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**Demand-Side Constraints and Structural Adjustment  
in Sub-Saharan African Countries**



**INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE**

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**Ulrich Koester  
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**JULY 1999**

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**INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE**

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## 1. SUMMARY

Structural adjustment policies are recommended and financially supported by the World Bank and the International Monetary Fund as part of an effort to solve the external account crisis prevailing in many developing countries, including some African countries. Structural adjustment programs include policy reforms implemented in various sectors and pursue, almost without exception, outward-oriented trade strategies. One aspect of structural adjustment programs is the potential for expanded production of agricultural tradables in Sub-Saharan Africa. Much of this expansion is expected to increase the volume of agricultural exports. Although the expanded production of importables, particularly food, could be significant, the situation in African countries deserves particular attention because their production is highly concentrated on a few export commodities. If most African countries promoted and expanded their exports at the same time, world prices would decrease. Is there a risk that, at least in the short or medium term, the structural adjustment programs could worsen the economic situation in Sub-Saharan Africa? If so, this demand-side constraint could counteract one objective of the recommended structural adjustment policy.

### SPECIFICS OF STRUCTURAL ADJUSTMENT POLICIES

Structural adjustment policies are much more than demand management, which is the main instrument of stabilization policy. "Adjustment can be broadly defined as the adaptation of consumption patterns, the reallocation of resources, and the changes in factor accumulation necessary to recover sustained growth in the face of a more adverse external environment" (Sełowsky 1987). Strategies in a package of structural adjustment policies include measures for economic growth that focus on investing in productive projects, raising domestic savings and mobilizing external measures, improving the incentives to efficient production through relative price adjustments, and removing other structural impediments to production. Such programs also aim to establish a viable balance-of-payments position to help meet external debt in a timely manner and to minimize external constraints that disrupt economic activity.

Consequently, structural adjustment policies usually comprise a mix of policy measures from the following three categories: demand-side policies, supply-side policies, and policies to improve international competitiveness. Although a real devaluation of the exchange rate is at

the heart of structural adjustment, other policy measures--for instance, institutional reforms--are considerably important to achieving program objectives. Structural adjustment programs must be designed for the specific country and cater to particular economic needs and conditions, which vary among countries. The major objective of all structural adjustment policies is to restore the overall macroeconomic and external balance in the economy. Hence, an individual country's capacity to produce must be brought in line with its overall consumption and investment and its need to pay the foreign debt.

The current imbalance between domestic absorption and domestic production can be reduced by reducing domestic absorption and increasing domestic output (for example, by increasing the production of exportables and import substitutes relative to nontradables). Structural adjustment policies focus primarily on the production of nontradables because after years of adjustment, reducing consumption and investment further is hard to implement without provoking major social and political repercussions.

#### THE NEED FOR STRUCTURAL ADJUSTMENT

To reverse past economic trends, major foreign assistance programs will probably have to become available to most African countries. Relevant economic indicators show the following:

- Income growth (gross domestic product [GDP] per capita) in Sub-Saharan Africa has been negative since the early 1970s. In particular, low-income countries experienced negative per capita GDP growth rates of 0.9 percent in the 1970s and 2.5 percent in the early 1980s.
- Between the mid-1970s and early 1980s the share of exports in GDP declined for most Sub-Saharan African countries and the share of imports increased.
- Food production per capita has declined significantly over the past 25 years.

The trends of major concern in these countries are their declining standard of living and increasing dependence on foreign assistance. External public debt increased considerably between 1970 and 1984, as did the debt service as a percent of GDP and as a percent of exports. For 9 of the 11 Sub-Saharan African countries studied here the share of interest payments in the total debt service was between 45 and 58 percent in 1980/82.<sup>1</sup> This share is expected to rise for 7 of the 9.

<sup>1</sup>The 11 are Burkina Faso, Burundi, Chad, Kenya, Madagascar, Mali, Mauritania, Mozambique, Niger, Senegal, and Zambia.

Consequently, these countries must devote an increasing share of their internal production to servicing the debt, and this obligation will coincide with falling per capita production if the prevailing trends continue.

Most Sub-Saharan African countries clearly live beyond their means, and this situation is not sustainable in the long run unless foreign assistance increases and assures a constant inflow of resources. Merely reducing domestic consumption in order to balance domestic spending and income is not realistic, however, because the standard of living in these countries is already low. The only viable solution is to employ fully potential domestic and external resources and to adopt a set of economic incentives that guarantee the most efficient use of these resources. Indeed, growth is the ultimate objective of a well-designed structural adjustment policy.

### **THE ROLE OF AGRICULTURE IN THE PROCESS OF STRUCTURAL ADJUSTMENT**

Agricultural adjustment policies aim to improve the overall economic performance of the economy. Macroeconomic as well as microeconomic adjustment policies are required. Macroeconomic policies, like monetary and fiscal, exchange rate, and trade policies, have a direct and indirect impact on the agricultural sector. Evidence from other studies (Krueger, Schiff, and Valdés 1988) shows that the indirect effects of across-the-board economic policies generally dominate the sectoral (direct) effects of price interventions in developing countries such as Ghana, Côte d'Ivoire, and Zambia in Sub-Saharan Africa. Overvalued exchange rates and high industrial protection prevail in most African countries and reduce the price of tradable goods compared with nontradable goods. Because its proportion of tradables is higher than that of other sectors, agriculture is taxed the most.

Policies aimed at specific sectors are also important in Sub-Saharan Africa, given the extent of the governments' regulations and direct interventions in agricultural markets. For example, pricing that is international or uniform across the seasons may actually thwart efforts to establish a food supply system with a low social cost. The actual management of public stockpiling and transport regulations may have similar effects. The growth and competitiveness of agroindustries may be significantly hampered by complex and often contradictory regulations. Parastatal marketing and trade regulations, such as licenses and domestic trade regulations, have to be reexamined. Also, logistical problems and inadequate delivery systems for supplying inputs influence the poor performance of agriculture in much of Sub-Saharan Africa.

A well-balanced structural adjustment program must include a strategy for overcoming the obstacles of macroeconomic management that

affect particular economic, institutional support, and service sectors. This task is extremely complex.

Clearly, the success of structural adjustment programs depends on the reaction of the domestic agricultural sector. In most countries of Sub-Saharan Africa, agriculture is the dominant economic sector and the main earner of foreign exchange. Thus the potential response of the agricultural sector to micro- and macroeconomic policy changes is crucial to their success. If all the reforms are implemented and successfully generate growth in the production of agricultural tradables, will a foreign market be able to absorb the additional exports without a significant decline in world prices?

#### **DEMAND-SIDE CONSTRAINTS TO STRUCTURAL ADJUSTMENT**

Structural adjustment will eventually increase the production of import-competing and exportable products. Moreover, agriculture in most Sub-Saharan countries generates exportable surplus because agricultural exports represent a large share of total exports.

A large incremental surplus of exports across agricultural products will probably not occur simultaneously. Instead, in the short and medium terms export growth will probably occur in traditional export products. World market prices for these products might become further depressed, which would impair the short-run success of the adjustment policy.

The mix of agricultural exports from Sub-Saharan Africa as a whole is heavily concentrated on a few products. Coffee and cocoa together accounted for between 52 and 69 percent of total agricultural export earnings from 1962 to 1984. About three-quarters of the agricultural export earnings came from only six products during most of 1962-84. In contrast, the products contributing to import earnings are much less concentrated, although the three products that held the highest share of agricultural imports in 1981/84--rice, wheat and meslin, and maize--increased their share from only 20 percent in 1962/65 to 44 percent in 1981/84.

Nevertheless the high concentration in agricultural exports does not necessarily mean that structural adjustment policies implemented in any of the Sub-Saharan African countries will depress world market prices in the short and medium terms. That assessment is too pessimistic. First, not all countries in Sub-Saharan Africa depend heavily on the main exports of the region. Concentration varies considerably among countries. Second, depressed prices on the world market are not necessarily the consequence of concentrated exports. More important is the share that the main exports of these countries hold in world exports and the vulnerability of their economy to the world price.

Third, world market prices will decline less if the supply of exports from countries outside Sub-Saharan Africa is price elastic. A price-stabilizing reaction of competing supply can be expected, at least in the medium and long runs. The export mixes of other exporters are not as concentrated as those of countries in Sub-Saharan Africa, which suggests that those countries have developed a more diversified production and export structure. They will probably reduce the acreage devoted to products with depressed world market prices.

Fourth, in the past the exports of Sub-Saharan African countries lost shares in the world market. A successful structural adjustment program will regain some of the market shares lost. This can only be achieved if competitors become less competitive in those products. Consequently, the possibility of slightly depressed world market prices is not enough to argue against moving toward an export promotion policy.

Fifth, whether promoting the export of a specific product is advisable depends not only on the expected world market price, but also on the domestic cost of producing the additional exportable surplus. Can the additional exportable surplus be generated at a low social cost? To what extent was the loss in market share the result of increasing cost and to what extent the result of policies? Policies, broadly understood to include supporting infrastructure and economic incentives, may hold the key to accelerating growth. Policies (for example, heavily taxing agricultural exportables) have been a major obstacle to export growth in many Sub-Saharan African countries.

Sixth, implementing adjustment policies across the continent simultaneously highlights the dissimilarity of export patterns among African countries and of other indicators, such as comparative advantage, that support the possibility of growth in trade between African countries. In 1981/84 Sub-Saharan Africa spent an average of 23 percent of its export revenue from a product on imports of that same product. However, trade between these countries was only 9 percent of exports in 1981/84. Hence, trade within Sub-Saharan Africa could be more than twice its 1981/84 level if countries would exploit the potential for trade within the continent.

Seventh, promoting traditional exports will certainly depress world market prices more in the short than in the long run. However, the short-term negative effect will only occur if the countries behave collectively and successfully promote their exports at the same time. This situation is unlikely to materialize.

Finally, structural adjustment policies will induce significant growth of nontraditional export commodities. In particular, growing nontraditional exports should have a major positive impact on the balance of payments and trade.

In spite of these arguments, this paper investigates the worst situation for the countries in Sub-Saharan Africa: the countries succeed in promoting exports all at the same time, their competition only marginally reduces their supply on the world market in the short run, and those supplies become more elastic in the long run.

The results indicate that countries in Sub-Saharan Africa should be reluctant to promote the export of cocoa products in the short run. The negative marginal revenue indicates that they should probably constrain rather than expand production, even if the domestic cost of expanding production were zero. The short-run prospects might also be bleak for promoting coffee exports. Expanded coffee production would only pay in the short run if the marginal costs of expanding production were about 50 percent of the 1984 world market price.

The picture looks much more promising in the long run. The reactions of competitors on the world markets are expected to help stabilize world market prices. Export promotion is generally advisable if the countries in Sub-Saharan Africa either produce at lower costs than their world market competitors or fetch higher prices than their competitors. The potential for both exists.

Their competitors have diversified their export patterns much more than Sub-Saharan Africa has. The competitors' advantage has moved away from the products of particular interest to Sub-Saharan Africa, which may therefore be able to push them even farther away.

Although Sub-Saharan Africa lost market shares in the past, they could take more advantage of the trade preferences granted by the European Community (EC) and redirect their exports to new markets. The potential for exporting to the EC remains unfulfilled.

Promoting trade among the developing countries and especially among the Sub-Saharan countries could help raise the prices of traditional exports, but it also widens the coverage of export products. This study supports this hypothesis empirically.

## **POLITICAL CONSTRAINTS TO STRUCTURAL ADJUSTMENT**

Structural adjustment policies are relatively recent, and information on their impact is limited. Nevertheless, these programs will probably not succeed in the short run. Depending on the timing of the individual policy components, the overall domestic economic conditions (such as real wages) may actually worsen. Adverse distributional effects may arise because of higher food prices, and food security objectives may be impaired in the short run. Therefore, some countries may abandon the policy before the overall positive effects can materialize. This has happened in Africa. Any structural adjustment policy will be more viable if policies are instituted to cushion the short-term

adverse effects. Additional assistance from external institutions such as the World Bank and the International Monetary Fund could help, but even generous financial assistance cannot guarantee a policy's success. Technical assistance, policy analysis, and managerial assistance are also needed.

4

## 2. INTRODUCTION

I do not know if it will get better when things change,  
but one thing is certain: if it is to get better,  
things will have to change.

Georg Christoph Lichtenberg  
(1742-99)

The economic performance of African countries has been disappointing for many years, and the need to break that trend is urgent. African countries have the potential to do much better than they have. However, prescriptions differ considerably. One extreme position has been expressed in the "Lagos Plan of Action for the Economic Development of Africa 1980-2000." This document has been adopted by African heads of state and by the Organization of African Unity (OAU). The plan states that one of the main objectives should be "to bring about self-sufficiency in food and a diminishing dependence on exports" (Prowne and Cummings 1984, 39). The other position is held by the World Bank and the International Monetary Fund (World Bank 1981). Their broad objective is "to enable the African countries to reduce their balance of payments deficits. To enable the African countries to enjoy a positive per capita growth rate during the decade of the eighties" (Browne and Cummings 1984, 39). They recommended a more outward-oriented trade strategy.

A policy based on the latter strategy implies a specific economic adjustment related to incentives. The incentive structure that exists between economic sectors and within a particular sector is largely determined by the real exchange rate, the effective exchange rates, and the institutional framework. At the core of structural adjustment are fiscal discipline, real exchange rate devaluation, and trade liberalization. Critics of structural adjustment programs point to external demand constraints and domestic supply constraints as possible barriers to implementing structural adjustment policies successfully. Some economies may have little potential for economic adjustment because of the specific underlying supply factors. Also, the political implications of an economic adjustment, especially in food security, may be so negative that a risk-averse government will not pursue such a policy. The major demand constraint is the negative effect of deteriorating world market prices on the country's export earnings.

The fallacy of composition "presumes that markets would not be able to absorb all of the exports that would materialize if developing countries" would jointly promote an export-led strategy. Furthermore, if the markets were found, "they would be closed by protectionist measures, provoked by the import penetration and outcries of market disruption" (Bhagwati 1988, 30).

This study proposes to investigate the effects of a structural adjustment pursued collectively by African countries. The report is organized as follows. In Chapter 3 a brief overview of the external position of Sub-Saharan African countries is presented and specific structural adjustment policies are highlighted. The possible effects of these programs are also focused on. Chapter 4 investigates the supply and demand constraints on structural adjustment, and Chapter 5 analyzes the export performance of the Sub-Saharan African region. The questions posed are how important are agricultural exports as a source of foreign exchange? What are the main agricultural export and import products? Who are Sub-Saharan Africa's major trading partners in agriculture? What can be concluded from a market share analysis of the competitiveness of Sub-Saharan African countries?

Chapter 6 estimates the potential effects on world market prices, foreign export earnings, and changes in production of the region's export growth. These results are of paramount importance for this study because they allow the products for which export promotion may produce significantly negative terms of trade to be identified and thus the discrepancy between world market prices and marginal export revenue to be highlighted.

The potential for expanding trade within Sub-Saharan Africa is briefly discussed in Chapter 7. The report concludes with a discussion of structural adjustment and the outlook for agricultural export earnings in Africa. A major constraint on quantitative analyses is the insufficient and sometimes unreliable empirical information available.

### **3. STRUCTURAL ADJUSTMENT LENDING AS A VIABLE APPROACH FOR ECONOMIC GROWTH IN SUB-SAHARAN AFRICA**

Economic development and structural adjustment are frequently used to describe the current efforts to reverse the worsening economic situation in Sub-Saharan Africa. Many analysts believe that only by tailoring its structural adjustment can a country use its micro- and macroeconomic policies to encourage long-term sustained growth.

Clearly, the origins of economic stagnation in Sub-Saharan Africa are manifold. Most African countries have suffered adverse environmental conditions (especially drought) that exacerbate their critical economic situation and leave the government little room to act. However, major reasons for the poor economic performance throughout Sub-Saharan Africa are exogenous (such as deteriorating terms of trade) and endogenous (such as inappropriate fiscal and monetary policies) economic factors.

In this chapter, a brief overview of the current and projected external economic position of select Sub-Saharan African countries is presented, and the features of structural adjustment programs that are currently being implemented in several countries are highlighted.

#### **THE CURRENT AND PROJECTED EXTERNAL POSITION OF SELECT SUB-SAHARAN COUNTRIES**

Growth of the per capita GDP in Sub-Saharan Africa has been negative since the early 1970s (World Bank 1984, 10). In particular, low-income countries experienced negative growth rates of their per capita GDP of up to 2.5 percent in the early 1980s. Oil-exporting countries also reported high negative GDP growth rates after 1980. This is mainly due to the falling price of crude oil on the world market.

Beginning with the first oil crisis in the early 1970s, most African oil-importing countries experienced worsening terms of trade for their traditional exports. With the exception of oil-exporting countries, the terms of trade deteriorated for almost all Sub-Saharan African countries (World Bank 1986, 77). These worsening terms of trade coincided with a recession in the Organization for Economic Cooperation and Development (OECD) countries and an exceptional increase in the international interest rates (Bianchi 1987, 180). The sharp decline in economic activity throughout the industrial countries reduced their demand for commodities imported from Africa. At the same time,

increased inflation in industrial countries raised the prices of those African imports (Zulu and Saleh 1985, 1).

