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AN ASSESSMENT OF
WEST AFRICAN AGRICULTURAL DEVELOPMENT

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AN ASSESSMENT OF WEST AFRICAN AGRICULTURAL DEVELOPMENT

1. SUMMARY AND RECOMMENDATIONS

This summary focuses on key agricultural production issues in West Africa and suggestions for improving the effectiveness of agricultural development programs. Descriptive material and analysis are in the body of the paper.

Declining Food Self-Sufficiency and Per Capita Food Production

Africa is the only continent with declining food production per capita. Average per capita GNP growth for all non-oil producing African states is nearly zero. Per capita food production is declining by 1.4% a year. For 70% of African countries, per capita growth was lower in the 1970's than in the 1960's.

West Africa's food self-sufficiency therefore has been declining. The annual change in cereal output has been negative for several countries. The annual change for cereal area also was negative for Mauritania, Mali, Niger, Senegal, The Gambia, Togo and Benin. The annual growth for cereal yield/ha. has been zero or negative for Guinea, Sierra Leone, Liberia, Ghana, Togo, Nigeria, Mauritania, The Gambia, Senegal, Chad, CAR, Cameroon and Congo. Cereals consumption per capita was below the FAO recommended 180 kg/year for several recent years in 13 countries. Of the 16 selected West African countries, 9 have

been designated by the U.N. as least developed.

Projected import gaps for West Africa including the Sahel are significantly higher than in Central, Eastern and Southern Africa put together. Most of Africa's projected food deficit for 1990 will occur in West Africa including the Sahel. The USDA T74 model, completed in 1980, estimates the total Africa food deficit at 21,804 million tons in 1990, of which 19.3 million tons will occur in West Africa, including the Sahel. Nigeria, a country with close to 90 million people and rapidly rising income, will incur most of West Africa's food deficit.

Recommendations. West African national and regional agricultural institutions should be strengthened, e.g. research including networking and training of indigenous manpower, backed by support of the faminput supply system to help increase food production. Also, a strong Sahel-based, semi-arid tropical (SAT) regional center in Niger is needed for millet and sorghum.

Private Enterprise

Substantial benefits can derive from private capital. The private sector can be a catalyst for agricultural development. An environment is needed with policies conducive to private investment. However, national traditional markets are suspect in most West African countries. Frequently, private enterprise is actively discouraged. A policy to improve free private markets is often conspicuous by its absence.

Input and output marketing and processing facilities are almost always operated by semi-autonomous government agencies or parastatals, typically as a monopoly which taxes farmers heavily through low producer prices. Public marketing agencies tend to be high-cost operations because of over-staffing, poor financial control and accountability, lack of cost effectiveness, and inexperienced management. On the other hand, small and medium scale enterprises, particularly those in rural areas, lack sufficient access to scarce skilled manpower and capital and are usually preempted by government.

Recommendations. West African countries need to adopt macro-economic policies to create a favorable environment for private investment and encourage private enterprises as an essential tool for agricultural development. Growth of the private sector can be supported by projects for practical training in needed skills and by financial resources.

Prices and Subsidies

Most West African governments have low official prices for cereals that undervalue agricultural production and reduce market incentives. These price controls and export taxes are disincentives which often result in underproduction.

Incorrect price signals to farmers do not permit realization of their full potential for resource allocation, production, and consumption. In many cases, the resulting changes in production have

greatly altered trade patterns causing would-be-exporters such as Guinea, Zaire, and Mali, to become importers. The magnitude of income transfers from the rural sector to the urban sector, and the efficiency losses (net social losses) are significant. The negative effects of price distortions on rural employment are serious.

Since farm gate prices are fixed at a low level in West Africa, governments use input subsidies as part of an overall balancing or equalization of prices. In several cases, the government levies duties or taxes on exports and then returns an approximately equal sum as input subsidy.

Subsidies can be helpful to encourage farmers to use new and improved production packages developed through research and field tests, and thereby help expand total production. Ideally, subsidy is aimed at the innovators and early adopters to stimulate the adoption process. Continued subsidies without time limits, however, cause an uneconomic allocation of resources.

Recommendations. The subsidy-price program should be retargeted without destabilizing the LDC economy with a package scheme that would involve subsidy, producer's price, urban consumer's price, and budget deficits of the national grain marketing boards, e.g. the OPVN in Niger, and the OFNACER in Upper Volta, to be supported by the international donor community. Such a package would include a program of gradual:

1. withdrawal of subsidies for agricultural inputs;
2. elimination of all official (low) farm gate price fixings;
3. termination of urban price support for food over a period of five years on a gradually increasing rate;
4. budget support during the phasing out period. This is necessary because the marketing boards will have to purchase cereals at prices increasingly closer to market prices while making them available to urban consumers at increasingly rising official consumer prices.

Recurrent Cost

Increasing absorptive capacity requires priority attention to programs to upgrade technical skills, build institutions, and increase economic infrastructure and supporting services. However, major elements of the above program do not generate revenues to pay for their operating expenses. Non-revenue generating activities include virtually all of institutional building projects and projects aimed primarily at rural areas. Most of the \$1 billion per year Sahel projects consists of activities that are not expected to be self-financing in the short run. The fiscal deficit of just 7 Sahelian countries (Chad not included) for 1982 is estimated at about \$180 million. Policy measures to reduce the recurrent cost problem include reconsideration of certain policies, such as free education, free primary health care, free potable water; and the

principle of the state as the primary employer and producer.

Recommendations. Several common donor practices should be discontinued, e.g., use of inappropriate technologies, overlooking the impact of projects in raising local factor prices, lack of attention to financial analysis, underestimation of project establishment costs, inability to meet technical requirements of project follow-up, and volatility of development strategies. Agricultural projects are needed with more efficient and flexible mechanisms for transfer of financing to national or local institutions. The real tax base should be increased through macro-policy reforms that accelerate private sector production, and introduce user charges for public services.

Donor Programs

AID expenditures directly related to food, agriculture, and nutrition declined as a proportion of total expenditure in 1979 and 1980 but increased somewhat in 1981 and 1982. On the other hand, expenditures unrelated to either food or income increased between FY 77 and FY 81.

Recommendations. Program expenditure directly related to food and rural income should be increased as a proportion of total development expenditure.

Research

Inadequate finance limits the research of national research institutions. Among 92 LDC's, of 17 countries with 0-10 scientists per crop, 15 are in Africa; of 8 countries with 11-20 scientists per crop, all are in Africa; and of 43 countries with more than 21 scientists per crop, only 9 are in Africa.

The biological, physical and technical research of crops and livestock in West Africa has been carried out in isolation from socio-economic research and has little impact on farmers' productivity.

West and Central Africa's crop and soil research is served by two international research institutions, namely IITA in Ibadan, Nigeria, and ICRISAT in Hyderabad, India. Continental programs like SA-FGRAD work through the OAU and with the assistance of international research institutions and African universities aided by AID and other donor agencies. Research institutions such as NISER (Nigeria) and CIRES (Ivory Coast), and national agronomic research stations in several countries, are engaged in continued research programs on crops and agriculture related activities. West African universities are also involved in research. The absence of a Sahel-based agronomic research center for semi-arid tropical countries may be responsible for the absence of disease-resistant high yielding varieties (HYV) of millet and sorghum seeds for West Africa. ICRISAT recently established a regional African Center in Niger carrying out research on millet and sorghum. This might eventually

result in development of HYV seeds for these cereals.

Recommendations. Increased support is needed to the national, regional, and international agronomic research institutions for enhancing African capabilities in research, including the encouragement and financing of socio-economic research related to agricultural production.

ICRISAT's capabilities should be strengthened in developing a strong Sahel-based SAT regional center in Niger for millet and sorghum.

Coordination of Research, Training and Extension

There is very little coordination between national institutions undertaking agronomic research activities and extension and outreach work. There is also minimal coordination between international agronomic research organizations based or working in West Africa, regional agronomic research centers, and national agronomic research centers. Agricultural extension is at its infancy in most of the West African countries. Agricultural training of both extension workers and farmers is also inadequate.

The lack of investment in research, training and extension is responsible for the slow growth of agricultural institutions in West Africa. For example, the West African countries spend about 0.4 per cent of GDP in agricultural research.

Recommendations. IITA, WARDA, and ICRISAT should work more closely with national agronomic research centers. Projects should

strengthen national agricultural research and training centers, e.g. the ones recently designed for Niger, Mauritania, Cameroon, Guinea, etc., and build into project designs a mechanism for backward and forward linkages between research and training on one hand, and extension on the other.

Cash Crop-Food Crop Conflict

Many West African countries may have comparative advantage in cash crops but stress food self-sufficiency. Several coastal countries, e.g. Ivory Coast, Ghana, Senegal, Cameroon and Liberia, may need to continue to focus on cash crops, such as coffee, cocoa, palm oil and groundnuts, and use the foreign exchange earned to buy cheap rice from external sources.

Recommendations. The goal of food self-sufficiency should be reassessed for West African countries who have comparative advantage in cash crops, and help target national priorities to maximize rural employment and revenues through an optimum food crop-cash crop combination.

Irrigation

Water is the main limiting factor of agriculture in many parts of West Africa, particularly the Sahel; required expansion of the irrigated area is on the order of one million hectares.

Large-scale irrigation with complete flood control, navigation, irrigation and power, especially with highly mechanized farming,

is very expensive (\$7,000-15,000 per hectare in Mauritania and Senegal). However, several Sahel countries will have recurrent and severe food shortages if they depend only on rainfed agriculture. Irrigation removes risks and uncertainties from natural vagaries inherent in rainfed farming. It also creates new jobs at a cost significantly less than in several other industries/activities within the same economy. Irrigation programs have considerable impact on both national and regional levels of the economy.

Recommendations. Feasibility analysis of alternative irrigation systems and planning for the development of major, multinational river projects should be undertaken in conjunction with other small irrigation projects that are cost effective in increasing agricultural production.

Livestock

On the production side, livestock issues include animal health, high rate of cattle mortality, low offtake rate, constraints of available pasture and water, diminishing range resources threatened by the progressive encroachment of agriculture into formerly pastoral areas, intensive feeding vs. farm fattening, and problems with different development approaches, e.g. range management, stratification and feedlot programs, and high costs of production.

On the marketing side, the issues include high transportation costs reducing profit, limited flow of information to population,

fixed prices for livestock and meat, and restricted entry to trade by licensing participants.

Recommendations. Livestock production and meat supply should be increased through: better range management; rational land use laws; pastoral hydraulic policy; technical, economic and social services for transhumance; fire prevention policy; agro-pastoral management; use of agro-industrial by-products; animal health; livestock feeds; genetic improvement; stratification; modernizing marketing and distribution network; and training and research.

Fisheries

Fish accounts for nearly half of the protein consumed in the Sahel. For coastal West Africa, per capita fish consumption is greater than meat. The share of fish production, processing and marketing in African national income and employment is significant. Several parts of coastal West Africa are considered to be the world's most abundant fishing grounds, yet no African state is among the top 22 fish exporting nations. However, West Africa's demand for fish is expected to double between 1980 and 2000. Very few AID projects are concerned with fish production, an industry which deserves additional investment.

Recommendations. Improvement of existing artisanal fishing is needed through the provision of training, outboard motors and improved gears.

In marine fisheries, while leaving construction of improved harbors and port facilities to other donors, AID can assist in improving the local distribution system, improving repair and maintenance facilities of small fishing crafts as well as facilities for storage and processing of fish.

Food Security of Rural Households

National food reserves and relative stability of food supplies and prices do little to relieve food insecurity for West Africa's rural majority because of the isolation of rural, subsistence households from the market during periods of food need. Rural households often cannot take advantage of the fact that food prices have increased only moderately as a result of the national food reserve systems, because they have little or no cash income or savings with which to offset the production shortfall. The vulnerability of small farmers to natural forces and the inadequacy or inefficiency of food storage by rural households periodically threatens their existence and nutritional well-being.

Recommendations. Economically feasible national projects and programs should be developed to improve food security for rural households in West Africa.

Population and Agriculture

Population growth rates in West African countries are among the highest in the world, ranging from 2.5-3.5% a year. Countries

like Nigeria, Ghana and Zaire are expected to double their populations between 1978 and 2000. Demographic trends have several relationships with agricultural development--the rural-urban migration diminishing the availability of agricultural labor force, degradation of land by shorter fallow periods in shifting cultivation, and reduced rural savings.

Recommendations. Family planning activities should be included in all development efforts. Support should be expanded to increase farm labor productivity.

Rural Nonfarm Enterprises and Employment

Rural nonfarm enterprises include artisanry, manufacturing, food processing, equipment repair, transport and commerce. Investment by rural people in nonfarm enterprises is considerable. Rural nonfarm enterprises are labor intensive and efficient in use of capital, and have strong profit-making capabilities and high savings and investment rates.

Recommendations. Capital is needed at realistic rates of interest but with some form of risk guarantee to rural nonfarm enterprises, and projects for practical training in entrepreneurial skills should be encouraged.

Energy Issues

West African farms and communities have been seriously threatened by the energy crisis in the form of supply scarcity and

rapid price increases for fuel and inputs such as fertilizer and pesticides. Transportation costs of agricultural inputs and products have risen rapidly. The increasing scarcity of fuelwood, the sources of 90-95% of energy supplies for rural West African domestic consumption, is detrimental at the national level because of its contribution as the major pressure in deforestation and the degradation of land, the resource base for agricultural systems.

Recommendations. External assistance is needed for energy planning, management training, technological development of conventional and renewable resources, and development of reforestation activities integrated with land use development.

Appropriate Technology

Appropriate technology for improving labor productivity, and crop and animal production includes equipment for land preparation, seeding, weeding, harvesting, post-harvest recovery, food processing, seed and crop storage and inter-cropping practices. It is linked with renewable sources of energy, nonfarm enterprises, and agricultural research and extension.

Recommendations. Training is needed of extension personnel in appropriate technology, and design of development projects should assure appropriate technology is used.

Regional Institutions

Collaboration is needed with existing regional institutions

to support agricultural production and marketing.

AID's assistance has concentrated on the regional coordinating organizations, regional financial assistance, river and lake basin development organizations, technical development organizations, and training institutes.

