction of their role is in order. Instead of being given monopsonistic purchasing roles, they might be made buyers of last resort. Subsequently, their role might be limited to that of a food security agency, responsible for maintaining security stocks, releasing these in times of shortage, and replenishing them from either imports or domestic supplies in times of surplus.

To play an effective role, whether substantial or limited, most boards need considerable strengthening. At one level this must take place through

assisting them to strengthen basic administrative functions. Training of staff and assistance in developing capacity in functions such as accounting, inventory and warehouse procedures, management information systems, data collective procedures, or basic organization are all needed. Such assistance has to be carefully orchestrated in a politically sensitive area, but it is feasible. These improvements, however, cannot stand alone.

A more fundamental restructuring of relationships and objectives is needed. Until boards are relieved of many of the implicit objectives that have been discussed in this chapter, their performance cannot be expected to improve substantially. To some extent this will depend on what other means can be found for achieving these implicit objectives; to some extent it will depend on the importance attached to solving the food problem. If both these conditions are met, then it may be possible to make explicit the board's roles and objectives. When objectives are clear and explicit, systems can be created both to help them achieve these objectives and to hold them accountable for performance. Financial viability is a useful criterion on which to judge performance. A system such as that elaborated by Mallon (1981) requires efficiency in management but in effect credits a parastatal for the costs of social responsibilities assigned to it. If such a system is carefully established, financial viability provides a means of judging the efficiency of performance.

The introduction of such an evaluation system must be accompanied by a restructuring of relationships between a board and its governmental parent agency. A study of one east African national grain board showed that communication and the intervention in management affairs took place in many of the wrong areas. The board communicated with the parent Ministry on many of the minutiae of administration, personnel affairs, the renting of warehouse space, and the cost of gunny bags. They did not provide overall reports other than financial ones, and the parent Ministry did not seem to know how to evaluate performance (if indeed it even considered evaluation one of its responsibilities) until the board got into sufficient financial difficulty that it had to make a special request for funds to cover its deficits. At that point the Ministry required that its financial management be carefully audited, but overall management performance was not really scrutinized.

On the other side of the relationship, the board was not formally involved in the annual review process to establish the price for its commodity. In addition, right in the middle of the discussions about why the large deficit was incurred, the parent Ministry made an administrative decision (without consulting the board or even giving them advance warning) that changed an administrative procedure in effect costing the board 2 percent extra on every bag of the commodity it bought.

This type of indefinite relationship is not conducive to effective implementation of food policy. In theory it is possible to restructure and rationalize such a relationship. To make it work will take considerable discipline on the part of all involved parties. If there is to be a strengthening of the public management—which is essential to solving African food

problems—incremental change in the institutions charged with responsibility of managing food policy will have to take place somewhat along the lines suggested here.

The problems inherent in the system for the giving and receiving of aid have been discussed earlier. Donors have a role along with governments in improving the management of food policy, and the changes required in their procedures may be as (or more) difficult to bring about than the changes required of governments. The practice of donors to focus almost exclusively on projects is not the most effective way to implement food policy. Some projects are needed, but they are implementation-intensive and draw on resources needed. For other tasks, developing policies to facilitate food policy may well be more effective and more equitable. Policies that provide incentives as well as preconditions for rural initiatives such as land rights and use policies and water rights policies, and programs that facilitate research or promote small-scale agro-industries may be more effective at insuring food availability than most projects. Donors, with the cooperation of African countries (which have also preferred the project form of organization), must use their assistance to support consistent policies that facilitate food policy goals. Their funds must support programs such as research, credit, or strengthening local institutions. They, along with recipient countries, must find ways to facilitate the aid giving and receiving process that emphasizes performance rather than facilitate the flow of aid.

None of the problems or characteristics of the food policy management described here are unique to Africa. Experienced observers of Asia cite the fact that many Asian countries experienced similar problems and faced similar issues in the 1960s. It seems to have been concurrent crises in agriculture, the rapid creation of new technologies, and the priority accorded to food production that alleviated their situation. Perhaps the current food crisis in African nations will prove to be a similar historical watershed for Africa.