Between the mid-1970s and early 1980s in most Sub-Saharan countries, the share of exports in their GDPs declined and that of imports increased (International Monetary Fund 1987). Consequently, most countries faced growing current account deficits, which peaked around 1980 following the second oil price increase in 1979. Table 1 reveals three stages in the development of the current account deficit in 10 countries. Current account deficits across Sub-Saharan Africa declined during the mid-1970s when global economic conditions were favorable. For all of the countries studied, except Mauritania, the current account deficit was less than 10 percent of GDP until 1977. The current account deficit was exceptionally high for all countries between 1978 and 1980 because of the second oil price shock. By 1980, most of the countries faced current account deficits between 10 and 20 percent of their GDP. Côte d'Ivoire and Madagascar, for example, ran current account deficits of 17.3 and 17.2 percent, respectively, of their 1980 GDP. Since then, the current account problem seems to have improved slightly across Sub-Saharan Africa.

Does this recent development signal a permanent or a temporary improvement in these countries' balance of payments? As will be shown below, most countries in Sub-Saharan Africa faced growing trade deficits and growing foreign debt obligations toward the late 1980s. Thus the favorable recent developments in their balance of payments are unlikely to continue.

In order to finance their high current account deficits, most countries borrowed on global financial markets. Borrowing seemed an attractive alternative given low international interest rates, which were expected to continue, and world market prices for primary commodities, which were expected to increase.

Although the following quote refers to Latin America, it applies equally well to the situation in Sub-Saharan Africa.

Nearly all these countries borrowed heavily to finance their rising current account deficits, most largely to maintain consumption. Oil exporters, buttressed by independent forecasts of continuously rising energy prices, also borrowed heavily to expand production and to raise public and private consumption to a level consonant with their higher expected permanent income (Bianchi 1987, 180).

It is not surprising that the external public debt in all the countries considered increased significantly between 1970 and 1984 (Table 2).

The debt problem in Sub-Saharan Africa is put in perspective when compared with the situation in developing countries such as Brazil,

Table 1--Current account balance as a percentage of GDP for select Sub-Saharan African countries, 1975-85

Country	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Burkina Faso	-8.4	-5.4	-11.2	-6.0	-5.9	-4.0	-3.8	-9.0	-6.5	n.a.	n.a.
Chad	-8.7	-0.8	-4.3	n.a.	n.a.	-1.5	n.a.	n.a.	n.a.	n.a.	n.a.
Côte d'Ivoire	-9.7	-5.3	-2.8	-10.6	-15.1	-17.3	-16.6	-13.5	-14.3	n.a.	n.a.
Kenya	-6.9	-3.6	0.6	-12.4	-8.2	-12.5	-10.8	-8.3	-2.3	-3.3	-3.6
Madagascar	-3.0	-1.6	-0.8	-3.7	-15.3	-17.2	-14.1	-10.0	-7.7	-6.3	n.a.
Mali	-9.4	-5.7	0.6	-10.3	-9.3	-9.1	-10.2	-9.2	-10.2	-10.9	n.a.
Mauritania	-13.2	-15.7	-22.3	-14.7	-17.2	-16.2	-16.5	-33.6	-25.5	-15.9	n.a.
Niger	-1.1	-2.9	-8.1	-12.5	-6.6	-11.0	-8.2	-11.7	-3.4	n.a.	n.a.
Senegal	-4.5	-4.8	-3.4	-10.8	-9.1	-14.9	n.a.	n.a.	n.a.	n.a.	n.a.
Tanzania	-8.9	-1.1	-2.0	-11.3	-7.8	-10.1	-4.5	n.a.	n.a.	n.a.	n.a.

Source: International Monetary Fund, *International Financial Statistics Yearbook 1987* (Washington, D.C.: International Monetary Fund, 1987).

Note: n.a. means not available.

Table 2--Structure of external public debt in select Sub-Saharan African countries, 1970 and 1984

Country	Total Debt		Debt Service						
	In US\$ Million		In US\$ Million		As Percent of GNP		As Percent of Exports		As Percent of
	1970	1984	1970	1984	1970	1984	1970	1984	Net Development Assistance, 1984
Burkina Faso	20.8	407.5	1.9	21.8	0.6	1.7	6.2	8.7	12
Burundi	7.3	334.4	0.6	17.3	0.3	0.8	2.3	7.5	12
Chad	32.1	109.0	2.7	2.5	1.0	n.a.	3.9	1.7	3
Kenya	318.5	2,633.4	27.4	348.4	1.8	6.1	5.4	22.9	81
Madagascar	92.5	1,636.4	6.9	116.6	0.8	3.9	3.5	24.3	75
Mali	237.6	960.0	0.7	17.4	0.3	1.7	1.4	8.0	6
Mauritania	27.3	1,170.6	3.3	42.2	1.7	5.4	3.1	10.0	25
Niger	31.3	677.9	2.3	66.6	0.6	6.7	3.8	18.3	41
Senegal	100.1	1,555.1	6.7	92.7	0.8	2.5	2.8	7.2	25
Tanzania	249.6	2,593.6	15.7	71.3	1.2	1.7	4.9	14.1	13

Source: The World Bank, *Financing Adjustment Growth in Sub-Saharan Africa, 1986-90* (Washington, D.C.: The World Bank, 1986).

Note: n.a. means not available.

Mexico, or Argentina (Table 3). In 1972 the outstanding debt in Sub-Saharan Africa accounted for 80 percent of the region's exports. For all developing countries the outstanding debt was 89 percent, and for the three largest borrowers (Brazil, Mexico, and Argentina) it was 222 percent (Krumm 1985,45).

Since then, Sub-Saharan Africa has fared worse than the average of all developing countries. In 1983, the outstanding debt to export ratio was 162 percent for Sub-Saharan Africa compared with 105 percent for all developing countries; the ratio was 256 percent in 1982 for the three largest borrowers.

The ratio of debt service to exports increased from 7 percent in 1972 to 15 percent in 1983 for all developing countries. The ratio for Sub-Saharan Africa was higher than that for the average of all developing countries for the first time in 1983 and 1984--19 percent and 26 percent, respectively (World Bank 1986, 11).

Compared with the ratio of debt service to exports in Brazil, Mexico, and Argentina (around 50 percent), the debt problem in Sub-Saharan Africa seems less severe. Nevertheless, the World Bank expects that for a dozen low-income countries in Africa<sup>2</sup> even rescheduling the debt at conventional terms will not diminish the consequences of the debt burden in the near future (World Bank 1981, 11).

Of the countries presented in Table 2, Kenya, Madagascar, Niger, Senegal, and Tanzania had the highest increase in their ratio of debt service to exports between 1970 and 1984. The ratio of debt service to net disbursements of development assistance reveals alarming tendencies in some countries. In 1984, Kenya and Madagascar used financial resources equal to 81 and 75 percent, respectively, of their net development assistance to meet debt service payments. However, that figure understates the real magnitude of the problem, since during 1984-85 for 14 Sub-Saharan countries, rescheduling the debt prevented major financial crises (World Bank 1986, 11).

The prospects for an improvement in the Sub-Saharan debt problem are small. Breaking down total debt service payments into interest payments and retirement of the principal reveals two significant developments (Table 4). First, for the 9 countries the share of interest payments was between 45 and 58 percent of the total debt service in 1980/82. With the exception of Burkina Faso and Kenya, this share is expected to rise during the late 1980s. Second, the ratio of the interest payment to debt service is expected to widen: Kenya will have the lowest ratio (42.2 percent) and Tanzania (70.5 percent) and Madagascar (70.3 percent) will have the highest.

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<sup>2</sup>Benin, the Gambia, Liberia, Madagascar, Mali, Mauritania, Niger, Somalia, Sudan, Tanzania, Togo, and Zambia.

Table 3--External debt and debt service in Sub-Saharan Africa and developing countries, 1972-82

Country Group/ Debt Category	1972	1978	1979	1980	1981	1982
	(US\$ billion)					
Sub-Saharan African countries						
Debt service <sup>a</sup>	0.8	2.4	3.3	4.7	5.1	5.8
Debt outstanding and disbursed ratio <sup>b</sup>	81.7	100.0	91.9	84.8	110.9	146.4
Debt service ratio <sup>b</sup>	9.9	8.2	8.3	9.3	11.9	15.9
Amortization ratio <sup>ab</sup>	5.4	5.1	4.8	5.2	5.7	8.8
Interest ratio <sup>ab</sup>	2.2	3.1	3.5	4.4	5.1	7.4
All developing countries <sup>cd</sup>						
Debt outstanding and disbursed	115.1	402.5	470.6	538.0	607.5	666.3
Debt outstanding and undisbursed	90.7	301.2	355.1	411.6	470.1	525.6
Debt service	12.0	47.5	63.6	71.0	82.9	91.1
Disbursed debts to exports <sup>b</sup>	88.8	80.3	70.9	67.2	72.3	92.4
Debt service ratio <sup>b</sup>	7.1	12.7	12.7	11.6	12.8	16.0
Three largest borrowers <sup>ce</sup>						
Debt outstanding and undisbursed	27.1	102.9	120.3	132.8	161.8	180.4
Debt outstanding and disbursed	22.9	86.6	100.2	113.8	140.0	158.3
Debt service	3.3	18.2	24.9	25.8	29.9	34.9
Disbursed debts to exports <sup>b</sup>	222.3	272.3	246.2	205.8	231.0	256.1
Debt service ratio <sup>b</sup>	31.7	57.2	61.2	46.7	49.3	56.5

Source: Kathie L. Krumm, *The External Debt of Sub-Saharan Africa: Origins, Magnitude, and Implications for Action*. World Bank Staff Working Paper 741 (Washington, D.C.: World Bank, 1985), p. 45.

<sup>a</sup>Due to rounding, amortization and interest do not always add up to debt service.

<sup>b</sup>Ratio of exports of goods to nonfactor services.

<sup>c</sup>Debt figures for medium- and long-term public and private debt, including private nonguaranteed debt.

<sup>d</sup>Countries in the Debt Reporting System.

<sup>e</sup>Brazil, Mexico, and Argentina.

Table 4--Decomposition of actual and projected debt service for select Sub-Saharan African countries, 1980/82 and 1986/90

Country	Actual 1980/82				Projected 1986/90			
	Interest	Principal	Total	Interest as Share of Total	Interest	Principal	Total	Interest as Share of Total
	(US\$ millions)			(percent)	(US\$ millions)			(percent)
Burkina Faso	10	10	20	50.0	17	19	36	47.2
Burundi	4	4	8	50.0	14	10	24	58.3
Kenya	241	247	488	49.4	266	365	631	42.2
Madagascar	52	44	96	54.2	130	55	185	70.3
Mali	10	7	17	58.8	40	27	67	59.7
Mauritania	30	26	56	53.6	57	42	99	57.6
Niger	83	100	183	45.4	70	52	122	57.4
Senegal	81	73	154	52.6	139	80	219	63.5
Tanzania	83	77	160	51.9	165	69	234	70.5

Source: The World Bank, *Financing Adjustment Growth in Sub-Saharan Africa, 1986-90* (Washington, D.C.: The World Bank, 1986).

To meet the upcoming debt service payments without defaulting on the loan or rescheduling the debt, most countries must improve their foreign exchange position. The foreign exchange position is largely affected by exports and imports (Table 5). In 1984/86 the nominal export revenues of 6 of the 11 countries studied fell short of their corresponding 1980/82 values. The decline was most severe in Mozambique, Niger, and Tanzania. Although nominal export revenues increased for 5 countries, this probably did not translate into an increase in export revenue, especially in Mali and Senegal. The increase in nominal export revenues that was expected in 1987/88 was insignificant; in addition, projected export revenues are subject to fluctuations in price and quantity. The nominal value of total imports decreased for all countries (except Mali and Chad) between 1980/82 and 1984/86. The decrease in imports was probably not voluntary, but rather the combination of scarce foreign exchange resources and governmental intervention. No further reduction in imports was projected for 1987/88. Declining imports usually indicate economic distress in a country. Lower imports are usually accompanied by a lower domestic investment rate, lower domestic consumption, and possibly by increasing urban unemployment. With the exception of Chad and Tanzania, 9 countries managed to reduce their trade deficit between 1980/82 and 1984/86. This result was achieved by reducing imports.

Most Sub-Saharan African countries are facing severe debt problems as the result of increased borrowing during a period of high energy prices, global recession, and high international interest rates. The

Table 5--Foreign trade performance of select Sub-Saharan African countries, 1980-88

Country	Exports			Imports			Trade Balance		
	1980/82	1984/86	Projected 1987/88	1980/82	1984/86	Projected 1987/88	1980/82	1984/86	Projected 1987/88
(US \$ millions)									
Burkina Faso	149	129	130	359	266	300	-210	-137	-170
Burundi	76	120	145	181	181	178	-105	-61	-33
Chad	71	98	93	73	168	205	-2	-70	-113
Kenya	1,089	1,044	998	1,907	1,363	1,438	-818	-318	-440
Madagascar	367	315	328	575	350	345	-208	-35	-18
Mali	168	189	193	270	285	305	-102	-96	-113
Mauritania	235	342	390	378	329	388	-143	13	3
Mozambique	431	200	215	920	683	763	-488	-483	-548
Niger	481	285	305	595	313	355	-114	-28	-50
Senegal	527	562	625	983	819	863	-456	-257	-238
Tanzania	536	340	325	1,030	857	1,062	-494	-517	-737

Source: U.S. Department of Agriculture, *World Food Needs and Availabilities, 1987/88* (Washington, D.C.: USDA, 1987).

financial situation in the oil-importing developing countries deteriorated during the mid-1980s and is expected to remain poor in the medium run. Under current conditions, export earnings are likely to decline or to improve slightly. Sub-Saharan Africa, unlike Korea, Taiwan, and other Asian countries, cannot take advantage of the relatively stable earnings from exports of manufactured goods. The export commodity composition of most countries in Sub-Saharan Africa includes large proportions of primary goods, such as agricultural products, minerals, and metals. World prices for primary commodities are unlikely to increase significantly in the long run, but will probably fluctuate widely. Oil importers in particular can expect to pay higher national import bills.

Together with growing debt obligations, the prospect for financial improvement in most Sub-Saharan African countries is dim. Rescheduling the debt burden alone will not remedy the current problem. In the long run, Sub-Saharan Africa will only meet its debt obligations if the debt rescheduling negotiations include a rigorous policy package of appropriate economic incentives that improve the allocation of resources.

#### **OBJECTIVES OF STRUCTURAL ADJUSTMENT LENDING**

The development strategy that the World Bank and International Monetary Fund recommend for structural adjustment lending is outward-looking or export-led and treats economic growth and adjustment as mutually reinforcing (Browne and Cummings 1984, 25). Structural adjustment loans were introduced by the World Bank in 1979 and eventually took shape in a document popularly known as the Berg report (World Bank 1981).

Among the objectives of structural adjustment are usually cited (1) the reduction or elimination of a balance of payments deficit, (2) the resumption of higher rates of economic growth, and (3) the achievement of structural changes that would prevent future payments and stabilization problems (Streeten 1987, 1470).

Although a variety of terms describe development programs with structural adjustment components, in practice the distinction between those programs is blurred. In fact, the World Bank's structural adjustment loans (across-the-board economic reforms), sectoral adjustment loans (sector-specific reforms), and the adjustment programs promoted by the International Monetary Fund employ the same major policy instruments; they only differ in ways that cater to the particular circumstances of a country. All programs have "far-reaching and sustaining policy reforms" at their core, and their coverage of sectoral and overall economic issues is comprehensive (Please 1984, 83). The appropriate combination of demand-side policies, supply-side policies, and policies to improve international competitiveness will

move the economy toward a sustainable external position and encourage long-term economic growth.

The following responses to structural adjustment programs are expected:

- Production increases across all sectors because the available technology is used fully. Graphically, this is equivalent to a move from inside the production possibility frontier toward its borders.
- Inefficiencies of factor allocation are removed across production sectors. Factors are allocated inefficiently if, for instance, the international division of labor is not fully exploited because of an incentive structure that is biased against exports. This is equivalent to a movement along the borders of the production frontier from producing nontradables to producing more tradables. In particular, developing countries could capitalize on comparative advantage they have in producing labor-intensive exports.
- Marginal factor productivity increases because innovative technologies are introduced to the production process.

#### **THE ROLE OF EXCHANGE RATE POLICIES IN STRUCTURAL ADJUSTMENT PROGRAMS**

The overvaluation of the currencies in Sub-Saharan Africa has contributed to the region's acute balance-of-payments problems. Table 6 indicates the extent to which the currencies of 14 African countries are overvalued. If the exchange rate is assumed to be more or less in equilibrium in 1969-71, the average overvaluation in 1978-80 would have been 38 percent for all Sub-Saharan African countries. The export sectors and the import-competing sectors clearly lost international competitiveness. Thus exports could not earn enough foreign exchange to compensate for the growing imports. Therefore, the real exchange rate is the EEG\*\* variable in an economic incentive system that focuses on export-led economic growth.

The real effective exchange rate is defined by Valdés (1986) as the ratio of the price of tradables to the price of nontradables. The prices of tradables are determined by world market prices, nominal exchange rates, and trade policies. The prices of nontradables, on the other hand, are only subject to domestic supply and demand conditions.

The effective exchange rate measures the incentives to produce exportables or import substitutes (Bhagwati 1988, 32). The effective exchange rate for exports ( $EER_x$ ) takes into account the nominal exchange rate and any export subsidies, tax credits, and export

Table 6--Index of real exchange rates in select African countries, 1973-83

Country	1973/75	1978/80	1981/83
(1969/71 = 100)			
Cameroon	75	58	80
Côte d'Ivoire	81	56	74
Ethiopia	93	64	67
Ghana	89	23	8
Kenya	88	69	86
Malawi	94	85	94
Mali	68	50	66
Niger	80	56	74
Nigeria	76	43	41
Senegal	71	60	85
Sierra Leone	100	90	73
Sudan	76	58	74
Tanzania	85	69	71
Zambia	90	79	86
All Sub-Saharan Africa	84	62	69

Source: World Bank, *World Development Report 1986* (Washington, D.C.: World Bank, 1987).