Recommendations. Both to encourage African initiative and to expand use of intermediaries, continued assistance is needed for development oriented regional organizations such as AFDB, EF, ECOWAS, CILSS, SAFGRAD, WARDA, CIRES and INADES.

Nutrition and Agriculture

Undernutrition is widespread within the poorest segments of West and Central African countries, particularly affecting women of childbearing age and their children. Increasing food production is the primary means of improving food consumption by low income groups. To understand the complex causes of malnutrition and plan for control, one must consider related factors: (1) production of foods; (2) distribution, conservation and marketing; (3) consumption of food; and (4) biological utilization of food.

Recommendations. Projects should be designed with specific consumption and nutrition goals to improve the nutrition status of target farm families. Agricultural programs should be formulated with attention to the food conservation, distribution and marketing of the food and nutrition system, as well as to the factors directly affecting consumption such as purchasing power, preparation methods,

cultural preferences, intra-family distribution, breast-feeding and weaning practices, and family size.

II. INTRODUCTION

Background

With the exception of Nigeria and Zaire, West African countries are small, with populations of less than 20 million. Agriculture is the dominant activity, providing livelihood of over 70% of the population and accounting for 40-60% of GNP. GNP per capita in the oil importing countries of West Africa grew less than one per cent during the 1970's. Per capita income growth in the 1980's is expected to be below 1.5%.

Soil and climate in large parts of West Africa are inhospitable to farming; the technology is mostly hand tools. Even animal traction, which is common in Asia, is rare in Africa. The infrastructure of roads, markets, communication, education and health are grossly inadequate in relation to the size and importance of the agriculture sector. Development of support services has been largely confined to a few export crops such as coffee, cocoa, palm oil and cotton. The research, training, extension and other support services necessary to sustain crop yield increases are poor.

Plan documents in almost all West African countries refer to the key role of the agricultural and rural sector in Africa's modernization. Since the disastrous drought of 1973-74, food self-sufficiency has become a universal objective, supported by donor-financed projects. However, unlike Asia, there is not yet

widespread acceptance in West Africa that small farmers can and must be the main contributors to broadly based economic development and eventual modernization. Modernization is often interpreted to mean mainly agri-industrial and commercial agriculture, largely through mechanized, large-scale farming.

West African countries vary in climate and geography. Even within the Sahel there are several types. One type has relatively good natural resource base, but poorly developed infrastructure (Mali and Chad); a second group are relatively poorly endowed in both natural resources and infrastructure (Upper Volta, Mauritania and Niger); and a third group have a poor natural resource base but more developed infrastructure (Senegal and The Gambia). Niger has used its uranium revenue for development plans and projects. Cape Verde and Mauritania are structurally food deficit countries.

Coastal West African countries have four types of climate and resources: (1) those with possibilities for raising their foreign exchange earnings from oil (Nigeria and Gabon); (2) those with mineral resources, e.g. bauxite, copper, diamonds, and cobalt (Zaire, Guinea, Gabon, Sierra Leone); (3) those with large export crops, e.g. coffee, cocoa, tea and palm oil (Ivory Coast, Cameroon, Ghana, Sierra Leone and Liberia); and (4) those which are both resource poor and have rather poorly developed infrastructure (Guinea Bissau and Benin).

Nigeria exported agricultural commodities before it became oil-rich. Cameroon and Ivory Coast are likely to become oil exporters. West Africa's food self-sufficiency has been declining. Annual growth of cereal output has been negative for several years in Mauritania, Mali, Niger, The Gambia, Senegal, Guinea, Ghana, Togo, Chad and CAR. The percent annual change in cereal area also was negative for Mauritania, Mali, Niger, Senegal, The Gambia, Togo and Benin. The annual growth rate for cereal yield/ha. has been zero or negative for several years in most countries.

West Africa's major cereals are millet and sorghum in the landlocked countries, rice and corn in the coastal countries. Root and tuber crops, e.g. cassava and yams, are grown widely in the forest zone. Cowpeas are grown in several Sahel and coastal countries.

Sahel is surplus in meat which it sells to the meat-deficit coastal countries. Sahel also has a fish surplus. Marine fisheries provide an immense opportunity to West African coastal countries; however, it is mostly underutilized. West Africa is critically milk-deficient.

The competition for land between food and cash crops, particularly in countries with large export crop sectors, is expected to lead to a decline in the coastal share of area under food crop cultivation from 75% in 1975 to 70% in 1990. Thus, the needed output would have to be attained mainly through increased

productivity of land and labor. The land productivity could be increased through reducing shifting cultivation, introducing appropriate crop rotation, increasing fertilizer application, and expanding the use of irrigation. The labor productivity would have to be increased through training, extension and technology.

Government wage and price policies in West Africa are heavily biased in favor of the urban sector and against the rural producers. The rapid growth of urban population (5-8% a year) increased the potential pressure on the governments to provide cheap food to cities and towns by holding producer prices below free market prices, sometimes even below cost.

Producer disincentives are the major factor in Africa's poor performance in food production. Between 1969-71 and 1980, food production per capita declined by 15% in Africa, in contrast to an increase of 7-8% in West Asia and Latin America. Production disincentives are least in Ivory Coast.

Agriculture Policy

Agriculture policy is concerned with three agricultural problems: (1) agricultural production and marketing; (2) food consumption and nutrition; and (3) economic policies and programs that influence both food production and consumption.

Concerns within the agricultural sector include, e.g., the increase in food production, farm level and broader, non-food concerns, such as alternative energy, appropriate technology, population

policy, health, education and social services. The discussion on food should be in the context of other demands on agricultural sector, e.g., exports, non-food production, and raw materials.

Issues within the food consumption/nutrition sub-sector include: (1) effective demand for food, both domestic and export; and (2) the nature and level of malnutrition.

Economic policy, including price and subsidy policies, is significant because of its (1) impact on the level and composition of agricultural and food production, and on the distribution of benefits of food production among small farmers; (2) impact on food consumption through fiscal and income policies, e.g., price support, wage control, and changes in urban/rural tax structure; and (3) on additional demand on agriculture by exports and non-food agricultural products.

For this paper, the words, strategy and policy, are used interchangeably in reference to agricultural programs and projects. Both strategy and policy utilize planning documents, agricultural sector surveys, consumption and nutrition surveys, economic memoranda, project papers, evaluations, and CDSSs.

AID Food Strategy

AID's food strategy is to assist African governments to identify:

1. Specific projects and programs that governments are prepared to undertake within their development framework;

2. The resource and policy constraints that have to be overcome before progress can be made toward goals; and

3. Short, medium and long term objectives, specific programs and projects be undertaken, and identification of types of external support necessary.

The Africa Bureau's food strategy is to assist host countries to:

1. Develop policies and institutions which encourage the rural poor to increase agricultural production and income;

2. Expand national capacities to develop and disseminate low cost, energy-conscious and simple-to-manage technologies for food production and marketing;

3. Broaden access of small farmers to needed inputs such as knowledge, credit, processing, storage and marketing;

4. Help create/support physical infrastructure.

Administrator Peter McPherson, in a speech, "A New Era of AID-University Relations", observed that resolving critical constraints to increased agricultural production and resource productivity will take a long term perspective--perhaps decades rather than years. Special attention must be given to national institutions, e.g., extension, research and training which link the concerns and problems of farmers, and other entrepreneurs in the private sector with the public capacity to address these problems.

AID Programs

AID has three types of programs:

1. Production--crop, livestock, inputs delivery, marketing and research. These programs directly influence production.

2. Social services--education, health, family planning, and water activities which sustain development.

3. Social welfare--disaster/relief/refugee assistance, shelter, food distribution, activities which are emergency measures.

AID policy and planning strategies in Africa focus on:

1. Projects to strengthen rural agricultural planning and policy analysis;

2. Use of PL 480 Title III to undertake policy studies and negotiate for necessary policy changes;

3. Support of institutions capacities to make price incentives effective, provide convenient buying points, prompt payments, storage and transport;

4. Better training of human resources, from farmers to scientists, to increase agricultural productivity;

5. Mid-term to long-term strategies--development of improved but self-contained technology, production and distribution of inputs required from off-farm services and extending the new techniques to farmers. Only by finding technology that provides a better pay-off will investment in fertilizer pay off;

6. Priority for farm to market roads that directly support food production and marketing;

7. Expenditures for physical inputs, projects, e.g., producing hand tools, more complex equipment, improved needs and fertilizer on an economic basis;

8. Research in some crop projects;
9. Crop storage and protection;
10. Fisheries;
11. Livestock and range management;
12. Marketing system improvement;
13. The institutions and manpower;
14. Agricultural research and extension;
15. Agricultural education and manpower;
16. Agricultural credit.

III. CHARACTERISTICS

Food Import Projections

While the most acute, short-run food problem is in East Africa, because of recent refugee problems and drought, the largest, long-run food deficit, both in terms of effective demand and nutritional requirement, is in West Africa. Nigeria, a country with nearly 90 million people and rapidly rising income, represents most of West Africa's food deficit. Table 1 gives comparative import gap projections for sub-Saharan Africa made by USDA, IFPRI, FAO, and MOIRA, using different demand and supply assumptions. Table 2 gives comparative import gap projections by regions. Projected import gaps for Sahel and West Africa are significantly higher than in Central, Easter, and Southern Africa. According to the USDA T74 model and the IFPRI constant 1975 model, with both low income growth and high income growth, most of Africa's projected food deficit for 1990 will occur in West Africa.

Urbanization and Income Growth

Urbanization and income growth have interacted to create a structure of demand in urban areas that is difficult to supply from domestic production. One result has been increasing imports.

The rapid growth of urban populations, at rates ranging from 5 to 8% a year, influenced government policy in favor of cheap food in cities and towns, and producer prices for food crops below export

1. COMPARATIVE IMPORT GAP PROJECTIONS,
SUB-SAHARAN AFRICA

<u>Source</u>	<u>Million Tons Cereal Equivalent</u>	
	<u>1985</u>	<u>1990</u>
USDA -		
C74		11.5
C79		10.2
T65		18.5
T74		21.1
IFPRI		
Constant 1975 per capita income		12.4
Low income growth		23.7
High income growth		28.7
FAO		
Trend	11.0	
Maximum production and demand		6.4
GOL (I)	4.9	
MOIRA		
Low income growth		11.0
High income growth, greater/equality		8.7

Source: Compiled by REDSO/WA.

2. COMPARATIVE IMPORT GAP PROJECTIONS,
BY REGION, 1990

<u>Source</u>	<u>Cereal Equivalent (000 MT)</u>			
	<u>Sahel</u>	<u>West</u>	<u>Central</u>	<u>East & Southern</u>
USDA				
C75	1,222.0	5,279.4	(549.8)	5,492.0
C79	984.6	6,618.1	(424.0)	2,869.4
T65	964.3	11,863.9	(349.6)	6,058.5
T74	1,133.0	18,167.9	(365.5)	2,138.1
FAO				
Trend	1,884.4	3,910.9	1,529.1	4,582.1
MPD	140.6	2,425.4	105.5	1,617.2
IFPRI				
Constant				
1975	3,092.0	9,236.0	(1,580.0)	863.0
Low	3,266.0	17,643.0	(1,039.0)	4,040.0
High	3,556.0	21,461.0	(888.0)	4,872.0

Source: Compiled by REDSO/WA

and import parities.

The growth in income and urbanization has shifted consumer tastes toward foods that are more convenient to prepare and cook. The demand for rice in coastal West Africa has been increasing rapidly, not simply because rice tastes better than millet or sorghum or root crops, but because rice can be cooked directly where millet (and some root and tuber crops) has to be ground, involving additional work for the housewife.

Rural-urban income disparities are already high in West Africa, the ratios typically ranging between 1:4 and 1:9, compared with 1:2 and 1:2.5 in many countries of Asia. Because agricultural sectors have been stagnant or slow growing, even relative to the poorly performing industry and services sectors, these disparities are worsening in many cases. The Ivory Coast is an exception where growth has been impressive. However, even there the distribution of benefits between agriculture and industry, and particularly within agriculture, have been unequal.

Low Investment in Research, Training and Extension

National agronomic research in West Africa is in its infancy. Inadequate finance limits the research of national research institutions. The West African countries have been investing only about 0.4% of GDP in agricultural research. Although African countries spend 35% more on extension services than on research, the linkage between research and extension is weak.

Collaboration is weak among national agronomic research centers, on the one hand, and between the national research centers and the regional and international agronomic research centers, e.g., WARDA, SAFGRAD, IITA and ICRISAT. There also is a tendency for anglophone and francophone research centers to be isolated from each other. For example, IRAT in the Ivory Coast has an impressive record of research on rice; however, IRAT's accumulated findings are not widely shared with anglophone counterparts, including WARDA. Consequently, research efforts are often duplicated.

The challenges to agricultural research systems in West Africa are by far the greatest in the world, combining constraints posed by ecological, technical, demographic, and institutional factors. Colonial agricultural development policies in West Africa were designed almost exclusively for the expansion of export crop production for the metropolitan countries. Research was largely concentrated on export crops. Agricultural extension, input supply, credit, and marketing and processing facilities were also highly fragmented.

Recent studies indicate that internal rates of return on research investment may range from 20-90% with returns in most cases exceeding 35%. Nevertheless, the substantial investment, on the order of \$118 million in 1980, in agricultural research in the international agricultural research centers has had only limited impact on West Africa's agricultural output thus far. Four of these

centers, with a total 1980 budget of about \$35 million, are in Africa. External development assistance organizations have made limited investment in West African research in agriculture.

Agriculture extension is also in its infancy. Frequently, there is no Department of Extension within the Ministry of Rural Development or as a separate entity. Extension activities may exist as a small office within the Ministry of Agriculture. Since there are only a few extension agents, it is physically impossible for the agent to cover his entire geographic area adequately. The extension agents are selected from job applicants who often come from urban areas. The agents are given only a sketchy training before they are sent to the village and are not well paid. The result is a weak agricultural extension service run by agents who are neither trained nor motivated to do the job.

In addition, the extension service suffers from two other basic problems: (1) there is frequently no field-tested package to extend for some crops, e.g., millet and sorghum, and (2) the national agricultural research scientists are often not enthusiastic about living in the village during the rainy season and working with farmers and extension agents to ensure that farmers are using the seeds developed in the research centers, along with other inputs and farming practices that are recommended for the production package.