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Appendix

SEMINAR PARTICIPANTS AND OBSERVERS

Participants

Julia C. Bloch
Assistant Administrator
Bureau for Food for Peace and
Voluntary Assistance
USAID
Washington, D.C. 20523

Cheryl Christensen
Branch Chief, Africa/Middle East
International Economic Division/
ERS
U.S. Department of Agriculture
500 12th Street S.W.
Washington, D.C. 20250

Edward J. Clay
Institute of Development Studies
University of Sussex
Brighton, Sussex BN1 9RE
United Kingdom

Ralph Devone
Assistant Executive Director
CARE, Inc.
660 First Avenue
New York, New York 10016

Amadou Thialao Diop
Chef de la Division des Aides
en Nature et en Formation
Ministere du Plan et de la
Cooperation
Dakar, Republique du Senegal

Thomas Eponou
CIRES
CIRES 08 B.P. 1295
Abidjan 08, Ivory Coast

Gordon W. Evans
Director
REDSO/WA - Abidjan
Department of State
Washington, D.C. 20520

Isaac Yaw Gyapong
Deputy Minister of State
Ministry of Agriculture
P.O. Box M 37
Accra, Ghana

Edward B. Hogan
USAID Consultant
6616 Midhill Place
Falls Church, Virginia 22043

Barbara Huddleston
International Food Policy Research
Institute
1776 Massachusetts Avenue N.W.
Washington, D.C. 20036

Charles P. Humphreys
World Bank
1818 H Street N.W.
Washington, D.C. 20433

Vernon C. Johnson
AFR/DR/ARD
USAID
Washington, D.C. 20523

John W. Koehring
Associate Assistant Administrator
Office of Development Resources
USAID/Africa Bureau
Washington, D.C. 20523

James S. Mathenge
Permanent Secretary
Ministry of Agriculture
P.O. Box 56737
Nairobi, Kenya

Donald G. McClelland
Bureau for Program and Policy
Coordination
USAID
Washington, D.C. 20523

Wila D. Mung'Omba
President
African Development Bank
01 B.P. 1387
Abidjan 01, Ivory Coast

Samuel Nnebe-Agumadu
Acting Deputy Director
Planning and Research Department
African Development Bank
01 B.P. 1387
Abidjan 01, Ivory Coast

Bede N. Okigbo
Deputy Director General
International Institute of Tropical
Agriculture
Oyo Road, PMB 5320
Ibadan, Nigeria

Sebastian S'Ouari
Acting Chief
Economic Analysis Division
African Development Bank
01 B.P. 1387
Abidjan 01, Ivory Coast

Mary Alice Price
Agricultural Development Council
1290 Avenue of the Americas
New York, New York 10104

William G. Rhoads
Chief, Planning Analysis &
Evaluation Division
Bureau for Food for Peace and
Voluntary Assistance
USAID
Washington, D.C. 20523

Francis S. Ruddy
Assistant Administrator for Africa
Bureau for Africa
USAID
Washington, D.C. 20523

Abdolaye Sawadogo
01 B.P. 2553
Abidjan 01, Ivory Coast

Adewale Sangowawa
Head, Agriculture and Rural
Development Department
African Development Bank
01 B.P. 1387
Abidjan 01, Ivory Coast

G. Edward Schuh
Head, Department of Agriculture
and Applied Economics
University of Minnesota
231 Classroom Office Bldg.
1994 Buford Avenue
St. Paul, Minnesota 55108

Theodore M. Smith
President
Agricultural Development Council
1290 Avenue of the Americas
New York, New York 10104

Dunstan S. C. Spencer
Director, Development Department
West African Rice Development
Association
P.O. Box 1019
Monrovia, Liberia

John W. Thomas
Harvard Institute for International
Development
1737 Cambridge Street
Cambridge, Massachusetts 02138

A. M. Weisblat
Agricultural Development Council
1290 Avenue of the Americas
New York, New York 10104

Observers

Robert Browne
U.S. Executive Director
African Development Fund
01 B.P. 1387
Abidjan 01, Ivory Coast

Mellen Duffy
Nutrition Officer
REDSO/WA Abidjan
Department of State
Washington, D.C. 20520

Sam La Foy
Regional Food for Peace Officer
REDSO/WA Abidjan
Abidjan, Ivory Coast

Tridib Mukherjee
Regional Agricultural Economist
REDSO/WA Abidjan
Department of State
Washington, D.C. 20520

Kouandi Nicolas
Agronomy Engineer
Secretariat d'Etat a L'Agriculture
04 B.P. 856
Abidjan 04, Ivory Coast

Aminata Traori
Directrice des Etudes et
Programmes
Ministere de la Condition Feminine
B.P. V 800 Abidjan, Ivory Coast

The Agricultural Development Council was founded in 1953 by John D. Rockefeller 3rd as The Council on Economic and Cultural Affairs, Inc. A private, nonprofit, tax exempt organization, the Council was incorporated under the laws of the State of New York.

In 1963 the name of the Council was changed, but its purposes have remained as stated in its original Certificate of Incorporation. In broad terms, these are "charitable, scientific, and educational and are designed to stimulate and support economic and related activities important to human welfare."