Note: A decline in the index reflects an appreciation of the real exchange rate.

tariffs. Similarly, the effective exchange rate for imports ( $EER_M$ ) includes import duties and import premiums from quotas in addition to the domestic currency received at the official exchange rate. A bias against exports can result if imports and exports are treated differently by macroeconomic and microeconomic policy instruments. Under an export-promotion strategy ( $EER_x = EER_M$ ), one unit of foreign currency earned by exports brings the same amount of domestic currency as one unit of foreign currency spent for imports.

The above terminology, adopted from Bhagwati (1988), differs from the real effective exchange rate as used by Bergsten and Williamson (1983) and throughout most publications of the International Monetary Fund. The latter "(1) weighs a country's exchange rate in terms of the currencies of its major trading partners (to make it 'effective' rather than bilateral) and (2) adjusts for differences in domestic price movements between the country and its trading partners (to make it 'real' rather than nominal)" (Bergsten and Williamson 1983, 108). In this study the Bhagwati concept of effective exchange rates is used.

The World Bank aims to provide incentives to encourage private agents and public decisionmakers to make the recommended changes. Setting prices correctly is one of the most important ways to remove policy distortions and, thus, to set incentives correctly from a macroeconomic point of view. In the long run, however, the appropriate price policy must be judged in the context of technological changes and increasing commercialization (Mellor, Delgado, and Blackie 1987, 353). It is crucial for the long-run supply response that price policies are combined with nonprice measures (Streeten 1987, 1473). The most important nonprice factors for making price incentives more effective are the following:

- Availability of inputs (such as water, fertilizer, and equipment);
- Technological innovations (such as high-yielding varieties of crops);
- An information network (extension and research services);
- Infrastructure to connect the location of production and consumption; and
- An institutional framework to provide credit and marketing services.

Despite the merits of an export-led growth policy many governments have pursued the path of import substitution. The main features of such a policy are effective exchange rates that are higher for imports than for exports and overvalued real exchange rates (Bhagwati 1968). Overvalued real exchange rates tax the producers of exports and encourage imports, which are relatively cheap in local currency. In such a situation the demand for foreign exchange to pay for imports exceeds the supply of foreign exchange received from exports. Governments must borrow in international financial markets or adopt restrictive measures to limit import demand and ration foreign exchange (import tariffs or import quotas). Restricting imports below the equilibrium level produces local prices for importables that are higher than prices in the official exchange rate. Therefore, the effective exchange rate is higher for importables than for exportables, and production shifts from exportables to import substitutes and nontradables that substitute for imports. A real devaluation narrows the difference between the effective exchange rates for importables and exportables. Thus resources shift from producing import substitutes to producing exportables.

The alternative to rationing foreign exchange is borrowing from foreign financial markets in order to meet the demand for foreign exchange to buy imports. In this case, a real devaluation will raise the domestic price of all tradables, both exports and import substi-

tutes, above that of nontradables. The consequence is that production shifts away from nontradables and toward export products and import substitutes.

Real devaluations are at the heart of the World Bank's and the International Monetary Fund's recommendations for the following reasons. First, price ratios change in favor of tradables and thus increase both net exports and foreign exchange earnings. Second, as the amount of foreign exchange resources increases, the need to ration foreign exchange becomes less pressing. Finally, the nontradables whose prices are not directly affected by the change in the exchange rate become relatively less profitable and therefore are produced less. However, in exchange rate policy, only changes in the nominal exchange rate are at the discretion of policymakers; the government also influences the price of home goods, however, through its policies on fiscal issues, wages, and foreign capital flows. The size of the real devaluation that accompanies a given nominal devaluation is subject to the adjustment in the price of nontradables. Price adjustments are the result of the nominal devaluation, among other determinants. Labor costs are probably the single most important determinant of the relationship between a nominal and a real devaluation (Valdés 1986, 163).

Any real devaluation will only produce these effects if domestic consumption can be reduced lower than domestic production. This is necessary because currency overvaluation and an actual or suppressed balance of trade deficit imply that a country is consuming too much compared with its production. Reducing the deficit will only succeed if the ratio of real consumption to real production can be lowered. Demand management is essential to supply-oriented strategies and to achieving absorption (that is, consumption plus investment) that grows slower than relative income. Demand management measures should be applied to the consumption component of aggregate demand. For an economy to reach its long-run growth potential, the investment component in aggregate demand must be protected from constraints (Killick 1983, 275).

Under the real economy approach, austerity may be the bitter solution for most low-income countries in Sub-Saharan Africa unless the new policy mix stimulates enough production to narrow the gap between domestic consumption and domestic production (Killick 1983, 270). However, the real economy approach will probably restrict consumption less than a strategy that relies solely on aggregate demand management and affects production growth less positively.

Special problems usually arise when new policies are in the process of replacing old ones. Demand policies and expenditure reduction inevitably affect the poorest members of society the most severely. Increasing food prices, for example, weaken the nutritional

status of the poor and can touch off urban riots and severely pressure the ruling government.

Governments often perceive the political costs of carrying through a program to be greater than the payments crisis to which it is addressed. At the efficiency level, programs designed with sensitivity to the probable political consequences simply stand a better chance of being implemented (Killick 1983, 285).

This argument is critical. Economic and political difficulties connected with devaluing the real exchange rate make selective tariffs and restrictive quotas appealing to governments, even though such instruments do not allocate resources efficiently.

Distributional issues are essential elements in the design of structural adjustment programs (Mellor 1988, 10). Targeted food subsidy programs are appropriate for reaching the urban poor, but are less effective in reaching the rural poor, who are geographically scattered. Nevertheless, income distribution may improve in the long run, because adjustment policies will increase the profitability of labor-intensive production and raise labor income. Such long-run effects are expected because prevailing policies favor capital-intensive production through overvalued currencies and import restrictions. Structural adjustment emphasizes reallocating resources in favor of labor-intensive production.

Reallocating of resources is time consuming. Employment may decline in the disfavored sectors without increasing the favored sectors. This is the main reason that adjustment may initially produce the negative overall economic performance described above. Policies to cope with the adverse effects of adjustment policies should be tailored to the specific situation of each country.

## **STRUCTURAL ADJUSTMENT IN THE AGRICULTURAL SECTOR**

In most developing countries the agricultural sector carries the major burden of real exchange rate overvaluation and discriminatory policies against exports. However, in many Sub-Saharan African countries the agricultural sector is the dominant economic sector and the main earner of foreign exchange. The reaction of the agricultural sector to micro- and macroeconomic policy changes is crucially important to the country's overall economic development. The disincentives to producing agricultural exportables have three major sources (Krueger, Schiff, and Valdés 1988).

1. Real exchange rates that are overvalued because of exchange controls;

2. Import-substitution policies; and
3. Export taxation intended to create government revenues.

Agriculture is taxed relative to import substitutes through a direct effect (export taxes that reduce the producer price of exports) and an indirect effect (import protection that raises the domestic price of import substitutes). Compared with nonagricultural home goods (nontradables), agriculture is taxed indirectly through the overvalued real exchange rates (Krueger, Schiff, and Valdés 1988, 9).

Krueger, Schiff, and Valdés (1988) estimate the combined impact of direct and indirect effects on the returns to agricultural producers in a regime with free trade and no interventions. Their findings reveal that the negative impact of indirect effects on producer incentives is much stronger than the direct effects. In Ghana, policies external to agriculture discriminated against agricultural exportables so much that producers had to be partly compensated through direct agricultural policies. Moreover, developing countries often protect import-competing agricultural commodities directly as well. The effects of direct price policies on import-competing agricultural commodities are in many cases offset by the negative indirect effects of an overall bias against the agricultural sector.

In addition to inappropriate fiscal and monetary policies, other factors preclude optimal efficiency in the agricultural sector. Panterritorial and uniform seasonal pricing are obstacles to the most efficient use of resources in the agricultural sector. Public stockpiling and transport regulations have similar negative effects. The prospects and efficiency of agroindustries may be influenced significantly and negatively by state interventions. Parastatal marketing organizations and trade regulations such as licenses and trade taxes keep the allocation of resources from optimal efficiency. Logistical problems, such as inefficient marketing of inputs, also contribute to the relatively poor performance of the agricultural sector.

Structural adjustment in the agricultural sector can be successful when it is focused on investment in productive projects, improved incentives to production through appropriate prices, and the removal of bias against exportables and other structural impediments. Removing structural impediments includes improving the institutional and regulatory framework, reforming the exchange and trade system, and imposing an appropriate structure of relative prices. Investments to remove deficient infrastructure and supply bottlenecks are integral components of a successful package for expanding the production of tradables. Better infrastructure in the form of more feeder roads, improved availability of seeds and fertilizers, investment in irrigation systems, and reforms of marketing complement the incentives to expand agricultural output and increase the export surplus.

Institutional reforms in the framework of structural adjustment programs are geared toward less government intervention. In many African countries this means divesting or considerably restructuring parastatal organizations. The long-term growth of the agricultural sector requires a functioning network of agricultural extension and research.

## CONCLUSIONS

The main objective of structural adjustment is to accelerate economic growth. The economic performance of African countries can be improved if resources are used more efficiently with the given technologies and if superior technologies are introduced. A better use of internal resources is possible and necessary. However, whether a given structural adjustment policy will produce economic gains even in the short run depends on the reasons that resources are used inefficiently and how the adjustment policy package is implemented. It is particularly important to know whether inefficient resource use is mainly due to internal price distortions or to inefficient government interference in the economy. Both causes may result in insufficient incentives for producers and traders to perform better. The composition of any policy package and, above all, the timing of its individual components, should be chosen keeping the particular causes of inefficiency and the constraints on demand in mind. If the main causes of inefficiency are price distortions and no external demand constraints exist, then adjustment policy can rely mainly on devaluation and corrections of the domestic price ratio. Most African countries, however, also suffer from inefficient marketing systems, inefficient input supply, internally distorted trade flows, and the use of suboptimal technologies, to name a few of the internal obstacles to using resources efficiently. If these obstacles are major contributors to internal inefficiency, beginning an adjustment with devaluation may be counterproductive. Not only do internal obstacles often prevent the supply of export products from responding positively to an adjustment, they also cause unemployment to rise and overall production to decline. Economic performance may deteriorate in the short run and thus impair food security.

Real devaluation and institutional reforms are at the heart of structural adjustment programs. Clearly, a particular country's status quo before structural adjustment will determine the particular policy mix and timing of its structural adjustment process. Changes in the real exchange rate reduce the deficit in the balance of payments and bridge the foreign exchange gap in the long run. Short-run adverse effects, such as the tendency to contract in response to a real income loss, might have to be accepted. Adequate measures, such as foreign assistance, can, however, protect the poorest and keep the adverse effects to a minimum. The government's reluctance to implement all components of structural adjustment is often a major constraint to

success. This is where international organizations (money lenders) must be persistent and uncompromising.

An outward-oriented policy emphasizes increasing the volume and value of exports, as well as reducing the net dependence on imports. Export prospects for Sub-Saharan Africa ultimately depend on price and income elasticities of demand in the receiving countries and supply elasticities in the competing producer countries. Again, the real exchange rate mainly determines the relative price of tradables and nontradables. Among exportables "it is precisely nontraditional exports . . . which respond most to exchange rate depreciations" (Killick 1983, 301).

Lower real exchange rates not only discourage imports and encourage exports, they also stimulate the production of new nontraditional exports. In later chapters the prospects for increasing agricultural export earnings in Sub-Saharan Africa will be investigated.

#### 4. SUPPLY CONSTRAINTS TO STRUCTURAL ADJUSTMENT

Critics emphasize two potential constraints that could preclude the benefits of structural adjustment programs. The first argument concerns external demand constraints, and the second refers to perceived domestic supply constraints. This chapter focuses on the existence of external demand constraints. However, these constraints are only binding if supply responds significantly to the structural adjustment policies. Thus investigating external demand constraints makes sense only in the absence of severe domestic supply constraints.

##### DOMESTIC SUPPLY CONSTRAINTS

The adjustment programs of the International Monetary Fund and the World Bank have been criticized for their incomplete adaptation to the domestic supply conditions in developing countries, particularly in Africa. Furthermore, the conditions of structural adjustment lending (for example, reducing domestic absorption) might adversely affect investment in the agricultural sector and thus limit future production (Yagci, Kamin, and Rosenbaum 1987, 11).

This criticism implies that a substantial expansion of aggregate agricultural output and exports is unrealistic in the short and long terms, even if all the components are in place at the start of the adjustment program. In order to evaluate the validity of these concerns, one has to take a closer look at the time frame and aggregate supply response of structural adjustment programs.

Structural adjustment is not intended to fix quickly economic problems that developed over several decades. The time frame for an adequate supply response is the medium and long run. Moreover, the response in the output mix must be distinguished from the change in total agricultural output. The response in the output mix, reallocating production factors in line with the corrected price ratio between products, can be easily accomplished and does not draw on resources used in other sectors of the economy. In general, switching from annual food crops to annual export crops while holding aggregate agricultural output and factor inputs constant should be highly responsive to relative prices, as many empirical studies on agricultural supply elasticities have shown. Only such a change can contribute significantly to the success of a structural adjustment policy. Comparative static trade theory assumes this switch will not affect total output (as indicated by the production possibility curve) but will affect the output mix. Many

empirical studies support the hypothesis that a change in the production pattern in line with comparative advantage will positively affect a country's welfare. Moreover, even if the production pattern does not set prices right, a country's welfare would probably improve as the internal consumption pattern adjusts to international price ratios. Possibly the most illuminating study of this is presented by Chinn (1981, 357). Chinn showed that China could significantly increase the amount of calories available to its people simply by exporting rice and importing wheat to take advantage of international price ratios. The most likely response of the agricultural production pattern and the certain reaction of the domestic consumption pattern to a change in relative prices would affect the country's quantities of exports and imports and thus be tempered by external demand constraints.

### **AGGREGATE PRODUCTION EFFECTS**

Whether or not aggregate agricultural supply responds to the prescriptions of a structural adjustment policy is uncertain because a comprehensive package of structural adjustment policies has not been implemented in Sub-Saharan Africa. However, some information is available on the aggregate production effects of individual elements of a policy package.

#### ***Price Incentives***

Price incentives are an important element of any structural adjustment policy, and an increase in agricultural prices might stimulate aggregate agricultural supply. This issue is still controversial: "the illusion that higher prices by themselves will lead to a large response in supply derives from an illegitimate application of what happens if the price of one crop rises relatively to others, to the case where the agricultural terms-of-trade as a whole improve" (Streeten 1987, 1474).

#### ***Terms of Trade***

The key variables in the growth of aggregate agricultural output are the agricultural and nonagricultural terms of trade. In order to encourage investment and capital formation in the production of export crops, the agricultural and nonagricultural terms of trade must improve as the price ratios among agricultural producers are corrected. The response of aggregate supply to price movements is expected to be lower than the supply response of individual crop output because switching the resources required for aggregate supply response between sectors costs more than switching them between crops.

To conclude, however, that the price responsiveness of aggregate agricultural output is low might be a mistake. The long-run supply response is the sum of the short-run response (in which land, labor, and

capital are fixed) and the effect of the price change on output (by means of its impact on the intersectoral reallocation of fixed factors). Thus the key distinctions between short-term and long-term output response to prices are the intersectoral flows of labor and capital and the relationship between incentives and new technology. The well-known distributed-lag approach that dominated the literature in the 1960s and 1970s failed to capture the response of labor migration, investment in agriculture, and changes in productivity to changes in the sectoral terms of trade.

The study by Bond (1983, 703-726) is frequently cited as empirical evidence for low elasticity of aggregate agricultural supply. Bond's model is inadequate, however, for estimating aggregate agricultural supply elasticities accurately (Schiff 1987, 384-387). Bond's estimates produce positive, but small elasticities and can only be accepted as the lower boundary of real elasticities. First, Bond uses aggregate output, not per capita output as her dependent variable. Second, she uses a trend variable to represent long-run structural changes. This does not capture changes in factor inputs fixed in the short term, but not in the long run, that occur in response to improved price incentives. Third, instead of expected prices, Bond uses the current price in her estimation (Schiff 1987, 385). Fourth, she does not explicitly quantify the effects of other variables that affect supply positively and are positively affected by price increases.

In the long run, the rate of labor migration between sectors depends on income differences between the agricultural and nonagricultural sectors (Mundlak 1985, 56). Unemployment in the urban sector also affects this migration. Agriculture in Sub-Saharan Africa is characterized by low average and marginal labor productivity and sharply seasonal labor requirements (Delgado and Ramade 1988, 118). Thus improving the agricultural terms of trade should cause labor input in agriculture to rise because the return to labor increases. Therefore, if seasonal bottlenecks in labor supply are removed, aggregate agricultural output will rise.

### ***Allocation of Capital***

A similar pattern holds for capital. For a given level of investment in the economy, the allocation of capital is influenced by the prospective returns to capital in each sector. Analyzing the relationship between prices and the adoption of new technologies in agriculture indicates that technical changes in agriculture (such as the introduction of tube wells, fertilizers, electricity, and equipment) usually require an increase in capital stock, which is subject to capital constraints. The adoption of new technologies therefore depends on the rate of capital accumulation, incentives, and prospective marginal returns to capital (Mundlak 1985, 56).