West African facilities for training agricultural students are limited both in quantity and quality.^{1/} Even when a country like Guinea produces a significantly higher number of agricultural graduates than is necessary, the quality of instruction received is marginal. In most cases, teachers are not adequately trained to teach, there are no libraries at the agricultural schools and universities, and agricultural extension is not considered an essential component and goal of the agricultural training. Agricultural training in West Africa suffers severely from inadequate investment.

Low Productivity

Productivity of both land and labor are low in West Africa. In places, land productivity is declining. Labor productivity is lower than in Asia or South America. However, because of institutional rigidities wage rates are usually higher than the value of the marginal product of the labor. Since the wage structure is institutionally determined and thus, politically not subject to a downward shift, the only way to make a high wage rate

^{1/} In 1960, even the educationally most advanced African countries, e.g., Ghana and Nigeria, had only 3% of the population of secondary school age enrolled in school compared with 8% in Bangladesh, 10% in Burma, 20% in India, and 26% in the Philippines. By 1976, the percent in Nigeria had gone up to 10. By then it was 23 for Bangladesh, 22 for Burma, 28 for India and 56 for the Philippines. (Uma Lele, "Rural Africa: Modernization, Equity, and Long-Term Development; Science, Vol. 211, February 6, 1981, p.551).

commensurate with productivity elsewhere is to increase labor productivity through training and extension programs.

Ecological Degradation

The accelerating rate of degradation of the national resource base is alarming. Sahel's soil base, in particular, is degrading and unless the trend is reversed, an already unfavorable resource-to-population ratio will become worse.

In 1973, drought claimed the lives of perhaps 150,000 people in Sahel. Famine is harder to quantify than other national disasters, and less photogenic. It is usually a gradual process. While the old, the very young and the infirm die in hunger, the able bodied keep moving in search of food. There have been large southward movements of the Sahel's inhabitants under the pressure of droughts in the past ten years. Rapid economic growth in coastal areas has provided an incentive to migrate. Ivory Coast clearly has acted as a melting pot for immigrants from the north.

Until recently, many observers believed that the changes in the region's rainfall patterns and the increasing spread of the desert were only temporary. However, it now appears that they may in fact be permanent. A recent study of Sudan shows that, since 1960, the desert has advanced 100 kms. to the south. The present rate of advance is probably 7-8 kms. a year. In Western Africa, the Sahara is reported to be advancing southward even faster.

Prohibitive Transportation Costs

Excluding Nigeria, West Africa's low population density explains the extreme inadequacy of roads, railways, and waterways. However, there is considerable diversity. Road mileage per square mile is less than .2 in almost all West African countries.

Because of few roads, the transportation system is very poor, rendering marketing difficult and expensive. Africa ranks last of all continents in transportation systems. The cost of moving grain 700 miles into the interior from the coast port is more than the cost of shipping it from New Orleans to an African port 6,000 to 7,000 miles away. A recently completed study by Louis Berger International, Inc., prepared for USAID/Senegal, concludes that the price of American sorghum traded in Mauritania is 33% lower than the price of CIF Rosso for Senegalese millet, and 10% lower than the subsidized price to wholesalers and millers.^{1/}

The costs of distribution and marketing in less developed countries are higher than in industrial countries. While total marketing costs and margins in Europe are 10-20% of the retail price, in several LDC's the corresponding margins are more than 20% and range up to 60%, in spite of relatively low wage rates. In the 1970's, the margins tended to be highest, on average, in Africa--

^{1/} Louis Berger International, Inc., "An Analysis of a Semi-Commerical Millet Transfer between Senegal and Mauritania" (Dakar: Feb. 1980).

Senegal (30-34%), Nigeria (48%), Ghana (51%). In landlocked Sahelian countries such as Niger, the cost of transportation, distribution and marketing of imported inputs are extremely high. For every \$1 of fertilizer purchased in the United States, Niger has to pay an additional \$2 for ocean and inland transportation and other incidental expenses. A recent bill for transport of 200 tons of fertilizer from Lome to Niamey, showed costs of 59,790 CFA/ton or about \$239.16 (@ \$1 = 250 CFA). In-country commercial freight rates, according to a recent FAO survey, are:

Zinder - Niamey	14,000 CFA	(\$56.00)
Maradi - Niamey	12,000 CFA	(\$48.00)
Niamey - Agadez	25,000 CFA - 35,000	(\$100-\$140)
Niamey - Diffa	35,000 CFA	(\$140)

at an average of \$53/ton for domestic transport and \$239.16 for overland transport from a coastal port for 25,000 tons of fertilizer, the GON must pay almost \$7.3 million to delivery fertilizer to district capitals. Transport costs in one year could purchase 73 Mack trucks.

IV. ISSUES

Declining Per Capita Production

The WFC meeting in the Hague in November 1980, expressed concern about the worsening food situation in low income regions and warned that the problem was most serious in sub-Saharan Africa. Per capita GNP growth for all non-oil producing African states is nearly zero. Africa is projected to fall farther behind other LDC's during the next ten years. Per capita food production in Africa is declining by 1.4% a year. Increased production of the 1960's and 1970's has resulted from expanding the area under cultivation, rather than increased yield. Desertification, deforestation, and erosion are threatening the essential agriculture resource base of the majority of African countries. Population and urbanization growth rates in Africa are the highest in the world. The majority of Africa's population still has no access to basic health services. The presence of some debilitating disease in most of the adult population is an important factor in the low productivity of labor. Life expectancy averages 45 years compared with 53 years in the developing world, and 72 years in the United States. For 70% of Africa, per capita growth was lower in the 1970's than in the previous decade. Africa, therefore, is the only undeveloping continent.

A dramatic increase in the food deficit is projected. According to IFPRI, if food consumption were maintained at 1975 levels per

capita and production trends continue, a tenfold increase in gross deficits would result. FAO-projected cereals deficit in 1990 for all African countries is about 12.3 million metric tons. Corresponding deficits for meat, milk and fish are 2.4 million, 8 million and 1.1 million metric tons. Almost two-thirds of sub-Saharan's total deficit would occur in Nigeria. However, large relative increases would occur in most countries. The rate of growth in staple crop production is particularly low in several countries of West Africa.

African food self-sufficiency declined from 98 to 90% between 1962-74. The reasons for the decline include: (1) insufficient expansion of cultivated areas; (2) slow or negative yield increases; (3) inadequate spread of improved technology; (4) recurring droughts; (5) parasite problems; (6) lack of infrastructural facilities; and (7) social and political constraints.

If the trend continues, food self-sufficiency will further decline to 81% by 1985. However, FAO studies indicate that with maximum feasible increase in food production, overall food self-sufficiency can improve to 94% by 1985, remaining at that level to 1990.

For Western Africa, the annual percent change in cereal output was negative between 1969-71 and 1975-77 for Mauritania (-9.7), Mali (-0.4), Niger (-0.6), The Gambia (-4.2),

Senegal (-4.2), Guinea (-1.5), Ghana (-3.0), Togo (-1.1), Chad (-2.9), and CAR (-0.5). The percent annual change for cereal area under cultivation and cereal yield per hectare also was negative for most Sahel countries.

Cereals Consumption Per Capita

Cereals consumption in 1977 was below 180 kg./year recommended by FAO in Mauritania (135), Cape Verde (131), Guinea (177), Liberia (179), Ivory Coast (119), Ghana (73), Togo (131), Benin (110), Nigeria (145), Chad (145), CAR (57), Cameroon (128), Gabon (101), Congo (39) and Zaire (45). Out of 16 West African countries, 9 are least developed.

Research

Inadequate financial limits the research of West Africa's national research institutions. Among 92 LDC's of 17 countries with less than 10 scientists per crop, 15 are in Africa; of 8 countries with 11-20 scientists per crop, all are in Africa; and of 43 countries with more than 21 scientists per crop, only 9 are in Africa. The biological, physical and technical research on crops and livestock has been carried out in isolation from socio-economic research and has little impact on productivity of farmers.

Crop and soil research are served by two international research institutions, namely IITA in Ibadan, Nigeria, and ICRISAT in Hyderabad, India. Continent-wide programs such as SAFGRAD,

function through OAU, with the assistance of international research institutions, and African and American universities supported by AID and other donor agencies. WARDA is the West African organization for development of rice. National research institutions, such as NISER (Nigeria), and CIRES (Ivory Coast) and national agronomic research stations in several countries, are engaged in continued research programs on crops and agriculture. West African universities are also conducting agricultural research. The institutions are candidates for sustained reinforcement by international donors for enhancing research.

The following paragraphs present a case for a regional, semi-arid tropical (SAT) crop improvement and farming systems program. A decade ago, a new variety of wheat brought a green revolution to less arid countries. However, although international research for agriculture in arid regions was developed to a significant level, no similar technological breakthrough is on the horizon for semi-arid areas.

IITA has a mandate for research on cowpeas. However, this crop is an integral part of the SAT farming system in Africa. If IITA is unable to provide core funding for breeding cowpeas adapted to SAT conditions, then ICRISAT should be encouraged to do so.

Although ICRISAT has not yet developed a long-term plan for Africa, the two cereal crops in the ICRISAT mandate are undoubtedly the two most important food crops of semi-arid Africa.

Genetic improvements can help stabilize yields at low levels of productivity by: (1) eliminating/reducing the effects of damage caused by pests and diseases; and (2) adapting the crop more closely to environments characterized by erratic rainfall. However, genetic improvements do not necessarily increase the potential for raising yields. Higher yields are achieved principally through farming practices that make more water and nutrients available to a crop variety that has the capacity to produce more grain. However, these two objectives, namely stability and increased yield potential, can conflict. For example, a variety bred for its response to improved farming conditions may perform worse than an unimproved variety in the absence of other inputs such as fertilizer. Therefore, multi-disciplinary work is needed, designed to examine the performance of improved genotypes under a range of farming conditions in West Africa. The work should include comparison at low and high levels of farming for both millet and sorghum.

There are programs to improve pearl millet in Senegal, Upper Volta, Niger, Mali and Nigeria. ICRISAT materials afford a wider range of genetic diversity; however, they lack adequate resistance to downy mildew, particularly in Upper Volta. Furthermore, certain problems in millet improvement, such as resistance to Striga, could not be addressed at the ICRISAT center in Hyderabad, India.

ICRISAT material should be tested for African adaptability at an early stage in the breeding program. In view of the African manpower shortage, effective use should be made of available manpower.

Sorghum populations suitable for West Africa have not yet been generated. At present, interest in food products and use of sorghum is mainly combined to chapati quality. African preferences and usages have not yet been seriously considered. Populations suitable for West Africa should soon be generated and cycled, based on West African multi-locational tests. Striga, zonate yeast disease, charcoal rot on certain soil types, shoof fly, midge, and stem borers are all serious problems and resistant varieties are sought. ICRISAT has not been very helpful to date in this effort.

Farming system research consists of three major interrelated activities--analyses of base data, research station studies, and on-farm studies. ICRISAT should make an analysis of its experience in watershed management in Africa, including the use of animals. Although much work has been done on fertilizer responses in India, development of a strategy on fertilizer use for SAT countries in Africa has not yet been developed. In many SAT areas, soil fertility differs from India. In the former, the soils are of lower natural fertility. Their natural fertility levels could not support as large a population as in areas of similar rainfall in

India. Fertility has to be built up over a period of time using a combination of fertilizer and cultural practices. Farming systems in SAT areas in Africa are more diverse than in India, ranging from various types of shifting cultivation to continuous cropping and sometimes total soil degradation.

Moisture behavior in SAT soils in Africa is not well understood and needs additional research. Problems of soil management under intensive agriculture will present a major challenge. Some of these problems are more like those studied by IITA than in India. Consequently, close cooperation between IITA and ICRISAT is desirable.

The recent study, Report of the TAC Quinquennial Review Mission to the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), prepared for OGIAR, recommends development of a long-term plan for ICRISAT's activities in Africa but also recommends that no firm commitments be made to the building program in West Africa, prior to reconsideration of the African core program.

The rice study by Stanford Food Research Institute and WARDA observed fundamental differences between the economic environments of West African and Asia.^{1/} The green revolution in Asia during the 1960's was a technological package well suited to Asian resources and institutional preparedness. Labor was relatively low cost and seasonally unemployed, thus allowing profitable increases in double

^{1/} Food Research Institute, Stanford University and West African Rice Development Association, The Political Economy of Rice in West Africa: A Summary of Principal Results (Washington DC: USAID, July 1979), p.63.

cropping and land-use intensity. Irrigation infrastructure has been in place for decades, if not centuries, reflecting substantial farmer experience with water control. These Asian conditions differ greatly from contemporary West Africa. Most Asian technologies are not transferable without substantial sacrifices in economic efficiency. Hence, the successful development of cereal production in West Africa probably will prove to be a highly indigenous process. Only a Sahel-based international research institution for SAT countries in Africa could address the problems discussed above effectively.

Food Self-Sufficiency

Food self-sufficiency is a goal of almost all West African countries. There are, however, costs of undue insulation from international supplies and competition, and potential benefits from greater reliance on trade.

The low ratio of labor to land influences the wage rate of rural unskilled labor. The wage rate is often considerably higher in West Africa than in Asian countries, where population densities are significantly higher. The world's most important rice exporter, Thailand, for example, had a rural wage rate of \$0.60 at official exchange rates in the mid-1970's, only one-third that of the forest zone of the Ivory Coast, and lower than in any West African country. The study by WARDA and Stanford Food Research Institute, The Political Economy of Rice in West Africa, concludes

that Ivory Coast, Liberia and Senegal do not have comparative advantage in production of rice although attainment of self-sufficiency in rice production is a central policy. These countries, as well as Nigeria, Ghana and Sierra Leone, are unable to produce rice efficiently with existing techniques, for delivery to either export markets or main domestic consumption centers. Some existing techniques of production in these countries can compete with imports of rice in rural areas and thus do not require protection from import competition. But some types of local rice production cannot compete in the absence of restrictive trade policy, which results in income losses from inefficient use of resources and welfare losses from the higher prices of rice.

When there are comparative advantages in cash crops, such as coffee, cocoa, tea, and groundnuts, in several countries, such as Cameroon, Ghana, Ivory Coast, Liberia, Senegal and Guinea, it may be advisable for these countries to make the best use of relatively expensive labor in higher value cash crops rather than in production of cereals. Since cash crops require better management and better access to inputs, including capital, an efficient cash crop sector eventually will increase the productivity of the food crop sector through better management, inputs, transportation and marketing.

Irrigation

Water being the main limiting factor in agriculture in many parts of the region, further expansion of irrigation is needed for

food production. The required expansion of irrigated area in the Sahel and other parts of West Africa is of the order of one million hectares. Irrigation clearly can increase production. In Asia, water control and other inputs on working farms result in yields up to five times higher than in unirrigated areas. The 20% of the agricultural land which is irrigated, produces 40% of the world's agricultural output.

However, irrigation projects have experienced many difficulties. The FAO estimated that roughly one-half of the world's irrigated land is afflicted with salinization, resulting in serious declines in productivity. Big irrigation projects with complete flood control facilities are expensive and grow more so as the easier opportunities are exploited. The cost to develop one hectare of land in Mauritania in the Gorgol irrigated perimeter, which is highly mechanized, is \$7,000 to \$15,000. The OMVS (Senegal River Basin) is experiencing very high cost of mechanized irrigation which would be feasible, in the long run, only with triple cropping with cash crops. The cost of highly mechanized irrigation projects increases a nation's external debts and is difficult to justify as grants. These expensive projects also increase the risk if the system fails to achieve planned targets.

West Africa must depend on rainfed agriculture for a long time. However, several Sahel countries will have severe recurrent food shortages if they depend only on rainfed agriculture. Irrigation

reduces risks and uncertainties from natural vagaries inherent in rainfed farming. It also creates new jobs at a cost significantly less than in some other industries. Irrigation programs have both national and regional impact. For example, the Senegal River Valley is an area where no major improvements can be envisaged with existing farming practices, either in rainfed or in flood recession cropping. The cost-benefit method of analyzing projects is not suited to identifying inter-generation distribution of income which would result from the river basin development project, such as on the Senegal River, Niger River, Lake Chad, or the Maro River. Such projects affect future distribution of income. Calculation of rates of return is a method of choosing among investment opportunities at the margin but does not adequately measure the impact of projects which change the structure of the economy. Decisions to reject irrigation because of a low rate of return would neglect important practical considerations and future effects. Realization of returns from projects in rainfed agriculture are difficult to measure and are subject to a variety of risks. Irrigation projects on the other hand, are more straightforward in their benefits, easier to implement, and less subject to technical failure. New projects in rainfed agriculture with attractive rates of return are becoming increasingly difficult to find. Large foreign aid programs cover the sector comprehensively and only marginal projects remain. For example, in southern Senegal, the extension of credit and

technical know-how to traditional farmers cannot be expanded much faster. In the next 15 years, new investments in rainfed agriculture are expected to experience diminishing returns even if project development is vigorous and the best available technology is applied.

While the foregoing analysis indicates the controversial nature of large-scale irrigation with complete flood control, navigation, irrigation and power (the proposed OMVS project is an example), it is perhaps safe to state that small irrigation would be cost-effective in many West African countries.

Private Agri-Business

Most West African governments are suspicious of private business in agriculture. Private traders are often officially prohibited from purchasing and marketing grains, although typically there exists a parallel market for private traders in addition to trading state grain marketing boards. In Senegal, even the milling of rice at private rice mills is illegal. However, private milling is tolerated in practice. In Guinea, private merchants trying to sell grain to consumers are likely to be arrested. In practice, however, private trading of cereals is strong not only within the country, but also across the frontier clandestinely. Reportedly, Niger's 120,000 tons of surplus production of millet in 1980-81 was consumed in northern Nigeria and Nigeria's simple super-phosphate

production finds its way into southeastern Niger.

Private enterprise is needed, not only in marketing of grain, livestock and meat, but also in agro-industries, e.g., food processing and manufacturing of farm tools, fertilizer, and animal traction components. The Economic Community of West African States (ECOWAS) has already asked REDSO/WA for assistance to determine the role of private firms in agro-industries for processing, canning, packaging, chilling and refrigerating food and livestock products.

Marine fisheries is another industry in which private investment could assist West African countries such as Senegal, Mauritania, Guinea and Ivory Coast, by linking them to U.S. private industries for increasing harvests of marine fish, as well as for processing, storage and marketing of fish. Another potential U.S. private enterprise involvement is seed multiplication. AID missions in West Africa have been using technical assistance from American seed firms, such as in the Niger Agricultural Production Supply Project, in project design and evaluation. However, there are opportunities for seed firms to participate in other seed multiplication projects.

Another important source of U.S. private enterprise in West Africa is private voluntary organizations (PVO). Several PVO's are involved in PL 480 food aid, agricultural training (OICI in Togo, Sierra Leone and The Gambia), and seed multiplication (CRS in Benin).

Absorptive Capacity and Recurrent Costs

The need to increase absorptive capacity requires priority attention to upgrade technical skills, build institutions, and increase economic infrastructure and supporting services. However, major elements of the above program will not generate revenues to pay for their operating expenses. Non-revenue generating activity includes virtually all of the institution building projects, e.g., higher level technical training and agricultural research organizations; also, projects aimed primarily at rural areas, e.g., farm to market roads, rural health clinics, functional education programs and integrated regional development programs. Most of the \$1 billion per year in Sahel projects are activities that cannot be self-financing in the near future. A sample of World Bank projects determines that annual recurrent costs of development projects can range from 7% of initial investment for paved roads to 30% and more for small farmer crop projection projects.

The recent HIID/University of Montreal Study^{1/} on Sahel recurrent cost, prepared by Club/CILSS, observes that for agricultural projects in Sahel, the process of establishing projects and

^{1/} Club/CILSS Working Group on Recurrent Costs, "Sahel Recurrent Cost Study: Executive Summary", p. XXI. Recurrent cost is defined as "the set of annual flows of gross expenditures of the government and its agencies, in local currency or foreign exchange, undertaken in order to generate socio-economic benefits in connection with the operation and maintenance of a unit of installed capacity, regardless of the source of finance of the expenditures in question, domestic or foreign."

developing them to self-sustaining operation is taking much longer than envisaged during project design. Due to unrealistically short planning horizons and funding commitment periods, projects are expected to attain normal operation within five years or less (in the case of Entente Fund sub-projects). However, such a time period is insufficient for projects to progress beyond an experimental or development phase during which they seek viable agronomic, socio-economic, and administrative technologies. Delay in cost recovery, in many cases, is because projects are larger, with greater target population, and with more numerous activities than justified by the existing level of technological capability.

The HIID/Montreal study estimated the fiscal deficit in 1982, of seven Sahelian governments (Chad excluded), of about \$180 million. In most West African countries, the real tax base is expanding slowly while government expenditure is rigid on the downside. A solution to the recurrent cost problem depends primarily on internal policy measures of governments. The necessary policy measures include both sectoral (microeconomic) measures and global (macroeconomic) measures.

Microeconomic measures include examination of recurrent cost implications at the time of project evaluation, considering uncertainties of prolonging the establishment phase, and reconsideration of certain social policies, e.g., free education, primary health care and potable water, which because of a lack of finance, restrict

both the maintenance of existing facilities and access by much of the population to new facilities.

The macroeconomic measures should include reconsideration of the principle of the state as the primary employer as well as preemptor of scarce factors. Suspicion of private sector activity should be eliminated. Small and medium-scale enterprises lack sufficient access to scarce, skilled manpower and capital. Capital is rationed in practice because of an overall low, negative real interest rate in the formal capital market, while parallel market interest rates are exorbitant for productive private investments.

AID, along with other donor agencies, should seek to reduce recurrent cost problems by modifying several common donor practices which include inappropriate technologies, overlooking the tendency of projects to raise local factor prices, lack of attention to project budget analysis, underestimating the length of the establishment phase, inability to meet technical follow-up, and volatility of development strategies and funding.

Agricultural projects should be designed with more efficient and flexible financial mechanisms, e.g., donor financing of a larger share of local investment costs, provision of sector budget support (in particular, for agricultural education, training and extension), and explicit finance of recurrent costs within time limits. Agricultural strategy should support and expand the real tax base through national policy reforms that accelerate growth of

private sector production, improvement of project preparation and implementation procedures, increased efficiency of recurrent expenditures, introduction of cost recovery through user charges, and transfer mechanisms for public development assistance.

Producer and Consumer Subsidies

Developing countries have numerous well-educated economists and agriculturalists in government and universities, who thoroughly understand economic arguments for and against agricultural input subsidies and the net, long run disadvantages of subsidies in markets with highly mobile factors of production. However, political risks are involved and LDC governments are unlikely to permit retail food prices, particularly cereals, to be determined solely by market forces. A food market completely unmanaged by government, given limitations inherent in imperfect food markets to their capacity to increase supply from domestic or outside sources, would quickly result in unacceptable inequity in food distribution when production inevitably declines. With almost universal national policies for moderating wide fluctuations in consumer food prices, and official consumer prices often below free market levels, it follows that producers must be subsidized if production disincentives are to be avoided. Producer subsidies seldom fully offset farmer losses from consumer subsidies and other implicit taxes, which suggests they should be higher rather than lower, if implicit taxes remain unchanged.

Under these circumstances, agricultural input subsidies should not be considered in isolation from consumer subsidies and producer prices. With widespread consumer subsidies and high implicit taxes, producer subsidies are necessary to avoid major disincentives to farmers. Large, abrupt increases of consumer prices can create serious political disturbances. Since consumer subsidies are not likely to be removed quickly, agricultural policy should aim toward lowering agricultural input subsidies along with steps to reduce consumer subsidies, increase producer prices, and raise yields.

At the same time, agricultural strategy should strengthen national food supply, price, and food reserve programs. National strategies may already be aimed toward increasing producer incentives and reducing subsidies. In practice, donors and host governments need to work toward more effective management of food supplies using a complete spectrum of policy tools, including increased reliance on free markets, improved technology, and food assistance.

Cash Crops

The Stanford University/WARDA study, "The Political Economy of Rice in West Africa," points out two major conclusions: (1) the relatively high wage structure in West Africa, largely determined institutionally rather than by a free market, particularly in coastal countries, is not commensurate with low labor productivity. This calls for a wage/productivity realignment by increasing African

labor productivity; (2) for some coastal countries, e.g., Ivory Coast, Liberia and Senegal, it may be cheaper to import rice than to grow it domestically. At present, comparative advantage for these countries is in cash crops, such as cocoa, coffee and groundnuts. Therefore, a case could be made that these countries should concentrate on export crops to earn foreign exchange to pay for imported food, assuming realistic exchange rates.

Cash crop production is likely to: (1) increase farmers' income because, usually, cash crops are of higher value than food crops; (2) increase the value of the marginal product produced by labor and reduce the wage/productivity gap; and (3) increase food production eventually.

Cash crop farmers usually have better access to knowledge and other inputs, including credit, management, and technology. Animal traction is used widely among cash crop farmers. The knowledge and management requirements are higher for cash crops than food crops. The higher management efficiency among cash crop farmers eventually translates into higher food production by farmers that grow both cash and food crops or the typical farmer who grows food. The typical cereal/tuber crop farmer expands his knowledge of animal traction and other appropriate technology through contacts with cash crop farmers.

Livestock

For nutritional self-sufficiency, West Africans must increase

production of not only cereals, roots and tuber crops, but also livestock and fisheries. Sahel's meat consumption declined from 17.2 kg. annually in 1968 to 12.9 kg. in 1977. Sahel's meat export also fell during that period. However, domestic and external demand for Sahel's livestock and meat could increase up to three times the 1977 production level by the year 2000. A study, "Strategie du Developpement de l'Elevage dans les Pays Saheliens" (January 1980), by l'Institut d'Elevage et de Medecine Veterinaire des Pays Tropicaux, points out that for the Sahel to meet domestic consumption needs and continue to export at current levels, there will be a production deficit of 35,000 to 110,000 tons of beef, 15,000 to 35,000 tons of goats/sheep, and 1,100 to 1,200 tons of milk products by the year 2000. Satisfying this demand will require an annual production growth of 5%.

Low off-take rates and slow growing herds are key constraints to expansion of meat supplies in Sahel countries. Range resources are being diminished by the progressive encroachment of agriculture into formerly pastoral areas. Rapid population growth provides the impetus for crop expansion into marginal lands. Deforestation, brought about by brush fires and use of firewood, deteriorates existing range resources. Agricultural settlement often disrupts access to water points by pastoralists. Expansion of rice production in Mali along the Niger River has reduced dry season pasture for cattle.

On the production side, livestock issues include animal health, high rate of cattle mortality, low off-take rate, constraints of available pasture and water, conflicts with crop production, intensive feeding vs. farm fattening, and problems with differing development approaches, e.g., range management, stratification and feedlot programs, and high production costs. On the marketing side, the issues involved include high transportation costs, limited flow of information to consumers, fixed prices for livestock and meat, and restricted entry to trade by licensing.

Increased livestock production and meat supply could be achieved through better range management, rational land use laws, pastoral policy, technical, economic and social services for transhumance, fire prevention policy, agro-pastoral management, use of agro-industrial by-products, animal health, livestock feeds, genetic improvement, stratification, modernizing marketing and distribution network, and training and research.^{1/}

Small ruminant projects are attractive in West Africa because: (1) such meat is a promising export item in Nigeria, Ivory Coast, and in the Middle East; (2) the sector provides good cash opportunities for smallholders; and (3) the sector is amenable to extension and transportation improvement because of location in agricultural areas.

1/ CRED, University of Michigan, Livestock and Meat Marketing in West Africa. Vol. I-V, 1980.

Key policy changes in West African livestock production and marketing are needed. In marketing, governments should facilitate competition rather than restricting trade. Issues to be reviewed include: (1) licensing traders which restricts competition. Government should think of traders as a resource rather than a hurdle; (2) price ceilings which distort production/marketing patterns; (3) administrative report procedures.

Policy changes needed in the transportation sector are: (1) discourage transportation of animals via trucking which is not economically justifiable; (2) establish trekking routes with water points to avoid crop damage; (3) improve railroad transportation and perhaps extend the system where long trekking exists.

Policy changes needed in range management and regional land use planning include: (1) reorientation from land management to herd management with monitoring and study of soil conditions and grass production; and (2) consistency of livestock and agricultural uses of land.