Recent work on aggregate agricultural supply response--which measures supply response by specifying the links between agricultural and nonagricultural labor and capital markets--provides empirical evidence that the supply response of aggregate agricultural output is considerable. These studies reason that "improved incentives will lead to an increase in privately provided inputs and will therefore increase the effectiveness of public goods; and vice versa, the provision of public goods will increase the effectiveness of price policy" and encourage private agents to invest in storage, transportation, and marketing (Schiff 1987, 387). Improved incentives and public goods are seen as complements to agricultural growth. Some of the best empirical work in this field has been done on South American countries, specifically the studies by Cavallo and Mundlak (1982) on Argentina, and by Coeymans and Mundlak (1987) on Chile.

Cavallo (1989) shows that in Argentina the growth of the agricultural sector was considerably hampered by policies that discriminated against the agricultural sector. Moreover, Argentina's agricultural output is quite responsive to improvements in the agricultural terms of trade "although some time is required. By the fourth year after the price increase, output has moved up by 30 percent of the price change" (Cavallo 1989, 15). Long-run aggregate supply elasticities of 1.0 to 1.8 follow rapid capital accumulation and increasing employment in agriculture. The impact of changes in economic incentives should not be viewed as a one-time impact. The process of sectoral growth is cumulative, and the output effect could be significantly greater than what might have been predicted by the agricultural price response analyses of the 1960s and 1970s.

Although these findings are for Argentina, they indicate considerable scope for long-term aggregate growth of the agricultural sector in Sub-Saharan countries as well. First, the high negative protection rates for agricultural exportables (Krueger, Schiff, and Valdés 1988) provide considerable space for price incentives.

Second, public investment in the agricultural sector accounts for relatively small shares of total public expenditure throughout Sub-Saharan Africa. The Food and Agriculture Organization of the United Nations (FAO) reports that the average share of agriculture in Sub-Saharan Africa's total public expenditure was less than 15 percent in 1978-82 (Alagh and Sarma 1984). Given the strict conditions of structural adjustment lending, reducing government spending probably will not affect the agricultural sector because such expenditures are needed immediately to support rural infrastructure and agricultural research. Other sectors, such as the military, will have to carry the major burden of cuts in public expenditure. Therefore, aggregate agricultural output will probably benefit from the full effect of complementarity between public goods and price incentives.

Third, improved agricultural terms of trade will increase the returns to labor input as well as increase aggregate agricultural output. The current bottlenecks in the supply of labor can be removed by offering higher real wages to attract labor to the agricultural sector. Thus nonprice factors are positively affected by a change in the price level and by the price level itself. Because of nonprice factors, an improvement in the agricultural terms of trade not only produces a one-time increase in agricultural production, but also stimulates production growth. Although positive, the production effect might be quite small in the short run, but more significant in the long run (Mellor and Ahmed 1988, 272). Of course, production grows more if policies are instituted to supplement directly the effects of price policy as one part of the structural adjustment policy package.

The level of real producer prices affects production growth. Cleaver (1985, 9) classifies the level of price discrimination in 31 African countries for the period from 1970 to 1981. Of those, 13 countries had low or no farm price discrimination and their agricultural production growth averaged 2.9 percent per year; the 8 countries with medium farm price discrimination achieved a 1.9 percent annual growth in agricultural production, and the 10 countries with high farm price discrimination had an annual growth rate of only 0.8 percent annually.

The remainder of this chapter briefly outlines an appropriate structural adjustment approach that should achieve long-term growth in the agricultural sector.

### **AN APPROPRIATE STRUCTURAL ADJUSTMENT POLICY**

Overall economic policies and agricultural price policies for particular sectors must be implemented so as to raise the relative price of agricultural tradables (both exportables and import substitutes). A higher real exchange rate is a necessary but not sufficient condition. The output of products with high nominal rates of protection at the current official exchange rate are not expected to expand. Expansion should be expected only for those products with low nominal (and effective) rates of protection. That is, the real exchange rate and sectoral price policies must be cohesive.

Structural adjustment programs usually do much more than change relative prices. They also involve investments that remove supply bottlenecks and deficiencies in infrastructure. Wanmali and Idachaba (1988) present an integrated interdisciplinary view of infrastructural development that applies to Sub-Saharan Africa. Expanding the net output of agricultural tradables requires net public investment in infrastructure and policies that reform input supply and output marketing. In particular, inefficiencies in the system for transporting goods from the producer to the final consumer must be removed. Lower

transportation costs produce lower consumer prices and encourage increases in demand.

This component of the package is one of the most difficult to achieve for two reasons. First, reducing the fiscal deficit usually requires reducing overall expenditures (unless revenue can be raised). Reducing expenditures makes maintaining even a trend level of public investment in and expenditure on agriculture difficult. The essential element of the package--financing--might not be unavailable. Second, reforming the institutional and the regulatory framework of agriculture is a herculean task in some Sub-Saharan African countries. The public and private agents who benefit from the hidden rents generated by parastatals and other institutions inevitably oppose any major institutional reorganization.

To expand nontraditional agricultural exports, particularly valuable products such as perishables, a modern dynamic service infrastructure in the nonagriculture sector is crucial. Reliable domestic and international transportation at competitive rates, information about market opportunities and prices in foreign markets, an agile banking system, working telephones and telexes, and, very important, a credible policy of no export restrictions or licenses are the most fundamental changes that must be achieved by the structural adjustment process over a three-to-seven-year period.

Neither a major supply constraint nor an inelastic aggregate agricultural supply response is perceived, as long as the entire structural adjustment package is implemented. The aggregate production response may be small in the short run, but the change in the ratio of agricultural prices may yield more significant production increases for individual crops. Moreover, even a small change in production will produce large changes in the marketable surplus. Consequently, the structural adjustment policies, if jointly accepted by a large number of African countries, may face external demand constraints.

## 5. FOREIGN TRADE PERFORMANCE OF SUB-SAHARAN AFRICA

The major objective of this chapter is to assess the structure of foreign trade in Sub-Saharan Africa. Africa's agricultural trade performance is crucial to understanding the impact of the increasing export of primary commodities from Sub-Saharan Africa on world markets and on Africa's economic growth and balance of payments.

### SHARE OF AGRICULTURAL TRADE IN TOTAL TRADE

#### Exports

The relative importance of agricultural exports varies considerably among countries (Table 7). The entire Sub-Saharan region has become less dependent on agricultural exports since 1976. The undeflated value of total exports (in US dollars) decreased slightly from \$33.8 billion in 1976/80 to \$32.8 billion in 1981/84. The undeflated value of agricultural exports declined 9 percent annually from \$8 billion in 1976/80 to \$5.2 billion in 1981/84. The proportion of agricultural exports decreased over the same period from 24 to 16 percent.

Table 7--Export structure of select Sub-Saharan African countries, 1976/80 and 1981/84

Country	Total Exports in Millions of U.S. Dollars		Agricultural Exports			
	1976/80	1981/84	Millions of U.S. Dollars		As Percent of Total Imports	
	1976/80	1981/84	1976/80	1981/84	1976/80	1981/84
Burkina Faso	65	67	65	51	100	76
Côte d'Ivoire	2,352	2,408	1,592	1,483	68	62
Kenya	1,108	1,073	691	603	62	56
Madagascar	359	306	317	283	88	92
Mali	135	207	113	207	84	100
Niger	318	394	57	77	18	20
Senegal	514	533	344	196	67	37
Tanzania	490	442	490	383	100	87
Sub-Saharan Africa	33,876	32,823	7,978	5,209	24	16

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987; and International Monetary Fund, *International Financial Statistics Yearbook 1987* (Washington, D.C.: IMF, 1987).

This development is largely the result of deteriorating world market prices for primary agricultural commodities such as coffee, cocoa, and cotton. Most of the countries studied here depend considerably on agricultural exports. Agricultural exports were virtually the only exports from 1981 to 1984 for Mali (100 percent), Madagascar (92 percent), and Tanzania (87 percent). Agricultural exports were the major export commodities for Burkina Faso (76 percent), Côte d'Ivoire (62 percent), and Kenya (56 percent) during the same period. In these three countries, the share of agricultural exports in total exports declined, which indicates a diversification into alternative exports. Metals and minerals constitute the main export commodities in Niger (uranium) and Senegal (phosphates and petroleum). In these countries, the share of agricultural exports in total exports is relatively low: 20 and 37 percent, respectively.

### *Imports*

The undeflated value of total imports to Sub-Saharan Africa increased 5 percent annually from \$31.2 billion in 1976/80 to \$38.7 billion in 1981/84 (Table 8). At the same time the undeflated value of agricultural imports increased at an annual rate of 8 percent from \$3.9 to \$5.6 billion. The share of agricultural imports in total imports increased slightly from 13 to 14 percent for the entire region of Sub-Saharan Africa. Some African countries have a relatively high share of agricultural imports in total imports, which indicates a food problem.

Table 8--Import structure of select Sub-Saharan African countries, 1976/80 and 1981/84

Country	Total Imports in Millions of U.S. Dollars		Agricultural Imports			
	1976/80	1981/84	Millions of U.S. Dollars		As Percent of Total Imports	
			1976/80	1981/84	1976/80	1981/84
Burkina Faso	248	296	52	71	21	24
Côte d'Ivoire	2,167	1,975	280	423	13	21
Kenya	1,643	1,653	166	211	10	13
Madagascar	463	429	65	97	14	23
Mali	280	355	49	96	18	27
Niger	337	541	58	61	17	11
Senegal	815	1,566	215	259	26	17
Tanzania	978	948	131	143	13	15
Sub-Saharan Africa	31,229	38,668	3,951	5,567	13	14

Source: Alberto Valdés, "Inter-DC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987; and International Monetary Fund, *International Financial Statistics Yearbook 1987* (Washington, D.C.: IMF, 1987).

In Mali, Burkina Faso, Madagascar, and Côte d'Ivoire, agricultural imports account for more than one-fifth of total imports (27, 24, 23, and 21 percent, respectively). Niger and Senegal managed to reduce the proportion of agricultural imports in total imports from 1976 to 1984. In all other countries agricultural imports increased in absolute value and share between 1976/80 and 1981/84.

## **ANALYSIS OF AGRICULTURAL EXPORTS AND IMPORTS**

Forty-nine single raw and processed agricultural commodities are included in the analysis of the agricultural export-import structure. The 49 commodities correspond to the three-digit Standard International Trade Classification (SITC). Real values are computed by multiplying nominal values with the appropriate UNCTAD import and export deflators using 1984 = 100 as the base. Most of the data presented in this analysis are from the Inter-LDC Trade Data Base directed by Alberto Valdés. This data base is the main feature of an ongoing project at the International Food Policy Research Institute. In the following paragraphs the major agricultural import and export commodities and any changes in the commodity composition over the past 25 years are identified. The export performance is examined in greater detail by applying a constant market share analysis to the total change in exports between 1976/80 and 1981/84.

### ***Composition of Agricultural Exports and Imports***

Coffee and cocoa are by far the most important export commodities for Sub-Saharan Africa. Throughout the past 25 years, the two products combined accounted for more than 50 percent of the value of agricultural exports (Table 9). In 1981/84 cotton, live animals, and tea were among the top five agricultural export commodities, and each contributed 5 percent of the total agricultural exports.

The number of export products has become increasingly more concentrated over the past 25 years. The single most important product, coffee, accounted for 39 percent of all agricultural exports in 1981/84 compared with 21 percent in 1962/65. Tea and live animals became increasingly important from 1962 to 1984, while oilseeds and nuts became less important (their share declined from 16 percent in 1962/65, when they were the third most important commodity, to only 1 percent in 1981/84).

The total real value of agricultural exports dropped to \$5.3 billion in 1981/84, half of its 1971/75 value. This drop is equal to an annual decrease of 8 percent. The most significant decrease was in the real export value of cocoa, which declined almost 25 percent annually between 1976/80 and 1981/84. Conversely, the real export value of live animals almost doubled, with annual growth rates of 17 percent between 1976/80 and 1981/84.

Table 9--Agricultural imports and exports of Sub-Saharan Africa, 1962-84

Commodity	1962/65		1966/70		1971/75		1976/80		1981/84	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
<b>Exports</b>										
Coffee	1,797.5	21	2,323.8	22	2,861.5	26	2,837.1	33	2,086.1	39
Cocoa	2,680.8	31	3,245.9	31	3,457.0	31	3,042.8	36	937.2	18
Cotton	411.3	5	534.4	5	590.7	5	320.6	4	292.5	5
Live animals	86.6	1	109.4	1	147.5	1	138.2	2	278.3	5
Tea	139.1	2	235.9	2	235.0	2	242.1	3	241.3	5
Oilseeds, nuts	1,333.7	16	1,441.1	14	840.5	8	231.6	3	70.0	1
Other	2,149.2	25	2,670.7	25	3,002.6	27	1,703.7	20	1,439.3	27
Total	8,598.1	100	10,561.3	100	11,134.8	100	8,516.1	100	5,344.6	100
<b>Imports</b>										
Rice	251.3	10	254.2	9	340.1	10	539.4	13	711.3	14
Wheat and meslin	189.1	8	322.0	12	354.0	11	422.2	10	603.2	12
Maize	40.7	2	85.5	3	103.7	3	134.7	3	401.5	8
Sugar and honey	173.4	7	147.6	5	343.7	10	373.3	9	385.2	7
Milk and cream	144.9	6	190.5	7	250.1	7	338.3	8	376.6	7
Manufactured fertilizer	132.3	6	112.9	4	157.9	5	258.1	6	298.2	6
Fixed vegetable oils	50.2	2	59.5	2	56.2	2	145.2	3	225.2	4
Alcoholic beverages	160.7	7	214.5	8	201.0	6	215.4	5	189.0	4
Other	1,260.8	52	1,391.2	50	1,546.1	46	1,834.8	43	2,046.8	39
Total	2,403.4	100	2,777.9	100	3,352.8	100	4,261.3	100	5,237.1	100

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987.

Note: Values are in millions of 1984 U.S. dollars.

Agricultural exports are also highly concentrated in two or three major commodities (Table 10). Although the list of countries in Table 10 is incomplete, price fluctuations on the world market for coffee will have the most severe impact in Kenya, Tanzania, Madagascar, Côte d'Ivoire, and Ghana. Côte d'Ivoire and Ghana are most vulnerable to changes in the world market price for cocoa. Changes in the price of cotton are most likely to affect West African countries and Tanzania.

Table 10--Major agricultural exports and imports of select Sub-Saharan African countries, 1981-84

Country/ Commodity	Value	Percentage of Total Agricultural Export Value
	(US \$ million)	
Kenya		
Coffee	249.2	41
Tea	154.8	25
Tanzania		
Coffee	147.8	38
Fresh fruit	59.6	15
Cotton	56.2	14
Madagascar		
Coffee	135.6	42
Spices	132.0	41
Burkina Faso		
Cotton	21.5	40
Oilseeds, nuts	10.6	20
Live animals	8.1	15
Mali		
Live animals	117.1	61
Cotton	63.3	33
Niger		
Live animals	38.2	72
Tobacco	10.2	19
Senegal		
Fixed vegetable oils	77.6	39
Crude fertilizer	56.7	29
Côte d'Ivoire		
Cocoa	718.4	45
Coffee	519.0	33

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987.

In agriculture, imports are significantly less concentrated than exports. The top five import commodities accounted for 48 percent of total agricultural imports in 1981/84, compared with 72 percent of the top five export commodities. Also, while the real value of agricultural exports decreased, that of imports increased from \$3.4 billion in 1971/75 to \$5.2 billion in 1981/84. The ratio of agricultural exports to imports dropped during those 15 years from more than 3 to 1 percent. Rice, wheat and meslin, and maize, the three most important commodities, increased their share of total agricultural imports from 20 percent in 1962/65 to 34 percent in 1981/84. This increase clearly reflects the growing shortage of foodgrains in Sub-Saharan Africa. In all the Sub-Saharan countries included in Table 8, foodgrains are the most important agricultural import commodities.

### ***Destination and Origin of Agricultural Trade***

The European Community is the single most important purchaser of Sub-Saharan Africa's agricultural exports (Tables 11 and 12). The European Community signed preferential trade agreements with 65 developing countries as part of its Lomé Convention, which came into force in 1975 with less than 50 countries (Koester and Herrmann 1987). In 1981/84, 52 percent of agricultural exports from Sub-Saharan Africa entered the Common Market. Except for sugar and live animals (38 and 0 percent, respectively) the European Community absorbed more than 50 percent of the region's major exports, such as coffee, cocoa, tea, cotton, fruits and vegetables, oilseeds, vegetable oil, and tobacco. Moreover, countries in the Organization for Economic Cooperation and Development (OECD) received more than two-thirds of Sub-Saharan Africa's major agricultural exports, except live animals, which were exported either to North Africa and the Middle East (40 percent) or to other Sub-Saharan African countries (59 percent). Much of the region's exports of fruits and vegetables (15 percent), cotton (17 percent), and tea (13 percent) went to developing countries outside North Africa and the Middle East and Sub-Saharan Africa. Except for cocoa (11 percent), the share of exports to centrally planned countries was less than 10 percent.

Of all the agricultural products imported by Sub-Saharan Africa, 39 percent came from the European Community (72 percent of the imports from all OECD countries). Not included were the imports of typical surplus products from the EC, such as milk and cream (79 percent) and sugar (62 percent). OECD countries, other than those in the European Community, are the major suppliers of food grains imported by Sub-Saharan Africa, including rice (36 percent), wheat and meslin (67 percent), and maize (49 percent). Developing countries provided 28 percent of all agricultural imports and 58 percent of rice and 46 percent of maize imports. These two imports came almost entirely from developing countries outside Sub-Saharan Africa. Virtually no imports came from centrally planned countries.