Policy issues in herder attitude and motivation are to: (1) optimize off-take of low-growth (older) animals through: (a) veterinary security; (b) investment alternatives; and (c) legal taxable access to delimited pasture areas; (2) streamline and reduce market controls to encourage higher prices.

Priority investment in the marketing infrastructure is for holding pens or grazing areas around large urban areas.

Priority investments in transportation are for:

- (1) rail shipments of livestock compete with passenger traffic and backhaul shipments. This causes delays on sidetracks and use of closed box cars used primarily for backhaul to prevent pilferage. Investment in improving box cars is needed to prevent shrinkage and loss. Scheduling of trains needs to be improved;
- (2) market diversification can be attained via improved trekking and railroad transportation. Mali sold livestock to Senegal before the drought but not after and the Senegalese market still exists for Mali to supply. For Upper Volta, trekking and transportation to Nigeria is needed to get around Niger's monopolistic position.

Program priorities are to: (1) make health interventions available but charge a nominal fee for medicines and services; (2) construct stock ponds for holding surface water; (3) investigate diseases and high mortality rates of small ruminants; (4) encourage transportation of small ruminants by trucks versus trains.

Fisheries

Fish provides nearly half the protein consumed in Sahel. For coastal states, fish consumption per capita is greater than meat. The share of fish production, processing and marketing in African national income and employment is significant. The size of processing industries for fish in Ivory Coast and Senegal

is a good example. Fish is a considerable source of foreign exchange in several West African countries, providing about 70% of Cape Verde exports, for example. Nigeria and Ivory Coast are fish-deficit countries. At 6% annual growth of demand as projected by FAO, the deficit will be larger.

The overall fish catch of coastal states from Morocco to Congo is no more than a few hundred tons per year. However, parts of this area are considered the world's most abundant fishing grounds. The stock of fish off the continental shelf of Mauritania has been estimated at 4-5 million tons, yet no African state is among the 22 nations handling 82% of the world's fresh fish exports. In 1976, only four sub-Saharan countries, namely, Nigeria, Ghana, Senegal, and Tanzania were among the top 40 fish producing countries.

One of the less well known effects of the Sahel droughts of 1972-74 was the drastic reduction of the traditional fish industry. For example, Niger's traditional fish industry declined 50%. Before the drought, there were an estimated 10,000 peasant fisherman mainly along the 500 km. of the river Niger, but also in the river Komodougou-Yobe and in the part of Lake Chad which officially is part of Niger. Estimates are imprecise, but the number of subsistence fishermen is down to about 6,000 to 7,000. The numbers of fish were reduced greatly as their food and habitat suffered. Niger's waters could probably produce 20,000 tons per year.

Africa's annual demand for fish is expected to double between

1980 and 2000, rising from about 3.4 million tons to about 7.3 million tons. Demand for fish in 1990 for coastal Africa (excluding Morocco and Spanish Sahara) will be about 2,835,000 tons, compared with a total production of roughly 2,752,000 tons. Very little research is concerned with helping meet food protein needs of Africans through increased fish production.

African inland waters are sources of potentially significant increases in catch, including Lake Victoria, Lake Tanganika, the Okarango Swamps, the Sudd on the flood plains of the Upper Chain, Lake Chad, the Senegal River, the Zaire River, and the Niger River. The development of inland fisheries and fish farming (aquaculture) requiring relatively low capital investment deserve priority in several countries.

With establishment of extended zones of jurisdiction, the highly productive fisheries of sub-tropical waters offer good opportunities for increased domestic catches including Northern African coasts of the Mediterranean. In order to capitalize on opportunities for marine fisheries, the West African countries concerned have to expand and modernize national fleets, construct port and processing facilities, improve local distribution systems, and the training of the fishermen.

Food Security of Rural Households

Food security probably is one of the most urgent of basic needs in West Africa. While AID programs address the basic

needs of the rural population, these programs have done little to strengthen the food security of the majority of rural households, because they often are directed toward small target groups, and in many cases, toward the market-oriented segment of the population.

National food reserves and relative stability of food supplies and prices do little to reduce food insecurity of the poor majority in Sahel and West Africa although they can have other highly desirable results in the economy. The reason for the very limited impact of food reserves on national food insecurity is the isolation of rural, subsistence households from the market during periods of food need because their chief source of cash income is the sale of surplus food in excess of consumption requirements. Rural households often cannot take advantage of the fact that food prices have increased only modestly as a result of the national food reserve system, because they have little or no cash income or savings with which to offset the production shortfall. The failure of major donors and international development agencies to recognize this primary element of food insecurity in developing countries is a major weakness in international efforts to improve the supply of basic human needs.

A dilemma must be faced to deal with the food insecurity of the poor majority, i.e., the inability of many governments to finance additional recurrent costs associated with new programs

to reduce food insecurity. The main causes are factors which result in unstable production, the natural vagaries of agriculturalists everywhere--uncertain rainfall, limited control over insects, birds, and animals, and plant and animal diseases. To reduce the vulnerability of small farmers to natural enemies, or to increase the capacity or efficiency of storage by rural households, requires additional tax revenues, even if the capital and technical assistance costs are borne by external financing. Since governments cannot finance the recurrent costs of new projects which are not self-supporting, new development projects must be predominantly projects which earn revenue.

A feasibility study should perhaps be initiated to investigate food security needs of rural households in West Africa and recommend affordable national projects and programs for strengthening the food security of rural families with specific tasks to

- (1) identify techniques for reducing instability of food production;
- (2) examine household food reserve and storage practices, (3)
- review food and nutrition characteristics of rural households,
- (4) investigate ways in which adjustment of food consumption patterns can compensate for instability in the supply of particular food items, (5) assess any correlation between instability of food production and malnutrition; (6) examine group activities, such as village or community reserve systems and cooperative credit facilities with a view to reducing food insecurity of group members;

- (7) review ways in which national grain marketing reserve and emergency food programs affect rural groups and households; and
- (8) suggest donor and national programs and projects to strengthen food security of rural households within costs affordable by the poorest countries of West Africa.

Population and Food

Population density influences the labor-intensity of traditional agricultural systems. Population growth is a determinant of aggregate demand. The rates of growth of the urban population and real income have important effects on the structure of demand. Spatial distribution of population--the result of internal and international migration--also has major effects on the size of the agricultural labor force and on the capacity of rural populations to save and invest in agricultural improvements.

African trends in crude birth rates, i.e., the number of births per thousand population, and crude death rates are the highest for any region, and as a result, Africa has the highest natural rates of increase (2.9% compared with 2.2% for LDC's as a group). Although fertility has declined significantly over the past decade for eastern Asia and Latin America, there is no evidence of a decline in Africa as a whole or West Africa.^{1/}

^{1/} R. Faulkingham, "West African Fertility: Levels, Trends, and Determinants", 1980. Abidjan: REDSO/WA.

In most countries of West Africa, incomes are below the level where improvements in socio-economic factors decrease fertility. For example, where per capita income is less than roughly \$450, increases in income accompany increases in fertility. Fertility falls as income rises above \$450 per capita. The result of rapid population increase is an enormous increase in overall demand for food, an increase that agricultural production has had difficulty supplying.

Studies have shown that the distribution of income among sub-populations sometimes has important implications for the incidence of malnutrition, and that nutritional shortfall may be unaffected by overall increases in income. Little data exists on income distribution and its effect on consumption in West African nations; however, the problem results primarily from insufficient production since equal distribution would reduce everyone to poverty.

In West Africa, however, there is a wide gap between rural and urban real income, even taking into account the higher costs of living in urban areas, and in access to amenities and services. This gap has resulted in part from government policies favoring large-scale industrial enterprises and agricultural price policies favoring urban consumers. Income differentials between rural and urban citizens and between the landlocked countries of the Sahel and the coast have led to extensive

migration from the savanna and Sahel to rural forest zones, and from rural to urban areas.

National planners express concern about these migrations, and speak of a rural exodus. However, it is important to keep African urbanization in perspective. Sub-Saharan Africa is now the least urbanized region of the world with 17% of its population in cities, compared to 59.3% for Latin America. Net annual rates of rural-urban migration are low on the whole, ranging roughly from 0.3% to 1.2% of rural population^{1/} (for Togo and Senegal, respectively), compared with 0.4-2.8% in Latin America.^{2/} Natural increase accounts for 35-72% of total urban population increase, and projections indicate that the share of natural increase in urban growth will increase with time.

However, migration, especially long-distance migration, is primarily young, educated men, and the result is to raise the dependent-worker ratio in the areas from which migrants depart and reduce the size of the agricultural work force. Remittances from migrants are important for the survival of many families, but the evidence on whether they can be a source for investment in agriculture is scanty. One study^{3/} found they were used mostly for consumption expenses, that little was invested, and that

1/ Zachariah and Conde, op.cit.

2/ F. Stier, 1979, "Effects of Demographic Change on Agriculture in an Eastern San Blas Panama Community". Unpublished dissertation, U. of Arizona.

3/ H. Rempel and R. Lobdell, 1978, "The Role of Urban-to-Rural Remittances in Rural Development". Journal of Development Studies, 14 (3):324-341.

investment was seldom in agriculture. The implication for agricultural strategy is that some areas may lack the labor force necessary for labor-intensification of agriculture, especially given the short agricultural season in the Sahel, and that increasing the productivity of labor is as important as increasing yield per unit of land.

Rural, Nonfarm Enterprises and Employment

The role of rural, nonfarm enterprise and employment is a significant factor in an assessment of West African agricultural development both in relation to food and cash crops and to overall rural economic growth. Rural, nonfarm enterprises include artisanry, manufacturing, agricultural product processing, equipment repair, transport, and commerce.

Involvement of rural people in nonfarm enterprises is considerable. Research^{1/} indicates that 20% of rural populations consider it their primary activity and 30% to 50% consider it their secondary economic activity. Participation in rural, nonfarm enterprises is a factor in distribution of income within rural populations, and particularly, to offset limited access to land. In Sierra Leone, for example, 64% of a sample of farm households using less than one acre stated that they were

^{1/} Much of the more important recent work has been in Africa. Specifically, research has been carried out in Sierra Leone, Upper Volta, Nigeria, and Kenya.

primarily engaged in nonfarm enterprise, while only 20% of those utilizing more than 15 acres considered this their primary activity.

Those using less than one acre had a total household income 31% higher than those using 1-5 acres and 6.9% higher than those using 5-10 acres. Rural, nonfarm enterprise and employment increase in importance as a focus of economic activity as rural incomes rise and opportunities for trade increase. Longitudinal African data for Kenya reveals that from 1969 to 1974, rural, non-farm enterprise and employment grew at 8.8% per year.

Rural, non farm economic activity is an effective means of utilizing available rural labor. Rural, nonfarm enterprises are labor intensive, thus, exploit the lower costs and more available of the two factors of production, labor and capital. Evidence from Sierra Leone, for example, indicates that in rice processing and cloth manufacture, labor is substitutable for capital in rural enterprises and also that more output is generated per unit of capital by small-scale, rural based, labor intensive firms than in large-scale, urban based, capital intensive firms producing the same product. Besides being efficient in use of limited capital, labor requirements of rural, nonfarm enterprises are adapted to seasonal variation in labor needs of the agricultural cycle. In western Nigeria, for example, rural households which considered nonfarm enterprise as primary in their activities, reported that 66% of their labor in the slack agricultural season

was in nonfarm work and 16% of their labor in the peak agricultural season was in those activities. Households which considered farming as their primary activity allotted 19% of slack season labor for nonfarm work and 2% of peak season labor.

Rural, nonfarm enterprises, as seen in African data, have strong profit-making capabilities, and these profits are kept in savings used predominantly for reinvestment capital for business expansion. Profit levels in Sierra Leone and in Kenya ranged from 20% to 200% depending on the nature of the enterprise. In Sierra Leone, reinvestment of profits provided 60% of initial capital for starting new enterprises and 90% of expansion capital for increasing enterprise activity.

Rural, nonfarm enterprises are very significant in rural economic life. The key question is the role they play in West African agricultural development. The answer lies in their function in backward and forward linkages to production and marketing. By way of backward linkages, agricultural product processing and transport provide cost-effective means to meet rural, urban, and export demand. In Sierra Leone, complex modelling of the rice milling industry concluded that, if capital, presently provided for large-scale plants in the form of credit with interest rates below the social opportunity cost of the capital, was provided instead at realistic rates, it would be important to maintain a mix of processing technologies including small-scale, rural mills. Forward linkages to agriculture take the form of input manufacture and repair,

especially for animal traction, mechanized agriculture, other appropriate technology equipment, and irrigation equipment. Provision of inputs is especially important when technology is being adapted to local conditions and constraints, a major emphasis in current efforts in appropriate or capital-saving technology. It is important because rural, nonfarm enterprise manufacture of technology is efficient, given locally specific labor-capital availability, and because local entrepreneurs are probably intimately knowledgeable of particular technological needs in rural areas.

Development assistance to rural, nonfarm enterprises should take the form of targeted inputs of capital, provided at realistic rates of interest, but with some form of risk guarantee. The latter point is crucial because rural, nonfarm enterprises often face unfair competition from public or quasi-public large-scale industries being supplied with capital at unrealistic rates of interest. Rural, nonfarm enterprises also often have profits limited by arbitrary prices imposed by government. Finally, technical assistance in managerial and entrepreneurial skills, such as bookkeeping and other business skills, are important for expanding rural, nonfarm enterprise capacity. Evidence from Sierra Leone indicates that rural enterprises which maintained even a rudimentary set of books generated more profits than those which did not. The contribution of rural, nonfarm enterprise and employment to rural economic development, especially to increased agricultural production and improved product processing is clear.

Nutrition

Numerous studies indicate that many West and Central Africans have inadequate diets. The most serious malnutrition is among the urban poor and subsistence farmers. Within these groups, young children, pregnant and lactating women are the most vulnerable. Undernutrition adversely affects mental and physical development, productivity, and the span of working years, all of which influence the quality of an individual's life and economic potential.

The principal nutritional disorder is protein energy malnutrition (PEM). The prevalence of serious PEM (Kwashiorkor and Marasmus) is between 1 and 10% of children under 5 years; the rate of moderate undernutrition ranges from 10 to 40%. The synergistic relationship between malnutrition and parasites and infectious diseases results in a high incidence of mortality and morbidity. Women of childbearing age, who perform between 1/3 to 2/3 of all agricultural labor, are in an almost constant state of nutritional stress from repeated pregnancies, prolonged lactation, disease burdens and hard physical labor. Maternal malnutrition correlates with low birth weight which is, in turn, associated with failure of children to thrive and stunting. Deficiencies of vitamin A and certain of the B vitamins are not unknown in the region. Goitre is endemic in certain areas.

The report of a 1979 FAO meeting, "Agriculture: Toward 2000", explores the projected numbers of undernourished persons in the

years 1990 and 2000 according to normative and trend food production scenarios. It is projected that Africa will continue to be a food deficit area even with an unprecedented production. While the percentage of undernourished in the population may decrease with progress, the actual numbers of persons with energy intakes below the critical minimum limit will increase to 60 million in 2000; if production targets are not realized, the number is expected to be 110 million.

Efforts to improve food production do not automatically reduce malnutrition or improve food consumption by low income groups. The purchasing power, preparation methods, cultural preferences and meal patterns, intra-family distribution, breast feeding and weaning practices, educational level, seasonal fluctuations and family size are all significant variables within the consumption sub-system. It is generally accepted that undernutrition is a poverty and production problem and not exclusively a health problem. A recent World Bank study states, "The empirical evidence shows that calorie intake is closely related to per capita income and that malnutrition characterizes the poorest segments of the population." If food prices continue to increase and/or income distribution deteriorates further, the prevalence of undernutrition within the lowest income groups, and particularly children and their mothers, may increase. There is evidence for this trend in some countries of the region, notably Zaire.

Malnutrition has a seasonal pattern. In most areas, there is a hungry season lasting for a few months before the harvest. Food production may be inadequate to insure year round supply but, in addition, a large proportion of the harvest is lost because of poor handling and storage. Losses of 25 to 30% of production are estimated, and, for the more perishable foods, losses can exceed 50%. Traditional methods for preserving (drying and smoking usually), storing and processing foods are not effective in avoiding waste.

The majority of Africans live in low-income rural households producing major portions of their own food. Some of these households produce food crops for sale as well. There is considerable controversy whether cash crop production leads to better diets through raised incomes or whether a shift from producing their own food to producing for sale, results in declining quality of the diet. Evidence supports both propositions, depending on the particular foods in question and location within a country. The effects of income and price variables on food consumption and ultimately on nutrition status of target households are generally not well analyzed by national governments nor AID.

Consumption Patterns. The bulk of the calories consumed is from cereals and starchy staples. Cereals provide a large proportion of the protein intake as well (about 80%). Daily per capita

calorie supply from all food sources as a percent of requirement ranges from 75% in Mali and Chad (1974 figures) to 115% in Ivory Coast (1974). Put another way, 61% of the total sub-Saharan African population consume below their calorie requirements (IBRD, 1978). In areas where starchy roots and tubers compose a large proportion of the daily energy intake, protein consumption may be very low if the more nutritious leaves of these plants and animal or vegetable protein sources are not included regularly in the diet.

Because West and Central Africa encompass many vegetal zones, namely, the semi-arid zone, the sub-Saharan zone, the Sahelian zone, the Guinea savanna, the coastal strip of savanna, and the rainforest belt, a variety of food crops are grown. Millet and sorghum dominate the agricultural patterns in both sub-Saharan and Sahelian zones. In the transitional zone between savanna and the first areas, millet, sorghum, maize, legumes, yam, cassava and sweet potatoes are the dominant staples on the farm. In the coastal savanna strip and forest areas, the main crops are cereals (maize, rice), legumes (beans, groundnuts) and starchy tubers and fruits (yam, sweet and bitter cassava, cocoyam, sweet potatoes and plantain). For example, in The Gambia and Senegal, the major crops grown include millet, beans, groundnuts, maize and rice. In the northern parts of Benin, Ghana, Ivory Coast, Nigeria and Togo, the dominant staples on the farms are cereals (mainly millet, sorghum, maize and rice), and groundnuts, sweet potatoes and sweet cassava.

In the coastal plain of Ivory Coast, Ghana, southern Togo, Benin and Nigeria, starchy staples (yam, sweet and bitter cassava, cocoyam, sweet potatoes, plantain), beans, and maize dominate the traditional agricultural patterns. In Guinea, Liberia and Sierra Leone, the dominant staples are rice, maize, sorghum, yam, cocoyam, cassava and sweet potatoes. In many parts of Central Africa, tubers (especially cassava, yam, sweet potato, cocoyam and plantain) are important staples. Plantains are particularly dominant around Lake Victoria.

Wheat, rice and maize are the major import commodities. The staples are prepared in a variety of ways and are generally accompanied by a sauce made from a vegetable or two, oil if available, and a bit of meat, fish or legumes. For the weaning age child, a thin gruel of a cereal or tuber is normally given as the principal supplement to breast milk.

The principal sources of animal protein are fish, beef, goat, lamb, pork and game (bush meat), while small amounts of eggs, poultry and, in some areas, milk are available. Production and consumption of animal foods is very low with supplies ranging from 5 to 25 gms. protein per capita per day; the average is 11 gms. daily or 29% of the requirement of a pregnant woman.

The consumption pattern of foods with a high vegetable protein content varies, although an estimated 65% of families consume some amount of beans, nuts, or seeds during the year, especially

groundnuts, cowpeas, bambara nuts, locust beans (nere), sesame seeds and other types of dried peas and beans.

Vegetables are available in considerable variety, especially peppers, eggplant, okra, tomatoes, carrots, onions, and numerous leafy vegetables, such as cassava and sweet potato leaves. The quantities grown, gathered and consumed vary widely within the region--from Sierra Leone, Liberia and parts of Zaire, where nutritious greens are regularly consumed in considerable quantities, to parts of the Sahel where one dried tomato, onion and pepper are added to the family sauce. In general, vegetable crops do not receive much attention on subsistence farms but are grown in a small kitchen garden. Nutrient rice fruits are abundant in many areas of West and Central Africa dependent on seasonal availability. However, fruits are not widely reported as eaten in rural areas while urban families seem to consume fresh fruit more often (40% urban compared with 21% rural in one national study). The most widely consumed fruits are bananas, mangoes and oranges, followed by papayas, limes and pineapple.

Oils and fats from a variety of sources are widely consumed. The most important types are palm oil, groundnut, sesame seed and cotton seed oil, and shea butter, as well as imported vegetable oils and butter and margarine.

To understand the complex causes of malnutrition in West Africa, and to plan for its control, one must consider the

interrelating factors: (1) production of foods; (2) distribution, conservation, and marketing of food; (3) consumption of food; and (4) biological utilization of food. A strategy for improving the food/nutrition situation in the region should include activities for addressing constraints in all four component areas but especially production, distribution and consumption factors. To plan for better nutrition through agricultural interventions, it is important for interventions to complement the existing food patterns such as including pulse or fish production in cassava or plantain producing areas.

Energy

Energy supply and costs are important in agricultural development. New difficulties have arisen from increases in prices of petroleum and derived products, and the scarcity of fuelwood supplies resulting from rapid deforestation. Serious constraints on agricultural improvement and expansion are associated with these phenomena.

Petroleum scarcity and price increases affect agricultural production by decreasing the availability of foreign exchange to meet other import costs at a time of decrease or, at best, fluctuation in demand for and prices of export crops. Rising balance of payments deficits limit the ability of national governments to import agricultural inputs. Effects at the farm and

community level are scarcity and rapid price increases for fuel, fertilizer, and transport of products to markets. Almost worse than price rises, is that supply and prices are unpredictable leading to heightened risks to farmers.

Increasing scarcity of fuelwood, 90% to 95% of the energy supply for rural consumption, is associated with deforestation and the degradation of land. Further, it is a factor in the decline of the quality of rural life which influences migration to urban areas. Urban populations are also heavily dependent on fuelwood and its derived product, charcoal, as their primary fuel source. As forests are cleared and not replanted, fuelwood must come from farther and farther away from urban areas, contributing to higher costs of living.

Fuelwood scarcity increases distances for fuelwood collection and increases demand for the already seasonally inadequate labor supply. Deforestation accelerates degradation of the agricultural land. Shifting cultivation has shortened fallow periods to the point that time for regeneration of forest growth is no longer adequate, because of population growth and macro-climatic variations. Large-scale clearing of forests has been a significant but less widespread factor in deforestation. Fuelwood demand is associated with rapid population growth, both in rural and urban areas.

To help meet energy supply needs of agricultural development, a number of efforts are being made. At the national level, energy planning and management training for conventional and renewable sources is being undertaken. The training is building the capacity of African governments to manage their exploitation of energy resources to minimize waste and maximize efficiency. Hydro-power research and construction is being carried out. At the community level, initiatives in mini-hydro or decentralized hydro-power are being developed to provide rural electrification which, among many purposes, could aid in agricultural processing. Development of techniques for exploiting renewable sources of energy includes solar, windmill, pyrolytic converters, and biogas technologies. Uses of these technologies are found in processing agricultural products, such as in crop drying and storage, and alleviating water constraints, such as in solar-powered irrigation pumps.

Development of alternative energy sources provides potential substitutes for fuelwood. However, prospects for replacing fuelwood for rural energy, at least in the short-to-mid-term, are limited. Incremental improvements can be made in the efficiency of existing techniques and equipment used in fuelwood consumption. The principal response to decreasing fuelwood supply and subsequent deforestation has been establishment of woodlots and the use of techniques for agro-forestry and silvo-pastoralism. Deforestation

has also been attacked by conservation to exploit forest products while maintaining forests as sources for energy, food and cash commodities, animal support and other purposes such as medical substances and hunting. Forest destruction is not a necessary result of shifting cultivation.

Appropriate Technology

Appropriate technology is crucial in improving labor productivity and crop and animal production, utilizing alternative sources of energy, increasing access to water for irrigation and animal-raising, expanding productive capacities for rural nonfarm enterprises, and providing for systematic consideration of local level realities in agricultural research and extension.

Appropriate techniques for improving labor productivity and crop and animal production in West Africa include: equipment for land preparation, seeding, weeding, harvesting, post-harvest recovery, food processing, and seed and crop storage; inter-cropping practices to increase output, lower crop failure risk, and control of weeds and insects; and mixed regimes of crop and animal production to provide pasture and fertilizer, and thus increase crop and animal production. At international, regional, and national institutions, appropriate technology packages are being designed, tested, and improved while other institutions extend and evaluate them.

VITA, Inc., for example, is working to develop and extend technology for renewable energy. In this way, appropriate technology is linked to the lessening of consumption of firewood, an important cause of deforestation which degrades the agricultural resource base. Pilot efforts are being made to find appropriate techniques and practices in the establishment of woodlots which are supported and maintained by rural people. The support is provided because the techniques are adapted to those people's actual needs through their participation in design and implementation. The Village Forestry Project in Guinea-Bissau is an example of this kind of technology.

Appropriate energy equipment is also involved in irrigation. Tube well manufacture and installation in Mauritania is an example. Appropriate technology in irrigation includes water control by small dams, dikes, and canals. They are distinguishable from capital intensive irrigation because they are small-scale, labor intensive in construction and maintenance, and adapted to local conditions.

Appropriate technology is needed to expand productive capacity of rural nonfarm enterprises. Fabrication of agricultural production equipment and repair is a prime example of linkages between enterprises and agricultural development. Rural nonfarm technology also takes advantage of renewable energy to lower costs and dependency on conventional sources. Even before the popularity

of appropriate technology among donors, rural nonfarm enterprises, for the most part, utilized technology appropriate to conditions of capital scarcity, local constraints, and opportunities. Thus, much current technology is well-suited to rural needs.

Some agricultural research and extension is oriented toward appropriate technology for small farm households. In research, this approach is often called Farm Systems Research or Farm Management Research which incorporate appropriate technology concepts, such as awareness of local needs, constraints, and possibilities (labor intensive technologies which avoid overtaxing labor supply in peak seasons); participation of rural people in technology development by using their knowledge of the environment (plant and soil varieties, inter-cropping techniques); and sharing the work of technology design and testing (placing test plots on farms to involve the farmer in experimentation, approximating real conditions on station grounds). Appropriate technology in extension involves training extension personnel to be aware of and sensitive to variation in farm conditions and to elicit participation of rural people in arriving at solutions for production and management problems.

Declining Terms of Trade

The performance of external trade among least developed, oil importing countries since the oil embargo can be described as catastrophic for economic development. Average prices of imports in The Gambia, for example, increased 80% through 1979/80 while

export prices, mainly groundnuts, declined 10%. Therefore, a unit of exports purchased only half as much imports as in 1974/75. The value of imported mineral fuels and lubricants increased 232%, far more than the average increase in import prices, but remained about 9% of total imports. During the same period, food imports increased 274%. While the value of total exports remained more or less constant, the value of total imports more than doubled.

Although some imports can be financed by foreign assistance, the wide divergence of import and export prices results in rapid accumulation of external public debt and rising debt service burden. The full debt service impact of diverging prices can be delayed somewhat by long term, concessional credits with long grace periods, but the eventual result, enhanced by continuing inflation in industrial countries and curtailment of IDA credits, may be reductions in agricultural development programs during the next decade or virtually complete dependence on external assistance to finance public development activities. Moreover, when debt service ceilings are reached, imports of agricultural inputs probably must be curtailed.

A central, long-term problem is the possibility of eventual contraction of the agricultural development program because external debt and debt service burdens have reached unsupportable levels. The stagnation of commodity export prices, probable continued inflation in industrial countries, expiration of grace

periods on accumulated concessional credit, and increasing resort to hard loans, are likely to be a real constraint on public development expenditures in the agriculture sector. Firm actions by governments and donors are warranted to: (1) increase the productivity of the private sector, both cash crop and food grain farmers; (2) expand other sources of foreign exchange earnings; and (3) develop domestic substitutes for imported food grains, largely through irrigated farming. Governments could become almost wholly dependent on external grants to finance import requirements of development in the foreseeable future.

Foreign Exchange Constraints

A new element in the performance of the agricultural sector of African countries is the rapidly increasing foreign exchange costs of energy imports which are increasing the per unit foreign exchange costs of growing food deficits, as well as imports of agricultural equipment and other inputs. The shortages of foreign exchange jeopardize the food security of the population and restrain increases in productivity by limiting imports of agricultural inputs.