Table 11--Destination of exports of select Sub-Saharan African countries, by commodity, 1981/84

Commodity	Value							Share of Total Commodity Exports						
	SSA	NAME	LDC	EC	OECD	CP	Total	SSA	NAME	LDC	EC	OECD	CP	Total
	(US \$ million)							(percent)						
Coffee	30.6	136.0	176.9	1,041.1	1,662.6	126.5	1,966.0	2	7	9	53	85	6	100
Cocoa	5.4	2.6	16.8	556.5	793.5	103.1	913.5	1	0	2	61	87	11	100
Tea	12.7	18.8	61.1	135.6	173.6	0.0	234.7	5	8	26	58	74	0	100
Cotton	10.7	13.2	75.1	163.2	191.5	20.0	286.6	4	5	26	57	67	7	100
Fruits and vegetables	30.7	11.3	84.5	152.2	189.4	4.6	277.3	11	4	30	55	68	2	100
Oilseeds	4.6	9.5	14.8	36.1	49.6	5.5	69.9	7	14	21	52	71	8	100
Vegetable oil	13.0	0.7	13.7	149.3	153.5	0.0	167.1	8	0	8	89	92	0	100
Tobacco	35.7	7.4	44.6	87.8	124.7	0.3	169.4	21	4	26	52	74	0	100
Sugar	21.9	4.1	43.3	50.1	87.0	0.9	130.9	17	3	33	38	66	1	100
Live animals	191.0	128.9	319.9	1.6	2.2	1.2	323.3	59	40	99	0	1	0	100
Total agricultural exports	452.3	352.7	1,063.1	2,701.4	3,851.9	294.2	5,209.2	9	7	20	52	74	6	100

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987.

Note: SSA is Sub-Saharan Africa; NAME, North Africa and the Middle East; LDC, developing countries; EC, European Community; OECD, Organization for Economic Cooperation and Development; and CP, centrally planned economies.

Table 12--Origin of select commodities imported by Sub-Saharan Africa, 1981/84

Commodity	Value							Share of Total Commodity Imports						
	SSA	NAME	LDC	EC	OECD	CP	Total	SSA	NAME	LDC	EC	OECD	CP	Total
	(US \$ million)							(percent)						
Rice	4.7	0.8	444.9	44.5	316.1	0.7	761.6	1	0	58	6	42	0	100
Wheat and meslin	0.2	0.0	3.3	202.1	633.2	0.0	636.5	0	0	1	32	99	0	100
Sugar and honey	21.9	7.2	71.2	259.5	344.6	0.0	415.8	5	2	17	62	83	0	100
Maize	25.0	0.0	188.2	21.1	222.4	2.3	412.9	6	0	46	5	54	1	100
Milk and cream	2.1	0.0	8.6	317.1	394.4	0.1	403.1	1	0	2	79	98	0	100
Manufactured fertilizer	16.6	30.6	67.3	111.7	243.4	6.4	317.1	5	10	21	35	77	2	100
Fixed vegetable oils	0.4	4.7	68.8	111.9	169.8	0.0	238.6	0	2	29	47	71	0	100
Total agricultural imports	452.3	67.1	1,567.2	2,171.3	3,985.8	13.7	5,566.6	8	1	28	39	72	0	100

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987.

Note: SSA is Sub-Saharan Africa; NAME, North Africa and the Middle East; LDC, developing countries; EC, European Community; OECD, Organization for Economic Cooperation and Development; and CP, centrally planned economies.

Two markets for the exports of Sub-Saharan Africa are of particular interest. Because of geographic circumstances, Sub-Saharan Africa has a relative advantage when exporting to North Africa and the Middle East. Also, although they have similar production patterns, countries in Sub-Saharan Africa trade among themselves. Regional trade accounted for 9 percent of agricultural exports in 1981/84. Live animals were by far the most important commodity, with 59 percent of the regional trade. Although important, fruits, tobacco, sugar, and vegetables have significantly lower shares of the regional market (11, 21, 17, and 11 percent, respectively). North Africa and the Middle East absorbed only 7 percent of all exports. Besides live animals, only oilseeds accounted for a two-digit share of exports (14 percent). In absolute values, coffee accounted for \$136 million (7 percent) of the exports to North Africa and the Middle East. Those areas, in turn, exported considerable amounts to Sub-Saharan Africa (especially manufactured fertilizer, which constituted 10 percent of all fertilizer imported by Sub-Saharan Africa. Only 8 percent of the imports came from other countries in the region. The barriers that limit regional trade within Sub-Saharan Africa and the prospects for that trade in the future warrant investigation.

### ***Agricultural Exports from Sub-Saharan Africa in Global Perspective***

Sub-Saharan Africa's market share of world agricultural exports dropped from 7 percent in 1962/65 to 3 percent in 1981/84 (Table 13). This drop coincides with an overall decline in the market share of all developing countries from 36 to 25 percent over the same period. The share of Sub-Saharan Africa in the world cocoa market, for example, dropped continuously from 78 percent to 35 percent between 1962/65 and 1981/84. During those 25 years, Sub-Saharan Africa lost almost its entire world market share of oilseeds and vegetable oils, maintained its share of coffee exports (21 percent), and considerably increased its share of tea to 15 percent by 1981/84.

Sub-Saharan Africa's share of the agricultural export market of all developing countries declined from 18 percent in 1962/65 to 11 percent in 1981/84 (Table 13). In the early 1960s, cocoa exports from Sub-Saharan Africa accounted for 87 percent of all cocoa exports from developing countries. This proportion dropped to 51 percent in 1981/84. Also, its share of exports of oilseeds and vegetable oils decreased from 49 and 34 percent, respectively, to 5 percent each. During the same time, Sub-Saharan Africa increased its share of developing-country live animal exports from 24 to 54 percent. Sub-Saharan Africa also has the potential to increase its market share of tea exports. In 1981/84 Sub-Saharan Africa supplied 17 percent of all the tea exported from developing countries. Coffee's share was approximately 25 percent during 1981/84. Sub-Saharan Africa also managed to maintain its market position among other developing countries in tobacco and cotton (12 percent) each. Only a small percentage of the sugar and fruits and vegetables exported from developing countries (4 percent each) originated in Sub-Saharan Africa during 1981/84.

Table 13--Sub-Saharan Africa's share of agricultural exports of developing countries and their value, 1962-84

Commodity/ Export Region	Value					Percent of World Export Value					Percent of LDC Export Value				
	1962/65	1966/70	1971/75	1976/80	1981/84	1962/65	1966/70	1971/75	1976/80	1981/84	1962/65	1966/70	1971/75	1976/80	1981/84
	(US \$ million)														
Coffee															
SSA	459.7	629.9	1,080.3	2,726.3	1,966.0	23	26	28	24	21	24	27	31	27	24
LDC	1,909.5	2,331.4	3,528.8	10,194.6	8,254.4	97	96	92	91	90					
World	1,973.1	2,438.6	3,817.5	11,160.7	9,162.6										
Cocoa															
SSA	607.2	771.2	1,328.2	2,831.3	913.5	78	71	69	57	35	87	81	80	70	51
LDC	695.0	951.8	1,669.4	4,060.7	1,808.8	89	88	87	82	69					
World	777.8	1,080.3	1,921.6	4,924.2	2,617.4										
Tea															
SSA	42.8	61.9	98.4	223.7	234.7	7	11	14	16	15	7	12	16	19	17
LDC	579.6	497.0	597.9	1,168.1	1,385.6	98	90	86	85	87					
World	590.0	554.5	695.3	1,368.1	1,597.0										
Cotton															
SSA	113.2	140.2	211.4	309.1	286.6	6	7	6	6	5	9	11	10	11	12
LDC	1,295.8	1,301.5	2,093.2	2,819.7	2,369.7	64	68	53	53	45					
World	2,036.0	1,918.1	3,337.1	5,291.6	5,266.1										
Fruits and vegetables															
SSA	56.1	73.7	177.2	244.4	233.2	2	2	2	2	1	8	7	9	6	4
LDC	737.2	1,004.0	1,908.5	4,363.3	5,311.5	25	25	25	27	26					
World	2,965.0	3,980.9	7,777.2	16,148.3	20,063.4										
Oilseeds															
SSA	299.4	254.0	213.2	175.4	69.9	23	16	5	2	1	49	45	19	10	5
LDC	612.4	564.8	1,113.5	1,741.8	1,369.3	47	35	27	23	15					
World	1,291.4	1,633.4	4,134.6	7,698.8	8,932.1										
Vegetable oils															
SSA	153.1	152.7	228.0	247.7	167.1	19	16	8	4	3	34	31	16	8	5
LDC	452.3	490.9	1,394.4	2,972.3	3,432.4	56	52	49	52	52					
World	813.2	943.8	2,871.0	5,680.5	6,641.7										
Tobacco															
SSA	29.3	31.7	68.5	153.0	169.4	3	2	3	3	2	16	16	13	15	12
LDC	187.5	199.7	518.1	1,011.4	1,469.4	17	14	21	20	22					
World	1,095.2	1,379.4	2,484.6	5,040.7	6,809.5										
Sugar															
SSA	18.7	14.6	46.8	81.4	130.9	2	1	1	1	2	3	2	1	3	4
LDC	535.3	637.2	3,326.8	3,148.1	3,363.3	52	57	65	51	48					
World	1,019.6	1,117.7	5,098.7	6,153.3	6,949.8										
Live animals															
SSA	25.7	33.3	65.9	133.0	323.3	4	4	4	4	7	24	23	34	37	54
LDC	107.6	145.1	198.6	355.1	603.0	16	17	11	10	14					
World	684.8	875.5	1,876.6	3,382.8	4,438.6										
Agricultural exports															
SSA	2,110.2	2,544.9	4,124.1	7,869.4	5,094.0	7	7	5	5	3	18	20	17	17	11
LDC	11,434.1	12,696.6	24,076.9	46,145.4	48,108.2	36	34	29	29	25					
World	31,535.3	37,788.0	81,697.2	158,169.5	189,342.1										

Source: Alberto Valdés "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987.  
 Note: SSA is Sub-Saharan Africa. LDC is developing countries.

## MARKET SHARE ANALYSIS

The underlying concept of the following analyses of the export performance of Sub-Saharan Africa is the constant market share approach. This approach assumes that a region's share of exports in the destination market remains unchanged over the observation period. The total change (in 1984 U.S. dollars) is broken down into four effects (Valdés and Gnaegy 1984). A detailed arithmetic derivation of the analysis is presented in Appendix 1.

1. The *import growth effect* is the proportion of change in the exports from Sub-Saharan Africa that is attributed to the overall growth of imports in the destination, assuming that market shares remain constant. This term is positive (negative) if total imports in the destination increased (decreased) over the period observed.
2. The *market effect* represents the proportion of change in the exports from Sub-Saharan Africa that is attributed to the concentration of those exports in regions whose import markets are growing faster (slower) than the average of all markets in question. Therefore, a negative (positive) market effect indicates a concentration of exports from Sub-Saharan Africa in regions with relatively slow- (fast-) growing import markets.
3. The *commodity composition effect* is calculated by carrying out the market share analysis for several commodities or commodity groups simultaneously. This component of total export change measures Sub-Saharan Africa's concentration on commodities with above (below) average import growth in the destination. A negative (positive) commodity composition effect indicates that the majority of Sub-Saharan Africa's export commodities have experienced below- (above-) average import growth.
4. The *competitive effect* is the residual component of the decomposition of total export change. It is a proxy for the change in Sub-Saharan Africa's competitiveness that results from economic and noneconomic factors not considered in other effects. The competitive effect actually accounts for the change in Sub-Saharan Africa's market share, while components 1 through 3 are based on its market share at the beginning of the period. A positive competitive effect means that Sub-Saharan Africa captured higher market shares, a negative effect means it did not.

The market share analysis is carried out for several destinations that are particularly important importers of Sub-Saharan Africa's agricultural commodities. The market shares of 1976/80 are compared with those of 1981/84.

### ***Exports to the World***

Between 1976/80 and 1981/84 the real value of Sub-Saharan Africa's agricultural exports declined by US\$3.2 billion, or approximately 10 percent per year (Table 14). During the same period the real value of global agricultural exports increased by \$6.4 billion, or 1 percent annually.

Cocoa and coffee, the two major sources of foreign exchange decreased the most: their real export values decreased \$2.1 billion and \$751 million, respectively. This negative effect was too large to be offset by increased revenues from other exports, such as live animals (\$140.1 million), sugar (\$43.9 million), fruit (\$47.3 million), and spices (\$45.5 million). These were outstanding commodities, whose real export values increased significantly during the period.

The import growth effect shows that the growth of Sub-Saharan Africa's exports would have been positive (\$304 million) if the region had maintained its overall 1976/80 market share. However, approximately three-fourths of all commodities experienced a negative real import growth effect. The severe consequences of the composition of Sub-Saharan Africa's export commodities, which are dominated by coffee, cocoa, and cotton, are revealed by the commodity composition effect (-\$2.5 billion). Compared with world imports, the commodity composition of Sub-Saharan Africa's imports is less profitable. The negative import growth effects of the three major export commodities account for more than 70 percent of the total change (-\$3.2 billion). The negative effect of export concentration on coffee and cocoa was only partly offset by the export of products that experienced a positive import growth effect (tobacco, live animals, fruits and vegetables, and animal feed). The positive growth commodities made up only 15 percent of the 1981/84 real export value of agricultural products.

An overall positive market effect usually indicates export concentration in relatively fast-growing import markets. However, the market effects on individual commodities are negative in most cases. Most commodities are directed to regions in which the growth of import demand is below average. The overall positive market effect (\$137 million) is largely the result of the export of live animals (\$156.8 million), whose market effect is very positive.

The overall negative competitive effect (-\$1,112.9 million) accounts for 35 percent of the total change. Thus, 37 out of 49 commodities lost market shares, and the negative impact of this loss could not be offset by gains in the market shares of other products. Sub-Saharan Africa was unable to improve or even maintain its competitive position compared with the rest of the world. The region suffered its most severe losses of market share in the real export value of cocoa (-\$505 million), oilseeds (-\$138.5 million), and coffee (-\$105.9 million). Sub-Saharan Africa improved its competitiveness in commodities such as sugar (\$52

Table 14--Constant market share analysis: total agricultural exports of Sub-Saharan Africa, 1976/80-1981/84

Code Number/ Commodity	Total Change	Growth Effect	Market Effect	Competitive Effect
(1984 US\$1,000)				
61 Sugar and honey	43,941	1,525	-10,023	52,439
74 Tea	-855	3,194	-29,266	25,217
263 Cotton	-28,188	-61,789	13,844	19,757
51 Fresh fruit	47,285	2,692	27,236	17,357
75 Spices	45,484	13,502	18,715	13,267
122 Manufactured tobacco	15,458	3,158	-739	13,039
48 Cereal preparations	3,178	1,012	-557	2,723
561 Manufactured fertilizer	5,053	2,840	647	1,566
99 Food preparations	2,937	2,588	-1,017	1,366
24 Cheese and curd	1,000	16	-8	992
91 Margarine and shortening	121	-8	-479	608
52 Dried fruit	109	-108	144	73
43 Barley	-140	49	-119	-70
25 Eggs	-18	24	48	-90
62 Confectionery sugar	-1,720	-41	-1,572	-107
262 Wool and animal hair	-580	-250	-146	-184
264 Jute	-192	-18	12	-186
23 Butter	-19	292	217	-528
411 Animal oils and fat	-920	-168	-55	-697
431 Animal and vegetable oil	-905	807	-348	-1,364
12 Dried meat	-1,085	132	620	-1,837
55 Vegetable roots	-2,226	478	-507	-2,197
265 Vegetable fibers	-11,741	-7,807	-1,141	-2,793
47 Cereals: meal and flour	-2,286	3,530	-2,867	-2,949
22 Milk and cream	-2,605	1,126	-117	-3,614
41 Wheat and meslin	-3,179	,869	-412	-3,636
291 Crude animal material	-4,034	88	487	-4,609
422 Other fixed vegetables	-14,218	-9,548	100	-4,770
45 Other cereals	-7,960	447	-3,381	-5,026
46 Wheat: meal flour	-5,543	826	7	-6,376
73 Chocolate and others	-7,867	1,146	-2,589	-6,424
121 Unmanufactured tobacco	-15,438	10,349	-14,948	-10,839
44 Maize	3,116	-666	17,835	-14,053
11 Fresh meat	-13,871	1,855	-19	-15,707
211 Hides and skins	-37,370	-18,592	-2,656	-16,122
42 Rice	-11,773	1,646	3,157	-16,576
13 Meat preparations	-12,999	1,172	2,976	-17,147
231 Crude rubber	-23,137	-4,123	-1,357	-17,657
271 Crude fertilizers	-21,002	-7,822	5,114	-18,294
54 Fresh vegetables	-7,007	7,859	3,468	-18,334
112 Alcoholic beverages	-17,503	1,261	-183	-18,581
53 Preserved fruits	-12,163	16,674	514	-29,351
1 Live animals	140,099	22,325	156,784	-39,010
292 Crude vegetable material	-41,107	9,241	-975	-49,373
81 Animal feed	-68,293	34,369	-11,115	-91,547
421 Fixed vegetable oils	-83,144	12,914	-4,305	-91,753
71 Coffee	-751,079	-656,386	11,193	-105,886
221 Oilseeds and nuts	-161,568	-10,734	-12,300	-138,534
72 Cocoa	-2,105,583	-1,577,554	-22,901	-505,128
0 Total	-3,171,530	304,040	137,018	-1,112,941

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987.

Note: The total commodity composition effect is -\$2,499,647.

million), tea (\$25 million), and cotton (\$20 million). However, for those products, this positive competitive effect was offset at least partly by negative market or import growth effects.