Three types of deterioration have occurred of the external position of the economies in West Africa--current account deficits, external public debt, and net foreign assets of the monetary systems. According to IBRD, the external gap relative to GNP was about 4.5% in 1970 (only 2.5% excluding Nigeria, which was a deficit

country), whereas it approached 10% at the end of the decade. To help finance such large deficits, external borrowing over the decade increased by 6.5 times, over 20% a year, with a marked acceleration in recent years. External borrowing increased about 50% faster than GDP or exports. Debt service increased even faster, by more than 25% a year, because of hardening of borrowing terms. Among petroleum-importing countries, both total public debt outstanding and debt service have increased more rapidly than exports. While in the 1960's and early 1970's, virtually no Western African country experienced debt problems, debt has now become a matter of concern in practically all countries, with the exception of Nigeria, and requires careful management. The reserve position of most West African countries has seriously deteriorated, with the exception of Nigeria. Before the first period of oil price increases, the oil-importing countries, both low-income and middle-income countries, held \$430 million in net foreign assets. By the end of 1979, short-term liabilities exceeded assets, resulting in negative net reserves of \$600 million.

Finally, inflation, and various distortions in the price system, mainly over-valued exchange rates, emerged as a new phenomenon. In contrast to the pre-1974 period when price increases were moderate, double-digit inflation prevailed in the late 1970's. High non-oil import prices, growing budget deficits, excessive levels of investments, overly easy monetary policies, and sluggish growth of food production were the main factors.

Regional Institutions

Implementation of agricultural strategy should include renewed and innovative collaboration with existing regional institutions. In practice, no scientific determination of level of donor resources nor optimal split between bilateral and multi-lateral assistance is possible, but long run institutional development requires considerable emphasis on institutions that:

- (1) support development and diffusion of improved production technology;
- (2) possess a large degree of African support, and
- (3) are cost-effective intermediaries for channeling U.S. resources to the agricultural sector.

Regional organizations active in West Africa cannot be considered a single group. AID's past involvement and assistance has concentrated on the following organizations.

TYPES OF REGIONAL ORGANIZATIONS

Regional Coordinating Organizations

1. Economic Community of West African States (ECOWAS)
2. The Entente Fund
3. Permanent Interstate Committee to Control Drought in the Sahel (CILSS)

Regional Financial Institutions

1. African Development Bank (AFDB)
2. Bank for West African Development (BOAD)
3. ECOWAS
4. Entente Fund

River and Lake Basin Development Organizations

- i. Organization for the Development of the Senegal River (OMVS)
2. Organization for the Development of the Gambia Basin (OMVG)
3. Niger River Commission
4. Mono River Union

Technical Development Organizations

1. West African Rice Development Association (WARDA)
2. Common Organization for the Fight Against the Locust and Granivorous Birds (OCLAVAV)

Training

1. African Institute for Social and Economic Development (INADES)

REDSO/WA has been most involved with the Entente Fund, ECOWAS, and CILSS, which have political as well as development purposes.

REDSO/WA has just completed an evaluation of the rural development activities of the Entente Fund and embarked on a design for the new program during 1982-86. The initial proposal is to concentrate on institution building. Also proposed are innovative production technologies for small farmers with mixed farming systems and village grain storage capability, and an information, liaison and documentation system to facilitate efficient documentation of information among the five countries (Ivory Coast, Upper Volta, Niger, Benin, Togo). To reduce administrative and accounting deficiencies, micro-computers and a standardized system of accounts for sub-projects is proposed.

Continued support to the rural development as well as the African enterprise activities makes economic sense in that it implies optimal allocation of financial resources through centralized administration, as well as the implementation of projects which are replicable in other member states.

ECOWAS is a larger group, including both anglophone and francophone states.^{1/} A recent decision of the Council of Ministers in January 1981 adopted a common agricultural policy including: (1) activities to eradicate hunger (development of food crops, livestock, fishing); (2) popularization of seed varieties and more productive animal species; (3) establishment of Community enterprises for the production and processing of agricultural products; (4) financing research programs to improve the genetic potential as well as agricultural projects in general. AID has agreed to assist in the agro-industry and processing component.

The primary responsibility of CILSS is to coordinate activities and mobilize resources to combat droughts in the Sahel.^{2/} Whether CILSS has a role in coordinating member countries' policies and programs which are less directly related to drought but a part of

^{1/} ECOWAS was established May 28, 1975, with the signing of the Treaty of ECOWAS by 15 West African states. The Cape Verde Islands joined later, bringing membership to 16 nations. Nine are francophone--Benin, Guinea, Ivory Coast, Mali, Mauritania, Niger, Senegal, Togo and Upper Volta; five are anglophone--Gambia, Ghana, Liberia, Nigeria and Sierra Leone; two lusophone--Cape Verde and Guinea-Bissau.

^{2/} CILSS includes: Gambia, Niger, Upper Volta, Mali, Mauritania, Senegal, Cape Verde, Chad.

overall development, such as transportation, trade, and industry, are questions to be resolved.

The primary regional financial institution is the African Development Bank (AFDB). The AFDB, established in 1963, includes membership of all 50 independent African countries with a capital of \$1.6 billion. The growth and volume of AFDB's lending targets during the next five years entails a major policy shift toward the agriculture sector. First preference for project funding is to meet food requirements including production, storage, and marketing and to integrated rural development. AID has been and expects to be involved in strengthening the in-house capacity of AFDB to design and evaluate proposed agricultural projects as well as major agricultural strategy.

V. CONCLUSION

The disappointing performance of agricultural production since independence nearly 20 years ago, accompanied by high rates of population growth, have resulted in rapid growth of the absolute numbers of hungry and malnourished people in West Africa. While particular projects and programs may be successful, the region as a whole has failed to halt or reverse declining food output per capita. This phenomenon is humbling for external donors who have devoted billions of dollars to development programs, largely in agriculture, with no measurable impact on the aggregate performance of the sector and highlights that, in spite of substantial external assistance, investment from domestic sources is the primary source of investment in the agriculture sector and needs to be given higher priority.

During the period in which most new African countries have been independent, corresponding roughly with the period of the Foreign Assistance Act (1962-date), the U.S. provided \$6.1 billion (1962-78) of economic assistance to Africa, \$2.3 billion (38%) in the form of PL 480 commodities. Non-PL 480 economic assistance was \$3.4 billion, 56% of U.S. aid to Africa. In recent years, approximately half of total economic assistance was for agriculture, rural development and nutrition activities. Economic assistance per capita to African countries has been consistently among the

highest in the world. In spite of a high level of economic assistance, however, performance of the agriculture sector has been unsatisfactory.

National policies should shift to the highest priority portion of the food gap which is the quantity being commercially imported. The emergence of international trade in food crops, amounting to 653,000 tons of commercial imports to West Africa (Gambia, Ghana, Guinea, Guinea Bissau, Mali, Senegal, Mauritania, and Cape Verde) in 1979/80, in addition to 408,000 MT of food aid, highlights the opportunity to focus agricultural development programs on national food crop markets. In the past, food crops for sale in local markets have often been distinguished from cash crops for export. However, food crops, as well as livestock and meat, are now entering national markets as commercial imports. Since productivity and yields are low in West Africa, domestic prices often exceed import prices including transport costs. A substantial demand exists for imported cereals and red meat, which can be met by domestic producers. In practical terms this means: (1) concentrating agricultural development programs on production of rice, sorghum, millet, corn and other food grains and meat; (2) increasing productivity of food grains and livestock to increase the competitiveness of domestic producers and narrow or eliminate the price differential between domestic and imported grains. Investment, therefore, is needed to increase the efficiency of food production which requires analysis of the

feasibility of various types of public and private investment in the food grain subsector.

For several years, various agricultural agencies, including IFPRI, FAO, USDA, and IBRD have called attention to declining food independence in sub-Saharan Africa. However, none of these organizations have undertaken field analysis to provide insights explaining this phenomenon. The Eliot Berg study for IBRD, for example, did not conduct special studies of the major issues but, instead, drew policy conclusions from widely acknowledged trends.

The prolonged drought in the Sahel is part of the explanation. Inappropriate national agricultural policies have been important in Nigeria, Zaire, Ghana, and Guinea. The role of agricultural productivity, which has declined in some countries, in the overall decline is not certain. The impact of higher import costs on use of agricultural inputs is not clear. Similarly, the effect of rapidly increasing urban population on both demand and supply has not been quantified. Reassessment is needed of the widely-held assumption that rural agricultural technology can be replicated as rural population expands, without significant declines in productivity. Better understanding is needed of the rapid increases of commercial and food aid imports of cereals in West and Central Africa during recent years.

A study is needed to identify more fully the causes of stagnation or decline in national food production and food production

per capita in countries of West and Central Africa during the last decade and to recommend agricultural development policies, programs, and projects for arresting and reversing the trend of decreasing food self-sufficiency.

Redirection of development policy toward: (1) macro-economic issues and policies essential for agricultural growth; (2) higher priority of production which, in some cases, may result in less resources devoted to areas with low production potential; (3) increasing target populations, with less emphasis on target groups in the poorest geographic areas; (4) reducing population growth to assist in reversing the decline in food production per capita; (5) increasing participant training relative to use of technical consultants, since one year of consultant services is equivalent to approximately 10 person years of university training in the U.S.; and (6) more support of agricultural credit which can directly influence production and generate revenues to pay recurrent costs.

Agricultural development strategy should: (1) identify more clearly the causes of decline in food production; (2) reassess national and donor programs to identify weaknesses and increase the impact on food production; (3) increase national budgets for agricultural development; (4) emphasize increasing the capacity of the agricultural sector to supply food commodities, mainly cereals, which are imported; (5) give more emphasis to national

applied agricultural research, which has received less attention than regional research projects; and investigate national policies and programs to improve the food security of rural households.

APPENDICES

1. WEST AFRICA: POPULATION, GNP AT MARKET PRICES
AND GNP PER CAPITA, 1978 AND 1979

	1978			1979		
	Mid-Year Pop (000)	GNP		Mid-Year Pop(000)	GNP	
		\$ Mil.	\$ Per Cap.		\$ Mil.	\$ Per Cap.
Sahel:						
Cape Verde	300	80	260	306	80	270
Chad	4,314	650	150	4,416	480	110
Gambia	571	100	180	586	150	260
Mali	6,290	810	130	6,469	930	140
Mauritania	1,544	420	270	1,589	510	320
Niger	5,001	1,180	240	5,155	1,410	270
Sénégal	5,380	1,930	360	5,525	2,370	430
Upper Volta	5,553	880	160	5,642	1,000	180
Sub-total	28,953	6,050	209	29,688	6,930	233
Non-Sahel, Coastal:						
Benin	3,323	740	220	3,427	860	250
Cameroon	8,058	3,950	490	8,248	4,610	560
C.A.R. 2/	1,909	510	270	1,954	560	290
Congo, Peoples Rep.of	1,459	850	580	1,498	950	630
Eq. Guinea	346	N/A	N/A	354	N/A	N/A
Gabon	634	2,130	3,370	645	2,110	3,280
Ghana	10,969	4,160	380	11,327	4,540	400
Guinea	5,133	1,350	260	5,269	1,470	270
Guinea-Bissau 2/	763	120	160	779	140	170
Liberia	1,742	790	460	1,802	890	490
Sao Tome/Principe 2/	107	43	410	110	52	450
Sierra Leone	3,292	740	230	3,383	842	250
Togo	2,418	770	320	2,494	860	340
Zaire	26,770	6,480	240	27,535	7,020	260
Sub-total	66,923	22,633	338	68,825	24,902	362
Ivory Coast	7,836	7,460	950	8,076	8,560	1,060
Nigeria	80,583	48,100	600	82,503	53,310	670
Total West Africa	184,295	84,243	457	189,092	93,712	496
Africa	450,000			--		

1/ Estimates of GNP for 1979 are tentative.

2/ Estimates of GNP per capita are tentative.

N/A - Not Available

Source: IBRD, World Bank Atlas, 1980

2. WEST AFRICA: INDICES OF FOOD PRODUCTION, TOTAL AND PER
CAPITA, BY COUNTRY, 1976-80

(1969-71 = 100)

Country	Total					Per capita				
	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980
Benin	111	115	130	128	132	94	95	103	99	100
Cameroon	106	109	112	116	117	93	94	94	95	94
Ghana	91	89	89	93	93	77	73	71	73	70
Guinea	108	104	107	109	104	90	85	85	84	78
Ivory Coast	147	148	158	170	179	118	115	119	124	127
Liberia	133	139	137	143	141	110	112	107	108	103
Mali	122	113	125	103	104	104	94	101	82	80
Niger	112	116	121	125	136	95	96	97	98	103
Nigeria	110	110	112	113	115	91	88	87	85	84
Senegal	123	90	120	83	82	103	74	96	64	62
Sierre Leone	114	120	115	118	121	98	101	94	94	94
Togo	88	84	98	105	103	75	70	79	82	79
Upper Volta	110	104	109	104	104	96	89	91	85	83
Zaire	<u>115</u>	<u>117</u>	<u>109</u>	<u>114</u>	<u>115</u>	<u>97</u>	<u>96</u>	<u>87</u>	<u>87</u>	<u>85</u>
Total Africa	111	110	113	113	115	94	90	90	88	87

Source: USDA, Economics and Statistics Service, Agricultural Situation: Africa and the Middle East, August 1981.

3. WEST AFRICA: INDICES OF AGRICULTURAL PRODUCTION, TOTAL AND PER CAPITA, BY COUNTRY, 1976-80

(1969-71 = 100)

Country	Total					Per capita				
	1976	1977	1978	1979	1980	1976	1977	1978	1979	1980
Benin	109	112	126	124	129	92	92	100	97	98
Cameroon	107	110	114	119	119	94	95	96	98	96
Ghana	91	89	89	93	93	77	73	71	73	70
Guinea	106	103	106	107	102	88	84	83	82	77
Ivory Coast	133	124	146	151	159	111	97	110	110	113
Liberia	128	129	127	131	131	106	104	99	98	96
Mali	132	122	135	115	116	113	102	110	91	89
Niger	111	115	120	124	135	94	95	96	97	103
Nigeria	110	109	112	113	115	91	88	87	85	83
Senegal	124	91	121	84	83	105	75	97	65	63
Sierre Leone	115	119	117	119	121	99	100	96	95	94
Togo	83	82	97	104	103	75	68	78	82	79
Upper Volta	111	106	109	104	104	97	90	91	85	83
Zaire	<u>114</u>	<u>116</u>	<u>103</u>	<u>112</u>	<u>114</u>	<u>96</u>	<u>95</u>	<u>86</u>	<u>86</u>	<u>84</u>
Total Africa	109	108	111	112	114	92	88	89	87	86

Source: USDA, Economics and Statistics Service, Agricultural Situation: Africa and the Middle East, August 1981.

4. WEST AFRICA: PRODUCTION OF SELECTED AGRICULTURAL COMMODITIES, BY COUNTRY, AVERAGE 1969-71, 1973-75, ANNUAL 1976-80

(1,000 METRIC TONS)

COUNTRY AND YEAR 1/	WHEAT	CORN	SORGHUM AND MILLET	RIE: PADDY	CASSAVA	OTHER ROOT CROPS	CITRUS	BANANAS AND PLANTAINS	SUGAR, RAW	PEANUTS IN SHELL	COTTON-SEED	TOBACCO	COFFEE	COCOA BEANS	COTTON
BEHIN															
AVERAGE:															
1969-71.....	--	201	57	4	555	575	--	--	--	50	24	1	1	--	12
1973-75.....	--	228	85	9	555	506	--	--	--	40	21	1	1	--	11
1976.....	--	182	76	18	624	629	--	--	--	61	14	1	1	--	8
1977.....	--	242	81	15	625	594	--	--	--	67	11	1	1	--	6
1978.....	--	343	65	9	721	645	--	--	--	64	12	1	1	--	7
1979.....	--	300	61	9	741	602	--	--	--	70	16	1	1	--	8
1980.....	--	310	65	10	750	702	--	--	--	70	16	1	1	--	8
CAMEROON															
AVERAGE:															
1969-71.....	--	312	340	15	690	995	--	1,083	7	196	34	5	72	115	17
1973-75.....	--	342	352	16	970	1,075	--	1,114	18	89	30	6	91	108	15
1976.....	--	465	390	19	1,010	1,115	--	1,100	32	90	38	6	70	84	18
1977.....	--	477	345	23	1,050	1,155	--	1,069	36	90	41	6	82	108	15
1978.....	--	470	390	24	1,050	1,155	--	1,060	45	90	59	6	89	107	22
1979.....	--	480	390	30	1,050	1,175	--	1,060	48	90	70	6	86	122	25
1980.....	--	490	400	30	1,100	1,190	--	1,065	51	90	24	6	90	120	28
GHANA															
AVERAGE:															
1969-71.....	--	377	216	71	1,600	2,360	107	2,599	--	59	--	1	5	423	--
1973-75.....	--	422	200	73	1,677	2,196	145	2,066	--	90	2	3	3	375	1
1976.....	--	286	333	70	1,819	1,952	145	1,840	--	91	3	2	4	324	1
1977.....	--	309	273	51	1,800	1,935	140	1,840	--	145	2	1	2	271	1
1978.....	--	340	257	50	1,850	1,951	150	1,970	--	105	2	1	1	265	1
1979.....	--	380	166	44	1,900	2,110	155	1,965	--	150	2	1	2	296	1
1980.....	--	400	210	50	1,900	2,126	155	1,970	--	150	1	1	2	270	1

WEST AFRICA: PRODUCTION OF SELECTED AGRICULTURAL COMMODITIES, BY COUNTRY, AVERAGE 1969-71, 1973-75, ANNUAL 1976-80--COM.

(1,000 METRIC TONS)

COUNTRY AND YEAR 1/	WHEAT	CORN	SORGHUM AND MILLET	RICE, PADDY	CASSAVA	OTHER ROOT CROPS 2/	CITRUS	BANANAS AND PLANTAINS	SUGAR, RAW	PEANUTS, IN SHELL	COTTON, SEED	TOBACCO	COFFEE	COCOA BEANS	COTTON
GUINEA															
AVERAGE:															
1969-71.....	--	165	72	364	482	92	--	84	--	25	--	--	0	--	--
1973-75.....	--	178	78	335	528	101	--	95	--	27	--	--	6	--	--
1976.....	--	188	80	400	540	120	--	99	--	30	--	--	5	--	--
1977.....	--	170	75	362	540	120	--	101	--	31	--	--	6	--	--
1978.....	--	190	80	366	550	125	--	103	--	32	--	--	5	--	--
1979.....	--	190	75	390	545	120	--	102	--	30	--	--	5	--	--
1980.....	--	180	70	351	545	120	--	102	--	30	--	--	5	--	--
IVORY COAST															
AVERAGE:															
1969-71.....	--	257	45	335	546	1,746	--	832	--	30	24	3	261	193	14
1973-75.....	--	245	56	405	799	2,085	--	1,056	9	46	44	3	261	227	24
1976.....	--	247	72	426	1,200	2,258	--	1,265	32	49	50	2	292	232	25
1977.....	--	258	73	477	977	2,130	--	1,221	31	49	45	2	146	303	30
1978.....	--	264	77	504	1,056	2,291	--	1,320	32	50	62	2	277	318	41
1979.....	--	275	79	534	1,112	2,315	--	1,346	52	52	68	2	245	370	46
1980.....	--	284	79	550	1,150	2,412	--	1,300	103	59	82	2	250	385	54
LIBERIA															
AVERAGE:															
1969-71.....	--	11	--	140	235	26	--	84	--	2	--	--	4	2	--
1973-75.....	--	11	--	221	250	29	--	93	--	2	--	--	4	3	--
1976.....	--	11	--	245	180	33	--	96	--	3	--	--	9	3	--
1977.....	--	12	--	256	140	35	--	98	--	3	--	--	8	3	--
1978.....	--	9	--	254	147	36	--	100	--	3	--	--	7	4	--
1979.....	--	9	--	240	173	37	--	102	--	3	--	--	8	4	--
1980.....	--	9	--	260	188	37	--	102	--	3	--	--	10	4	--

WEST AFRICA: PRODUCTION OF SELECTED AGRICULTURAL COMMODITIES, BY COUNTRY, AVERAGE 1969-71, 1973-75, ANNUAL 1976-80--CON.

(1,000 METRIC TONS)

COUNTRY AND YEAR 1/	WHEAT	CORN	SORGHUM AND MILLET	RICE PADDY	CASSAVA	OTHER ROOT CROPS	CITRUS	PANANAS AND PLANTAINS	SUGAR RAW	PEANUTS IN SHELL	COTTON-SEED	TO-BACCO	COFFEE	COCOA BEANS	COTTON
MALI															
AVERAGE:															
1969-71.....	--	69	678	173	155	68	--	--	--	147	37	--	--	--	19
1973-75.....	--	72	719	201	137	65	--	--	--	159	50	--	--	--	25
1976.....	--	81	832	227	40	36	--	--	--	230	79	--	--	--	46
1977.....	--	78	751	199	40	36	--	--	--	229	76	--	--	--	42
1978.....	--	80	1,035	209	40	37	--	--	--	146	85	--	--	--	48
1979.....	--	60	744	177	40	37	--	--	--	179	80	--	--	--	48
1980.....	--	60	740	177	40	38	--	--	--	185	80	--	--	--	48
NIGER															
AVERAGE:															
1969-71.....	--	2	1,237	34	143	--	--	--	--	257	7	--	--	--	3
1973-75.....	--	4	897	35	178	--	--	--	--	82	5	--	--	--	2
1976.....	--	12	1,305	29	197	--	--	--	--	79	5	--	--	--	2
1977.....	--	6	1,472	27	180	--	--	--	--	83	4	--	--	--	2
1978.....	--	9	1,487	33	205	--	--	--	--	74	4	--	--	--	2
1979.....	--	8	1,592	25	210	--	--	--	--	50	2	--	--	--	1
1980.....	--	8	1,750	28	215	--	--	--	--	60	3	--	--	--	2
NIGERIA															
AVERAGE:															
1969-71.....	--	1,259	6,857	425	11,871	16,653	--	1,280	37	995	114	13	4	271	55
1973-75.....	--	1,346	5,958	546	13,370	18,802	--	1,390	50	401	92	14	3	216	47
1976.....	--	1,440	6,545	611	13,900	19,600	--	1,450	40	350	130	10	3	167	81
1977.....	--	1,500	6,700	620	14,000	19,700	--	1,400	36	643	70	8	3	205	36
1978.....	--	1,640	6,860	826	14,150	19,810	--	1,425	34	469	80	8	3	140	37
1979.....	--	1,670	6,915	870	14,600	19,810	--	1,425	29	400	52	12	3	170	29
1980.....	--	1,720	7,000	1,030	14,870	19,810	--	1,425	32	400	69	12	3	170	40

WEST AFRICA PRODUCTION OF SELECTED AGRICULTURAL COMMUNITIES, BY COUNTRY, AVERAGE 1969-71, 1973-75, ANNUAL 1976-80--CON.

(1,000 METRIC TONS)

COUNTRY AND YEAR 1/	WHEAT	CORN	SORGHUM AND MILLET	RICE PADDY	CASSAVA	OTHER ROOT CROPS 2/	CITRUS	BANANAS AND PLANTAINS	SUGAR RAW	PEANUTS IN SHELL	COTTON SEED	TOBACCO	COFFEE	COCOA BEANS	COTTON
SENEGAL															
AVERAGE:															
1969-71.....	--	42	544	118	165	20	--	--	--	755	10	--	--	--	5
1973-75.....	--	46	642	99	117	23	--	--	17	1,039	24	--	--	--	13
1976.....	--	47	555	112	114	16	--	--	20	1,182	32	--	--	--	16
1977.....	--	32	417	64	125	13	--	--	25	671	22	--	--	--	13
1978.....	--	45	803	147	137	20	--	--	30	1,050	22	--	--	--	12
1979.....	--	45	476	112	120	20	--	--	35	600	18	--	--	--	9
1980.....	--	49	553	68	120	20	--	--	35	530	14	--	--	--	8
SIERRA LEONE															
AVERAGE:															
1969-71.....	--	11	16	444	493	63	104	174	--	20	--	--	6	5	--
1973-75.....	--	12	17	496	567	72	118	190	--	19	--	--	5	6	--
1976.....	--	11	14	528	600	76	124	198	--	20	--	--	10	7	--
1977.....	--	14	20	587	615	78	127	201	--	20	--	--	5	7	--
1978.....	--	14	20	500	639	80	130	200	--	15	--	--	13	7	--
1979.....	--	13	20	527	630	80	130	208	--	15	--	--	10	11	--
1980.....	--	13	20	565	630	80	130	208	--	15	--	--	10	9	--
TOGO															
AVERAGE:															
1969-71.....	--	102	136	19	430	456	--	--	--	18	5	--	12	27	3
1973-75.....	--	114	130	13	448	438	--	--	--	20	6	--	11	16	3
1976.....	--	95	113	15	392	428	--	--	--	23	5	--	11	16	2
1977.....	--	123	107	16	319	403	--	--	--	27	3	--	5	16	2
1978.....	--	159	115	17	371	507	--	--	--	35	9	--	7	14	4
1979.....	--	158	136	11	443	494	--	--	--	30	10	--	9	14	5
1980.....	--	140	110	20	458	510	--	--	--	35	10	--	10	14	5

WEST AFRICA: PRODUCTION OF SELECTED AGRICULTURAL COMMODITIES, BY COUNTRY, AVERAGE 1969-71, 1973-75, ANNUAL 1976-80--CON.

(1,000 METRIC TONS)

COUNTRY AND YEAR 1/	WHEAT	CORN	SORGHUM AND MILLET	RICE, PADDY	CASSAVA	OTHER ROOT CROPS 2/	CITRUS	BANANAS AND PLANTAINS	SUGAR, RAW	PEANUTS IN SHELL	COTTON-SEED	TOBACCO	COFFEE	COCOA BEANS	COTTON
TOTAL/ AVERAGE: (West Africa)															
1969-71.....	3	3,249	11,000	2,335	27,166	25,179	211	7,419	85	2,818	319	23	447	1,041	160
1973-75.....	2	3,565	10,251	2,680	26,077	25,854	263	7,664	155	2,317	334	27	462	956	170
1976.....	2	3,635	11,461	2,953	32,561	26,749	269	7,783	170	2,611	408	21	499	838	225
1977.....	3	3,828	11,307	2,934	33,235	26,582	267	7,675	182	2,463	338	18	335	918	177
1978.....	4	4,163	12,267	3,180	31,832	27,043	280	7,899	192	2,510	378	18	403	860	196
1979.....	5	4,168	11,694	3,241	33,599	27,278	285	7,938	215	2,049	363	22	463	987	194
1980.....	6	4,243	12,052	3,401	34,131	27,445	285	7,937	276	2,012	351	22	466	976	217
TOTAL/ AVERAGE: (Africa)															
1969-71.....	8,023	20,108	18,538	7,222	37,209	29,268	3,033	11,464	2,482	4,387	2,321	180	1,120	1,041	1,243
1973-75.....	8,784	23,170	17,575	7,282	39,946	32,402	3,321	12,230	2,834	4,147	2,132	212	1,157	957	1,135
1976.....	10,202	23,897	18,628	7,647	44,862	33,952	3,211	13,060	3,191	4,504	1,783	252	1,114	838	974
1977.....	7,863	25,094	18,719	7,552	45,356	33,840	3,300	12,958	3,293	4,483	1,780	241	1,037	918	961
1978.....	8,507	26,957	20,320	7,854	44,518	34,053	3,451	13,171	3,458	4,722	2,008	248	1,048	860	1,099
1979.....	8,238	23,173	18,517	8,263	46,598	34,723	3,768	13,291	3,556	3,941	1,923	305	1,030	921	1,079
1980.....	8,423	26,024	19,286	8,511	47,321	35,174	3,746	13,376	3,308	4,029	2,034	246	1,054	976	1,163

1/ Data for 1980 are preliminary.

2/ Other root crops may include yams, cocoyams, sweetpotatoes, and white potatoes.

Source: USDA, Economics and Statistics Service, Agricultural Situation: Africa and the Middle East, August 1981.

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