All in all, Sub-Saharan Africa exports too few commodities and fails to maintain its competitiveness in major export markets, which contributes to the deterioration of its real export earnings. The internal or external factors responsible for the loss in overall competitiveness remain to be identified.

### ***Exports to Developing Countries***

In 1981/84 Sub-Saharan Africa's agricultural exports to developing countries accounted for 19 percent of its total agricultural exports. Seven commodities, of which live animals (30 percent) and coffee (17 percent) were the most important, made up 80 percent of the agricultural exports that Sub-Saharan Africa sold to developing countries. The commodity composition of these exports was less concentrated than that of agricultural exports as a whole. The following paragraph analyzes whether Sub-Saharan Africa could capture larger market shares by taking advantage of the relatively fast-growing import markets in developing countries.

The total real value of agricultural exports to developing countries increased \$115.9 million from 1976 to 1984 (Table 15). The largest gains were experienced by exports of live animals (\$138.7 million), fresh fruit (\$22.1 million), and spices (\$27.5 million). The export revenue earned by these commodities more than outweighed the export revenue lost by commodities such as coffee (-\$46.7 million), oilseeds and vegetable oils (-\$36.4 million), and cocoa (-\$16.3 million).

If Sub-Saharan Africa had maintained its overall 1976/80 market share, the import growth effect would have been \$205.2 million, or almost twice the total change in real export earnings. The import growth effect was positive for the majority of commodities, which indicates considerable growth potential for future exports to developing countries. The import growth effect for three traditional commodities (coffee, cocoa, and cotton) was negative. However, this loss was more than offset by the large, positive import growth effects for commodities such as spices, oilseeds, maize, fresh fruit, and tea. The positive overall market effect (\$66.3 million) reveals that Sub-Saharan Africa could direct its exports to regions with relatively fast-growing import markets. Livestock exports contributed \$72.6 million to the gain, which more than compensated for losses on relatively slow-growing import markets, such as the market for oilseeds, which lost \$20.7 million. The commodity composition effect was negative, but rather small (-\$31.8 million). This implies that the commodity composition of Sub-Saharan Africa's exports to developing countries had a slightly negative impact on the total change in real export revenues.

Table 15--Constant market share analysis: agricultural exports from Sub-Saharan Africa to developing countries, 1976/80-1981/84

Code Number/ Commodity	Total Change	Growth Effect	Market Effect	Competitive Effect
(1984 US\$1,000)				
263 Cotton	10,813	-11,654	4,212	18,255
61 Sugar and honey	14,770	3,307	-3,546	15,009
74 Tea	15,476	6,906	-3,865	12,435
122 Manufactured tobacco	10,559	2,343	-744	8,960
121 Unmanufactured tobacco	-3,963	846	-11,455	6,646
48 Cereal preparations	4,346	109	-22	4,259
561 Manufactured fertilizers	6,580	458	2,071	4,051
112 Alcoholic beverages	1,508	-334	-574	2,416
73 Chocolate	2,293	168	-252	2,377
55 Vegetable roots	1,682	554	-661	1,789
99 Food preparations	3,037	3,548	-2,075	1,564
211 Hides and skins	155	260	-1,657	1,552
24 Cheese and curd	998	50	-43	991
91 Margarine and shortening	125	-174	-311	610
43 Barley	70	121	-191	140
262 Wool and animal hair	-22	1	-9	-14
25 Eggs	-10	168	-96	-82
431 Animal and vegetable oil	-40	154	-81	-113
411 Animal oils and fat	-183	-10	-42	-131
52 Dried fruit	-153	-54	74	-173
264 Jute	-194	31	-38	-187
265 Vegetable fibers	-2,529	-824	-1,509	-196
53 Preserved fruits	-431	161	-101	-491
62 Sugar confections	-2,247	-356	-1,257	-634
23 Butter	-248	498	-12	-734
47 Cereals: meal and flour	-1,452	1,184	-1,873	-763
231 Crude rubber	-550	1,360	-1,057	-853
13 Meat preparation	-1,547	98	-685	-960
291 Crude animal material	-1,002	353	297	-1,652
45 Other cereals	-2,726	4,066	-5,121	-1,671
11 Fresh meat	-714	3,267	-2,226	-1,755
41 Wheat and meslin	-1,459	402	244	-2,105
12 Dried meat	-1,785	849	-99	-2,535
22 Milk and cream	-2,114	1,297	-384	-3,027
72 Cocoa	-16,272	-9,376	-2,741	-4,155
292 Crude vegetable material	-4,182	1,992	-995	-5,179
81 Animal feed	-2,968	5,601	-2,664	-5,905
75 Spices	27,497	31,644	1,997	-6,144
46 Wheat: meal and flour	-5,312	93	747	-6,152
271 Crude fertilizers	-4,276	-1,510	3,873	-6,639
51 Fresh fruits	22,161	7,652	21,787	-7,278
44 Maize	9,674	10,849	7,240	-8,415
54 Fresh vegetables	-2,473	7,308	257	-10,038
422 Other fixed vegetables	-2,655	2,297	5,446	-10,398
221 Oilseeds and nuts	-18,491	15,685	-20,760	-13,416
42 Rice	-9,862	1,701	2,711	-14,274
421 Fixed vegetable oils	-17,898	1,333	1,411	-20,642
71 Coffee	-46,716	-27,582	8,464	-27,598
1 Live animals	138,632	106,503	72,638	-40,509
0 Total	115,907	205,184	66,325	-123,764

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987.

Note: The total commodity composition effect is -\$31,838.

Even in favorable markets, Sub-Saharan Africa lost competitiveness and market shares for most commodities. The negative competitive effect (-\$123.8 million) reflects this loss of market shares and offsets almost 60 percent of the import growth effect. Live animals (-\$40.5 million) and coffee (-\$27.6 million), in particular, severely lost market shares of real value. Sub-Saharan Africa could improve its competitiveness in the markets for cotton (\$18.2 million), sugar (\$15 million), and tea (\$12.4 million) in developing countries.

Hence Sub-Saharan Africa was able to increase real export earnings from exports to developing countries only because the import demand was growing relatively fast (large import growth effects). Compared with its competitors in this particular import market, Sub-Saharan Africa performed below average and lost market shares overall. Especially in coffee and live animals, other developing countries picked up the market shares previously held by Sub-Saharan Africa.

### *Exports to the European Community*

The European Community has preferential trade agreements with the majority of Sub-Saharan Africa countries and is its most important export market. Thus the question of whether Sub-Saharan Africa could capture higher shares of the EC market is pertinent.

Overall, the real value of Sub-Saharan exports to the European Community declined by \$1,554.3 million in U.S. dollars between 1976/80 and 1981/84 (Table 16). Clearly, the highest loss was the result of depressed prices for cocoa and coffee on the world market. Only the export revenues of sugar (\$28 million) and fresh fruit (\$23.8 million) increased among the products exported to the European Community.

Even assuming that Sub-Saharan Africa maintained its share of common market imports, the real value of its exports would have been \$226.7 million lower in 1981/84 than in 1976/80. The real value of the EC imports declined because the world market prices for agricultural commodities such as coffee and cocoa deteriorated severely.

In 1981/84 almost three-fourths of Sub-Saharan Africa's agricultural exports to the European Community were four commodities: coffee (43 percent), cocoa (21 percent), cotton (5 percent), and tea (5 percent). Certainly, the commodity composition, which is highly concentrated, was most unfavorable for developing export earnings in the European Community. The negative commodity composition effect (-\$1,275.3 million) accounted for 82 percent of the total loss in real export value. This was primarily the result of negative growth effects for real export earnings of cocoa (\$1,090.3 million), coffee (\$321.6 million), and tea (\$25 million). Again, real export earnings declined because the terms of trade for most of Sub-Saharan Africa's exports, especially the above products, deteriorated.

Table 16--Constant market share analysis: agricultural exports from  
Sub-Saharan Africa to the European Community, 1976/80-1981/84

Code Number/ Commodity	Total Change	Growth Effect	Market Effect	Competitive Effect
(1984 US\$1,000)				
61 Sugar and honey	28,023	-3,209	1,490	29,742
263 Cotton	-465	-27,287	62,221	20,601
51 Fruit fresh	23,845	-2,292	6,042	20,095
231 Crude rubber	1,039	-10,895	5,367	6,567
75 Spices	4,481	-866	239	5,108
121 Unmanufactured tobacco	3,867	-6,619	6,741	3,745
265 Vegetable fibers	-965	-5,207	647	3,591
122 Manufactured tobacco	5,399	981	903	3,515
422 Other fixed vegetables	-3,034	-10,115	5,747	1,334
62 Sugar confections	528	0	2	526
12 Dried meat	521	2	10	509
52 Dried fruit	454	8	26	420
1 Live animals	367	13	-62	416
23 Butter	363	2	-2	363
431 Animal & vegetable oil	140	339	-260	61
24 Cheese and curd	1	0	0	1
264 Jute	0	0	0	0
43 Barley	0	0	0	0
44 Maize	-6	-2	0	-4
91 Margarine and shortening	3	-1	0	-5
25 Eggs	-7	-1	-1	-5
22 Milk and cream	-2	4	0	-6
262 Wool and animal hair	-468	-235	-138	-95
99 Food preparations	-69	67	6	-142
46 Wheat: meal and flour	-194	7	10	-211
47 Cereals: meal and flour	-776	699	-1,052	-423
291 Crude animal material	-471	-253	233	-451
411 Animal oils and fat	-800	-104	76	-772
45 Other cereals	-3,571	-925	-1,762	-884
41 Wheat and meslin	-1,200	-381	235	-1,054
561 Manufactured fertilizers	-1,015	1,089	-818	-1,286
48 Cereal preparation	-1,206	392	86	-1,684
42 Rice	-1,800	179	81	-2,060
74 Tea	-6,623	-24,946	20,649	-2,326
55 Vegetables and roots	-3,144	-261	66	-2,949
54 Fresh vegetables	-1,061	4,526	-1,374	-4,213
73 Chocolate	-6,028	28	-1,445	-4,611
13 Meat preparations	-4,867	119	-123	-4,863
112 Alcoholic beverages	-8,033	565	-930	-7,668
11 Fresh meat	-9,549	65	-1,125	-8,489
271 Crude fertilizers	-12,337	-3,751	27	-8,613
53 Preserved fruits	-5,751	10,122	-1,700	-14,173
71 Coffee	-328,918	-321,575	12,918	-20,261
211 Hides and skins	-34,084	-16,308	4,593	-21,869
292 Crude vegetable material	-23,219	2,513	-1,038	-24,694
421 Fixed vegetable oils	-59,505	3,643	-11,336	-51,812
81 Animal feed	-29,681	19,098	3,309	-52,088
221 Oil seeds and nuts	-95,096	-20,464	4,283	-78,915
72 Cocoa	-979,379	-1,090,257	287,632	-176,754
0 Total	-1,554,295	-226,741	344,482	-396,785

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987.

Note: The total commodity composition effect is -\$1,275,250.

The overall market effect of \$344.5 million indicates that Sub-Saharan Africa concentrated its exports in relatively fast-growing markets. Also, for most individual commodities, its exports went into markets with above-average growth.

However, Sub-Saharan Africa has lost market shares to other competitors in the EC import market. The major losses in competitiveness were in cocoa (-\$176.8 million) and oilseeds (-\$78.9 million). Compared with severe losses in these two products, improved competitiveness in sugar (\$29.7 million), cotton (\$20.6 million), and fresh fruit (\$20.1 million) were insignificant.

All in all, the potential benefits of the Lomé agreement are overshadowed by Sub-Saharan Africa's loss of competitiveness and the declining prices in the EC market.

## CONCLUSIONS

The three market-share analyses reveal the major reason for Sub-Saharan Africa's poor agricultural export performance. The composition of its export commodities does not allow enough leverage to offset the effects of deteriorating world market prices for one major export by increasing the value of others.

Sub-Saharan Africa's choice of export markets favors its export performance. In general, countries in this region have concentrated their exports on markets with above-average growth in the demand for agricultural imports. This is especially true of the developing countries and the European Community. The same should be true of exports to oil-exporting countries. If Sub-Saharan Africa would diversify its export composition, fast-growth import regions would have to be identified for the new, nontraditional export commodities. Consequently, a number of market regions would gain in importance.

Nevertheless, Sub-Saharan Africa has suffered severely from market share losses that are not due to negative import growth effects and negative commodity composition effects. It remains pure speculation at this point whether most of the loss of competitiveness is the result of national policies that are biased against agricultural exports.

## 6. POTENTIAL FOR EXPORT EARNINGS FROM INCREASED TRADITIONAL AGRICULTURAL EXPORTS

Many critics of structural adjustment policies expect that their effect on demand will be limited. The negative repercussions of changing world market prices, which are the consequence of export growth strategies promoted in many Sub-Saharan African countries, are known as the fallacy of composition. This "presumes that markets would not be able to absorb all of the exports that would materialize if developing countries" would jointly promote an export-led strategy (Bhagwati 1988). Furthermore, if the markets were found, "they would be closed by protectionist measures, provoked by the import penetration and outcries of market disruption." The consequences of such a development would be continuously deteriorating terms of trade and, in the worst case, decreasing export revenues.

The above argument is extremely general, which is both its chief attraction and its chief weakness. Clearly, implementing trade liberalization and export orientation will not take place simultaneously in all Sub-Saharan African countries, and exports will not be dumped simultaneously on the world market (Streeten 1987, 1479). In addition, economic growth throughout developing countries will increase import demand for primary goods from other developing countries. Thus larger export quantities will be absorbed by a growing world market.

In some cases, the market may be limited not by the nature of the final consumers' demand, but by the antitrade policies of the rich-country buyers that limit "excessive" imports. This has been the case with agricultural protection in many OECD countries (Valdés and Zietz 1980), which may have to lower their protectionist barriers in the long run under the pressure of global trade liberalization. This change, although distant, would create considerable potential for the exports of Sub-Saharan African countries to grow.

In the past the real price of tropical commodities did not necessarily fall, and much of the empirical material backing up the thesis of the secular fall in the terms of trade is for a specific time period (Scandizzo and Diakosawas 1987). Much of the discussion of price movements overlooks changes that may result from cost-reducing innovations.

New products such as soybeans and concentrated frozen orange juice from Brazil, fresh fruit from Chile, and pineapples and tapioca pellets from Thailand suggest that the potential expansion of nontraditional

exports is enormous. Thus a poor country might profit from the international economic environment, imperfect as it is. A more open trade strategy could lead to more diversified exports by enabling the economy to be more flexible and better able to adapt to changing world conditions.

A number of very small economies with highly specialized resources are condemned to a specialized pattern of production and exports. If a specific country has no production alternatives, its opportunity costs are zero. Hence, it should try to capture higher shares of its market. This can only be achieved if the world market prices for their product fall--at least for a period of time--and their competitors decrease their supply. Consequently, the demand elasticity faced by individual countries is not as small as often presumed. These countries should heed the strictures against relying on trade. At the same time, an alternative strategy will, in most cases, entail a severe loss of income.

If an appropriate structural adjustment program is implemented, the aggregate export growth stimulated throughout Sub-Saharan Africa will affect the world market. The analysis of these effects is carried out as follows. First, the effects of export growth on world market prices and export revenue is analyzed, and then the potential for trade among African countries is assessed. The last issue is of particular interest. If countries jointly promote export growth and real income increases, then trade among developing countries would also increase and world market prices would fall less because of global shifts in demand.

#### **STRUCTURAL ADJUSTMENT AND EXPORT EARNINGS FOR SELECT COMMODITIES**

The countries of Sub-Saharan Africa are extremely dependent on agricultural exports. In addition, one or two commodities on the following list account for the majority of a country's agricultural exports: coffee, cocoa, tea, cotton, sugar, oilseeds and fixed vegetable oils, spices, fruit and fruit preparations, and live animals.

With the exception of live animals, which are almost exclusively traded within the regions, all of these commodities compete on the world market with exports from nonAfrican countries. Export revenue in Sub-Saharan Africa is linked by the world market price with shifts in export supply and import demand in other countries. A central question in the context of structural adjustment concerns the likely effects that will occur in world market prices and export revenues as a result of export growth in Sub-Saharan Africa. This question is addressed for specific commodities. The results allow products for which export growth will produce negative world market repercussions to be distinguished from those for which it will not.

Of the above commodities, coffee, cocoa, tea, and cotton are relatively homogeneous products and have no close substitutes. Sugar, although homogeneous, can be easily substituted with corn-based products, and the world market is rather thin. The world market for oilseeds and fixed vegetable oils consists of a number of industrial and edible oil crops, which can substitute for one another to various degrees. The export growth potential for groundnuts, the most important oil crop for Sub-Saharan Africa, has to be evaluated in the light of most other oil crops.

Finally, many crops that are botanically very different are aggregated under spices and fruits and fruit preparations. Time constraints and lack of detail do not allow these two commodity groups to be analyzed in this study. This analysis is restricted to traditional exports, which are the most likely to suffer from the repercussions of negative terms of trade on the world market.

#### **DETERMINANTS OF WORLD MARKET PRICE EFFECTS AND THE REPERCUSSIONS ON SUB-SAHARAN AFRICA**

The countries in Sub-Saharan Africa have highly concentrated agricultural exports. This does not necessarily mean that implementing structural adjustment simultaneously in all these countries will depress the world market even in the short-to-medium run. Whether world market prices for a specific product fall in response to export growth depends on the following:

- World demand that grows because the population or the income or both grow;
- The price elasticity of world demand;
- The share of Sub-Saharan African exports in world markets; and
- The reaction of supply in Sub-Saharan African and competing countries to changes in world market prices.

#### ***World Demand***

The success of a structural adjustment policy in Sub-Saharan Africa depends on the prospect of world demand for its export commodities. If world demand for a specific commodity increases 3 to 5 percent because population grows and per capita income increases, Sub-Saharan exports could also grow 3 to 5 percent without increasing world market shares. Because Sub-Saharan African countries have lost market shares in most commodities over time, the first effect of structural policy could be to stimulate exports in order to hold the region's share of world export markets. In light of their past export performance, any structural

adjustment policy could be moderately successful if past negative export growth could be made positive.

Such a moderately successful policy would probably affect world market prices only marginally. Countries in Sub-Saharan Africa would not have to compete with other suppliers on world markets because they would only hold their market shares. Of course, production growth rates would vary across agricultural products, since the growth of demand for individual products responds to differences in income elasticities.

World demand for exports from Sub-Saharan Africa could be stimulated further if industrialized countries would open their markets to imports from developing countries. The European Community and other OECD countries are the most important regions for Sub-Saharan Africa's exports. These countries have closed their markets more to processed agricultural imports than to raw products (see Table 17). Liberalizing agricultural imports would create additional demand for Sub-Saharan Africa's exports. Moreover, abandoning tariff escalation could help these countries set up an export-oriented agroindustry without facing strong external demand constraints.

### ***Price Elasticity of World Demand***

It is often argued that world demand for tropical agricultural products is fairly price inelastic and that increases in exports from Sub-Saharan Africa would inevitably lower world market prices and possibly even export revenues. However, this apprehension does not hold true for all tropical export products; fruits and vegetables are among the exceptions. The price elasticity of an individual country's import demand depends on the reaction of internal supply and demand to relative changes in world market prices. Thus world market demand might be much more price elastic than internal demand within a country. On the other hand, world demand might be less price elastic than domestic demand if internal price changes are related marginally or not at all to changes in world market prices. In the sugar market, for example, most countries pursue protectionist policies that disconnect internal price changes from changes in the world market price. Because most countries adjust their domestic policies to long-run changes in world markets, long-run price elasticities of world demand will probably be larger than short-run elasticities. Even small elasticity of world demand in the short run may not be of major concern for Sub-Saharan African countries, which will face external demand constraints only if the demand for their exports is price inelastic. This is not necessarily true if their share of world markets is small or other suppliers react elastically to changes in world market prices.

### ***Market Share and Reaction of Competing Suppliers***

If countries in Sub-Saharan Africa would significantly increase their exports of individual products, the effect on world markets might

Table 17--Tariff rates on select commodities in developed countries

Product	European Community	Japan	United States
Coffee			
Green roasted	5.0	0.0	0.0
Coffee extracts	18.0	17.5	0.0
Cocoa			
Cocoa beans	3.0	0.0	0.0
Powder and butter	12.2	4.9	0.0
Chocolate	27.0	27.4	6.5
Cotton			
Raw cotton	0.0	0.0	0.0
Yarn	6.0	3.6	6.8
Fabrics	10.0	5.9	7.4
Clothing	13.7	13.2	8.8
Sisal			
Fibers	0.0	0.0	0.1
Cordage	11.7	7.7	2.3
Wood			
Rough wood	0.0	0.0	0.0
Plywood	2.8	4.6	6.3
Wood manufactures	5.1	4.1	5.3
Paper			
Wood pulp	0.0	0.0	0.0
Paper preparations	0.0	2.1	0.0
Paper products	9.4	4.6	3.5
Rubber			
Natural rubber	0.0	0.0	0.0
Rubber products	5.3	4.8	5.3
Leather			
Hides and skins	0.0	0.0	0.0
Leather	3.9	6.2	3.7
Leather goods	11.7	11.0	14.4
Tobacco			
Unmanufactured	0.0	55.0	18.0
Manufactured	54.5	16.8	12.1

Source: The World Bank, Accelerated Development in Sub-Saharan Africa: An Agenda for Action (Washington, D.C.: World Bank, 1981), p.158.

be insignificant if Sub-Saharan Africa's share of the world market is small. Table 18 presents the market shares and export values of Sub-Saharan Africa's most important export products. These countries hold high shares of two main export products on the world market, coffee and cocoa. Therefore growth in these exports could affect world market prices and, moreover, could have significant repercussions on the economy of Sub-Saharan Africa. Some products, like palm kernels, sisal, groundnut oil, and groundnuts, are dominant exports of Sub-Saharan Africa and have high shares on world markets, but their export value and share of export revenue are fairly small. Thus a drop in world market prices would cause fewer adjustment problems.

Table 18--Sub-Saharan Africa's share of world exports of major agricultural commodities, 1985

Commodity	Export Value (US \$ million)	Share of World Exports	Commodity Shares of World Agricultural Exports		
			Sub-Saharan Africa	Asia	South America
			(percent)		
Cocoa beans	1,880.4	61.2	20.1	0.9	2.6
Palm kernels	11.9	52.9	0.1	0.0	0.1
Sisal	29.8	43.4	0.3	0.0	0.1
Coffee	2,538.5	22.3	27.3	3.8	22.4
Groundnut oil	58.4	20.9	0.6	0.2	0.4
Tea	362.5	15.3	3.9	5.3	0.3
Cotton	568.9	9.4	6.1	4.0	1.9
Tobacco	370.3	9.2	4.0	2.4	2.7
Groundnuts	32.7	6.7	0.4	0.6	0.3

Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook 1986* (Rome: FAO, 1987).

Sub-Saharan Africa's main agricultural export products are generally of small interest for Asian and Latin American countries. The main exception is coffee, which accounts for 22 percent of South America's agricultural exports. Agricultural exports have a smaller share of Asian and South American than of Sub-Saharan African exports, which indicates that their export pattern is more diversified. In fact, they diversified their exports significantly over time and are probably most likely to react to changes in world market prices for specific commodities. These countries may react to a decline in price by

shifting resources to the production of alternative exportables. Consequently, countries in Sub-Saharan Africa could capture higher market shares at world market prices that are only somewhat lower. Taking into account the supply reaction of competing suppliers, the demand for the agricultural exports of Sub-Saharan Africa is much more price elastic than world demand. Of course, the growth of Sub-Saharan Africa's exports will depress prices more in the short than in the long run because adjustment in competing countries takes time.

### ***The Model***

A simple, comparatively static model constructed for each of six independent commodity markets (cocoa, coffee, tea, cotton, sugar, and groundnuts) can help analyze Sub-Saharan Africa's prospects and potential for earning revenue from exports (see Appendix 2 for the complete model and supporting data). The model abstracts any interdependencies of production or consumption that exist among the commodities considered. The world market for exports consists of four country groups: Sub-Saharan Africa, which excludes South Africa; developed market economies, which includes North America, Western Europe, Oceania, Israel, Japan, and South Africa; centrally planned economies; and all market economy developing countries except those in Sub-Saharan Africa. The time horizon in which these adjustments take place is assumed to be five years. The model is run for various exogenously given percentage increases in production ( $z$ ).

Chapter 5 argued that structural adjustment will not take place simultaneously in all Sub-Saharan African countries and exports will not be dumped on the world market simultaneously. In spite of these arguments, this chapter investigates the worst situation from the perspective of Sub-Saharan Africa's countries: they succeed collectively in promoting their exports, and competing countries do not reduce their supply on the world market.

### ***Empirical Results***

The effects of stimulating Sub-Saharan Africa's exports will be different in the short than in the long run. Table 19 presents the respective results. The corresponding elasticity assumptions and the data base are presented in Appendix 2.

Table 19 reveals that under the worst outcome countries in Sub-Saharan Africa should be reluctant to promote the export growth of cocoa products. The negative marginal revenue earned indicates that they should constrain rather than expand production, even if the domestic costs of expanding production are zero (this is the argument for an optimum export tax). The short-run prospects are bleak for increasing coffee exports. Such an increase would only pay in the short run if the marginal costs of expanding production in the Sub-Saharan Africa countries were about 50 percent of the 1984 world market prices.

Table 19--Short- and long-run effects of a 5 percent policy-induced shift in the supply curve for specific agricultural products

Variable	Product					
	Cocoa	Coffee	Tea	Cotton	Sugar	Ground-nuts
	(percent)					
Short-run effects						
Change in production	2.8	4.0	4.5	4.8	4.8	4.4
Change in exports	3.0	5.1	6.1	10.8	55.1	34.6
Change in world market prices	-5.6	-2.5	-1.1	-0.4	-0.5	-1.6
Marginal revenue as percent of world market price	-86.7	51.0	81.9	96.3	99.1	95.4
Long-run effects						
Change in production	2.5	4.3	4.6	4.9	4.9	4.0
Change in exports	2.9	5.5	6.3	9.5	56.3	33.4
Change in world market prices	-2.5	-1.4	-0.7	-0.2	-0.25	-1.0
Marginal revenue as percent of world market price	13.8	74.5	88.9	97.9	99.6	97.0

Note: This assumes that all Sub-Saharan African countries act together.

The picture is much more promising in the long run. The expected reactions of competitors on the world markets will help stabilize world market prices. Export promotion will be generally advisable if Sub-Saharan Africa produces at lower costs than its competitors on world markets or is able to fetch higher prices than its competitors. There seems to be potential for both.

The countries whose exports compete with those of Sub-Saharan Africa have diversified their export pattern much more than have the countries in Sub-Saharan Africa. The competitors' advantage has moved away from the products of particular interest to Sub-Saharan Africa and could be pushed even farther away.

## POLICY IMPLICATIONS OF THE RESULTS

1. No external demand constraint exists generally for Sub-Saharan Africa's agricultural exports, but one does affect select agricultural export products. Consequently, structural adjustment policies in Sub-Saharan Africa countries will not necessarily fail because of external demand constraints.

2. The severity of the external demand constraint will be felt differently by individual countries. Countries for which coffee, cocoa, or both account for a high share of agricultural export earnings and whose agricultural export earnings hold a high share of total export earnings will feel the external demand constraint the most. Special problems could arise for countries like Côte d'Ivoire or Ghana. Côte d'Ivoire earned an average 78 percent of its total agricultural revenue from exporting cocoa and coffee each year of 1981/84. Moreover, agricultural export earnings accounted for 65 percent of its total export earnings. External demand constraints might be felt even more by Ghana, which derives nearly 100 percent of its agricultural export earnings from cocoa bean products. Its agricultural products contribute about 45 percent of its total export earnings.

3. Even highly vulnerable countries, like Côte d'Ivoire and Ghana, may have a structural adjustment policy in place. If these countries' exports are highly concentrated on cocoa, coffee, or both they either enjoy a comparative advantage in these products or have failed to diversify their export pattern. In the first case, they should strive for higher shares of world markets. Structural adjustment policies could help them achieve this objective. They should accept world market prices that are temporarily low in order to displace competing supply. If, on the other hand, they simply failed to diversify their exports, structural adjustment policies could help them do so.

4. A less-than-one ratio of marginal export revenue to world market prices does not indicate that export promotion will not improve a country's welfare. Domestic marginal costs may be lower than world market prices, and expanding production may lead to social benefits. Some Sub-Saharan African countries certainly have overvalued exchange rates, export taxes that produce domestic marginal costs that are lower than world market prices, or both.

5. Countries should be aware of potential external demand constraints. A structural adjustment policy will be more successful if it takes external constraints into account. This perspective should not encourage countries to reject structural adjustment policies, but only to implement them in ways specific to their own situations.

## THE EXPORT STRUCTURE OF SUB-SAHARAN AFRICAN COUNTRIES

Sub-Saharan African countries may face less severe external constraints on demand if they implement adjustment policies simultaneously and stimulate regional trade in agricultural products. Adjustment policies could boost trade among countries in Sub-Saharan Africa by reducing the barriers to trade, encouraging income growth, and affecting import demand positively. Increased trade within Africa could play a dominant role in the success of adjustment policies. The result could be a more diversified pattern of African exports and less dependence on the import demand of industrialized countries.

However, growth in regional trade in agricultural products will only materialize if the potential for expanding trade exists. The hypotheses presented support positive expectations. The following provides empirical evidence on the export structure of Sub-Saharan African countries to support the hypotheses.

As indicated, differences in factor endowments, climate, and traditional production patterns may produce different export structures in Sub-Saharan countries. To test this hypothesis empirically, the export similarity index<sup>3</sup> was computed for 19 Sub-Saharan Africa countries.

If the export patterns of countries a and b are the same, it holds that  $x_i(ac) = x_i(bc)$  for each product  $i$ . In this case, the index will take on a value of 100. If the export patterns are completely dissimilar, the value of the index will be zero (Koester 1986, 4).

The export similarity indexes between any two countries are presented in Appendix 3, Table 28. Out of 171 paired indexes, only 22 (13 percent) are larger than 50. The closest similarity in export pattern was found for Uganda and Angola, with an index of 97.5, followed by the index for Uganda and Zaire (77.7).

The low indexes, of which 84 (50 percent) have values less than 10, indicate that the export patterns among Sub-Saharan African countries

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<sup>3</sup>This index is defined in Koester (1986) by the formula:

$$S(a, b, c) = \frac{49}{\sum_{i=1} \text{Minimum}[x_i(ac), x_i(bc)]} 100,$$

which measures the similarity of the export patterns of countries a and b to market c.  $x_i(ac)$  is the share of commodity  $i$  in country a's exports to market c, and  $x_i(bc)$  is the share of commodity  $i$  in b's exports to c.

are rather dissimilar. The dissimilarity among trade patterns suggests that the opportunity for trade within the region exists. Of course, the potential for trade expansion is higher when the export similarity indexes between neighboring countries are lower. Figure 1 presents the export pattern of neighboring countries. In general, the pattern of West African neighbors is more dissimilar than that of East African countries. However, even indexes around 50 do not support the hypothesis that the scope for trade within the region is limited because the countries are too similar. Finger and Kreinin (1979) found similarity indexes around 50 for the US-EC exports in the early 1970s, but the bilateral trade between these regions has expanded significantly since then.

The export similarity index is based on export shares, not on absolute export values. In order to hypothesize the collective response of many Sub-Saharan African countries to export-promoting policies, one has to consider absolute export values as well as market shares.

Other indicators support the hypothesis that export growth across several Sub-Saharan countries will probably lead to increased exports for the commodities for which a particular country has a comparative advantage. Coefficients for relative comparative advantage (RCA) and comparative export performance (CEP) were computed according to Koester (1986):

$$RCA = \ln \left( X_i / M_i : \frac{\sum_{i=1}^{49} X_i}{\sum_{i=1}^{49} M_i} \right),$$

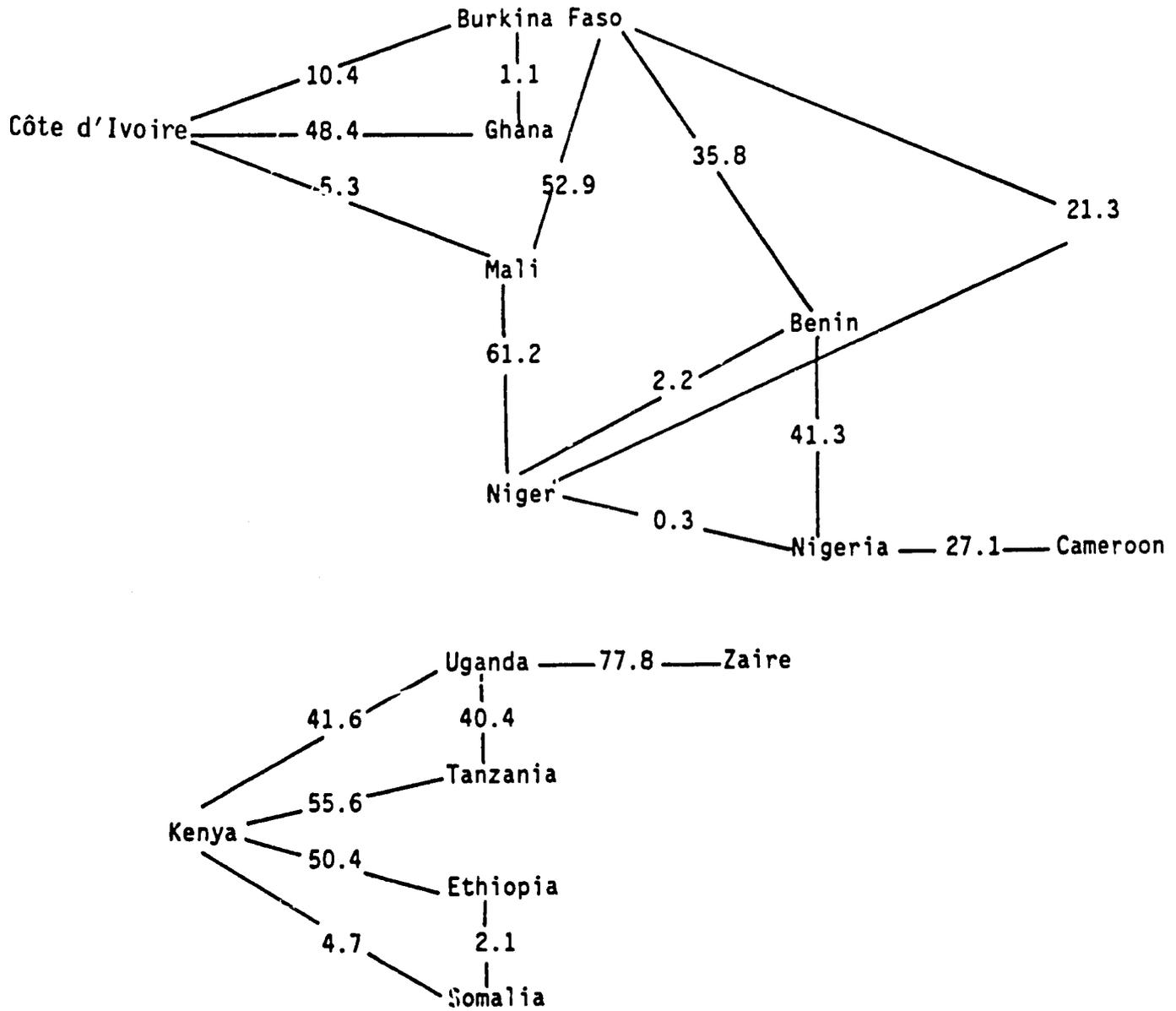
where  $X_i$  and  $M_i$  denote exports and imports, respectively, of 49 agricultural products. The higher the RCA index, the more successful is the country in exporting product  $i$ . The RCA index will be negative if the country is only importing product  $i$  or if the ratio of export and import values for product  $i$  is smaller than the ratio of the total agricultural exports and imports.

The measure used for calculating CEP coefficients is

$$CEP = X_i / X_{iw} : \left( \frac{\sum_{i=1}^{49} X_i}{\sum_{i=1}^{49} X_{iw}} \right),$$

where  $X_i$  is export values for product  $i$  of the country under consideration, and  $X_{iw}$  is world exports of product  $i$ . An index of more than unity says that the individual country's export values of product  $i$  divided by the country's total agricultural export values are greater than the world exports of product  $i$  divided by the value of total agricultural exports. Thus  $CEP > 1$  implies that export product  $i$  is more important from the individual country's point of view than for the world (Koester 1986, 47).

Figure 1--Export similarity indexes for select Sub-Saharan African neighboring countries, 1981/84



Although RCA and CEP indicators were calculated for 49 commodities, only the most important ones--coffee, cocoa, tea, live animals, and cotton--are considered in Appendix 3, Table 29. For the entire region, coffee and cocoa have the highest comparative advantage indexes. In general, the RCAs were higher in 1981/84 than in 1971/75, which reveals, along with the commodity shares in total agricultural exports, increasing concentration on a few export commodities. The CEP index measures the relative importance of a commodity in a country's export composition compared with global exports. Cocoa, which does not have the highest share of exports, does have the highest CEP value, followed by coffee and tea. Once again, this implies that in Sub-Saharan Africa, export revenue for these three commodities is particularly vulnerable to negative world market price effects. However, these calculations also confirm that the countries differ significantly in their exports. The eight countries listed in Appendix 3, Table 29--Burkina Faso, Côte d'Ivoire, Kenya, Madagascar, Mali, Niger, Senegal, and Tanzania--have heavily concentrated exports, yet their three main export earners are not the same in each country.

The above analysis leads to two conclusions. First, promoting export growth across several Sub-Saharan African countries will not automatically lead to the negative repercussions that are regularly described as a fallacy of composition because countries differ significantly in their export structure.

Second, the relatively high country-specific RCAs and CEPs imply that individual countries are extraordinarily vulnerable to the negative impact of declining world market prices on the earnings from their principal agricultural exports. Not only should the products with high shares of aggregate agricultural exports (for example, coffee, cocoa, tea, and cotton) be considered, but the products that are important for only a few countries (for example, fruits, spices, oilseeds, tobacco, animal feed, and fertilizer) should be considered as well.

## **POTENTIAL FOR TRADE WITHIN SUB-SAHARAN AFRICA**

Capturing additional market shares in fast-growth export markets is of crucial importance for improving the export performance of Sub-Saharan Africa. A relatively important market for these exports is the Sub-Saharan region itself. Here the possible consequences of structural adjustment for increased regional trade are examined.

African countries do not trade much with each other. "As a percentage of foreign trade, official trade within Africa south of the Sahara has not risen above 4 percent since 1970, lagging far behind the achievements of Latin America, where regional trade has accounted for between 15 and 22 percent of total foreign trade; these past fifteen years, and still further behind Asia's performance; 20 to 27 percent of Asian countries' foreign trade is with other countries of the same

continent" (Egg and Igue 1987, 229). The 1981/84 proportion of regional trade was 9 percent for agricultural exports and 8 percent for agricultural imports.

Past experience seems to support the belief that African countries are very similar and that the potential for regional trade in agricultural products is therefore small. Comparing the export patterns of individual countries does not support this view. The costs of producing agricultural products are only partly determined by natural conditions, such as climate and soil. Per capita resource endowment, the level of development, transport costs, and the size of the country are even more important determinants of agricultural production (see Koester 1987, 190). The need for hard currencies to import manufactured goods from developed countries makes exports from Sub-Saharan Africa to developed countries more attractive than trade within the region.

Countries in Sub-Saharan Africa could benefit from trading with each other in several ways. First, expanding a country's export markets supports the development of comparative advantage in production. Second, regional trade encourages export diversification away from the products traditionally exported to industrial countries. Third, regional trade is politically desirable since it supports the regional economic and political integration of Sub-Saharan Africa. At present, live animals are the major commodity traded among Sub-Saharan Africa countries. Trade within the region is most important among West African countries, and regional exports vary widely among countries. In 1981/84, Madagascar had no regional exports, while more than 90 percent of Niger's agricultural exports were imported by other countries in Sub-Saharan Africa (see Burfisher and Missiaen 1987 for a detailed analysis of regional trade in West Africa).

It is not possible to quantify the exact amount that trade among African countries could expand if they would liberalize. However, empirical data suggest that the potential expansion is significant. The export similarity index for the eight countries in Appendix 3, Tables 28 and 29 reveal highly similar export patterns among the traditional livestock exporters and among the leading cash crop exporters-- Côte d'Ivoire, Kenya, Madagascar, and Tanzania. The highest export similarity index is that of Mali and Niger (61), which export mainly live animals to their southern neighbors, Côte d'Ivoire and Nigeria. On the other hand, Kenya, Côte d'Ivoire, Tanzania, and Madagascar export mainly beverages to industrial countries.

The potential for increased trade within the region, even given the current production pattern, is revealed by the trade overlap indicator (Koester 1986, 49). This indicator is defined as:

$$TO = 2 \left( \sum_{i=1}^{49} \min (X_i, M_i) \right) / \sum_{i=1}^{49} (X_i + M_i).$$

The coefficient varies between 0 and 1 for each of the 49 products. It will be zero if the country only exports or imports a given product. It will be 1 if the country's exports are exactly matched by its imports of the product.

Trade might overlap for agricultural products slightly because a country either produces a surplus of a product or has to bridge a deficit. This argument neglects the geographical dimension of the countries and their internal heterogeneity. A country might export a regional surplus of a commodity and import the same commodity to a deficit region.

On average in 1981/84 Sub-Saharan Africa spent 23 percent of the export revenue it earned from a given product on importing that same product (Table 20). However, trade within Sub-Saharan Africa accounted for only 9 percent of exports in 1981/84. Regional trade could be more than twice its 1981/84 level if countries would exhaust the possibilities of trade within Sub-Saharan Africa. If the trend of increasing trade overlap coefficients prevails, Sub-Saharan Africa will import more of the same commodities that it exports. The trade overlap coefficients vary considerably for the specific countries studied. The major determinants of the country-specific coefficient are country size, local logistics, and relative openness of the border to commodity flows.

Table 20--Coefficients of trade overlap for select Sub-Saharan African countries, 1971-84

Country	World Trade			Regional Trade		
	1971/75	1976/80	1981/84	1971/75	1976/80	1981/84
Tanzania	0.07	0.11	0.04	0.16	0.12	0.04
Kenya	0.09	0.13	0.08	0.10	0.13	0.04
Madagascar	0.06	0.03	0.04	0.03	0.00	0.02
Senegal	0.09	0.08	0.19	0.14	0.03	0.08
Niger	0.18	0.11	0.07	0.12	0.08	0.07
Mali	0.08	0.10	0.02	0.11	0.08	0.00
Burkina Faso	0.08	0.08	0.12	0.12	0.04	0.05
Côte d'Ivoire	0.05	0.05	0.05	0.14	0.18	0.04
Sub-Saharan Africa	0.16	0.18	0.23	n.a.	n.a.	n.a.

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987.

Under free trade conditions countries will adjust production according to their comparative advantage in production. Free trade would probably increase the potential for regional trade. Regional trade will probably increase in the products in which Sub-Saharan Africa countries have a comparative advantage in production and for which income elasticities are high. Clearly, long-run growth of per capita income will increase food imports, in particular vegetable oil and beverages, as occurred during the oil boom in Nigeria.

Actual trade flows are much higher than recorded ones. Burfisher and Missiaen (1987) report that "during 1970-82, 40 percent of intra-regional trade was estimated to be unrecorded" in West Africa. Egg and Igue (1987) confirm these findings. The existence of unrecorded or illegal trade flows indicates that the present barriers to trade do not, in fact, hinder it. Removing the present trade barriers would spur trade within Africa significantly.

Not all countries will benefit equally from increased regional trade. A country's export composition has to match the import demands of Sub-Saharan Africa. Therefore, the exporters of staple food, live animals, and vegetable oils have the most to gain from increased trade within Africa. To take advantage of the potential for increased trade, institutional barriers, logistical problems, and trade policy obstacles must be removed.

APPENDIX 1. CONSTANT MARKET SHARE ANALYSIS

The arithmetic decomposition of the total change in real exports into separate effects is presented in the following passage. A discrete time period is chosen for the market share analysis<sup>4</sup> of an individual commodity and of the aggregate of a country's export commodities. The variables and symbols used are as follows:

where  $s_{ij}^0 = (q_{ij}^0) / (Q_{ij}^0),$

$i = 1, . . . , m =$  subscript for commodity  $i,$

$j = 1, . . . , n =$  subscript for import market  $j,$

$0$  = superscript indicating the beginning of the observation period, that is, the base period,

$1$  = superscript indicating the end of the observation period,

$w$  = change in a variable between periods,

$q_{ij}^0$  = exports of commodity  $i$  to market  $j$  during the base period,

$Q_{ij}^0$  = imports of commodity  $i$  in market  $j$  during the base period, and

$s_{ij}^0$  = market share of commodity  $i$  in market  $j$  during the base period.

$s_i^0 = (q_i^0) / (Q_i^0),$

where

$s_i^0 =$  market share of commodity  $i$  in all markets during the base period,

<sup>4</sup>This approach is based on earlier works by Barend DeVries, Stephen Magee, Vittorio Corbin and Oli Havrylyshyn, and more recently Alberto Valdés. See Valdés (1984).

$q_i^0$  = exports of commodity  $i$  to all markets during the base period, and

$Q_i^0$  = imports of commodity  $i$  to all markets during the base period.

$$S^0 = q^0/Q^0,$$

where

$S^0$  = market share of total exports to all markets during the base period,

$q^0$  = total of a country's exports during the base period, and

$Q^0$  = total imports to a region during the base period.

#### MARKET SHARE ANALYSIS OF AN INDIVIDUAL COMMODITY

If

$$q_{ij}^0 = S_{ij}^0 Q_{ij}^0 ; q_{ij}^1 = S_{ij}^1 Q_{ij}^1, \quad (1)$$

and

$$S_{ij}^1 = S_{ij}^0 + wS_{ij}; Q_{ij}^1 = Q_{ij}^0 + wQ_{ij}, \quad (2)$$

then

$$wq_{ij} = q_{ij}^1 - q_{ij}^0 = S_{ij}^1 Q_{ij}^1 - S_{ij}^0 Q_{ij}^0. \quad (3)$$

Using equation (2) in equation ((3) yields:

$$\begin{aligned} wq_{ij} &= S_{ij}^0 Q_{ij}^0 + S_{ij}^0 wQ_{ij} + wS_{ij} Q_{ij}^0 + wS_{ij} wQ_{ij} \\ &\quad - S_{ij}^0 Q_{ij}^0 \\ &= S_{ij}^0 wQ_{ij} + wS_{ij} Q_{ij}^0. \end{aligned} \quad (4)$$

This is the decomposition of the total change in export value of commodity  $i$  to one import market  $j$ .

Summing equation (4) for all import markets  $j = i, \dots, m$  yields

$$wq^i = \sum wq_{ij} = \sum S_{ij}^0 wQ_{ij} + \sum wS_{ij} Q_{ij}^0. \quad (5)$$

Adding  $0 = S_i^0 w Q_i - S_i^0 w Q_i$  to equation (5) yields

$$w q_i = (S_i^0 w Q_i) + (\sum S_{ij}^0 w Q_{ij} - S_i^0 w Q_i) + (\sum w S_{ij} Q_{ij}^1). \quad (6)$$

TOTAL CHANGE = IMPORT GROWTH EFFECT + MARKET EFFECT + COMPETITIVE EFFECT

The import growth effect is the potential change in total exports of commodity  $i$  under the assumption of a constant (base period) market.

The market effect is the difference between the overall import growth effect ( $S_i^0 w Q_i$ ) and the sum of the market-specific growth effects ( $\sum S_{ij}^0 w Q_{ij}$ ).

The market effect is determined by the magnitude of  $S_{ij}^0$ ,  $w Q_{ij}$ , or both. For equal absolute changes ( $w Q_{ij}$ ), a more important import region (a large  $S_{ij}^0$ ) affects  $\sum S_{ij}^0 w Q_{ij}$  more than a less important import region (a small  $S_{ij}^0$ ). Also, under equal market shares in the base period, the sign and magnitude of the absolute change ( $w Q_{ij}$ ) determine an import region's contribution to the market effect. Therefore, the market effect is likely to be negative under unfavorable conditions of import demand in the most important regions of destination.

The competitive effect is the residual after subtracting the import growth effect and the market effect from the total change in exports. The competitive effect takes the change in market shares ( $w S_{ij}$ ) explicitly into consideration. The severity of a loss of market share in an import market ( $-w S_{ij}$ ) is proportional to the absolute size of the import market ( $Q_{ij}^1$ ).

#### MARKET SHARE ANALYSIS OF THE AGGREGATE OF A COUNTRY'S EXPORT COMMODITIES

Summing equation (6) for all commodities  $i = 1, \dots, m$  yields the total change of a country's export earnings:

$$w q = \sum w q_i = \sum S_i^0 w Q_i + \sum (\sum S_{ij}^0 w Q_{ij} - S_i^0 w Q_i) + (\sum \sum w S_{ij} Q_{ij}^1) \quad (7)$$

Adding  $0 = S^0 w Q - S^0 w Q$  to equation (7) yields:

$$w q = (S^0 w Q) + (\sum S_i^0 w Q_i - S^0 w Q) + [\sum (\sum S_{ij}^0 w Q_{ij} - S_i^0 w Q_i) + (\sum \sum w S_{ij} Q_{ij}^1)]. \quad (8)$$

$$\text{TOTAL CHANGE} = \text{IMPORT GROWTH EFFECT} + \text{COMMODITY COMPOSITION EFFECT} + \text{MARKET EFFECT} + \text{COMPETITIVE EFFECT.}$$

The market effect and the competitive effect for the aggregate of a country's export commodities are the sum of all commodities. The interpretation is analog to the interpretation given above.

The import growth effect is calculated without considering the commodity composition and is the product of the change in total import demand in the region of destination and the exporters' overall market share during the base period. The specific impact of the proportion of the various export commodities is the commodity composition effect. That is the difference between the sum of the commodity-specific growth effects and the total import growth effect. The former is determined by (1) the magnitude of a country's base period market share of commodity  $i$  ( $s_i^0$ ) in all import regions and (2) by the absolute change of import demand for commodity  $i$  ( $wQ_i$ ). If an exporter's commodity composition is dominated by commodities that experience below-average import demand growth the commodity composition effect will probably be negative.

## APPENDIX 2. PROSPECTS AND POTENTIAL EXPORT EARNINGS FROM TRADITIONAL AGRICULTURAL EXPORT COMMODITIES

by Joachim Zietz

A simple world equilibrium model in percentage change form is constructed for each of six independent commodity markets to analyze the prospects and potential of export earnings for Sub-Saharan African (SSA) countries. Three questions are addressed. First, what is the likely development of foreign exchange earnings over a five-year time period in the absence of government intervention other than that needed to hold the real exchange rate constant? Second, could an exogenous, price independent increase in domestic production, financed by the government or foreign donors, raise export earnings above what they would be in the absence of government intervention, or is such an effort doomed because countries in Sub-Saharan Africa are facing an inelastic world demand curve for their products? Third, if government intervention can indeed increase export earnings over the natural level, for which commodities would this strategy work best? Finally, where do government funds earn the highest return from foreign exchange?

### THE MODEL

The model detailed below is designed to analyze the prospects for an increase in the foreign exchange earnings of Sub-Saharan African countries over a period of  $T$  years. It is comparatively static in nature and abstracts from any interdependencies in production or consumption that may exist among the commodities considered. The computation of the model is similar to the one detailed in Zietz and Valdés (1986). In spirit, it resembles the one used in Valdés and Zietz (1980).

For each country group  $i$ <sup>5</sup>, domestic demand ( $Q^d$ ) is assumed to be a function of domestic price ( $p_d$ ), real income ( $Y$ ), and population ( $N$ ):

$$Q^d = Q^d(p_d, Y, N). \quad (1)$$

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<sup>5</sup>The subscript  $i$  is left out of the following equations wherever possible to avoid clutter.

Domestic price ( $p_d$ ) is related to world price ( $p_w$ ) through the real exchange rate ( $e$ ):

$$p_d = p_w e. \quad (2)$$

Domestic supply is given by:

$$Q^s = Q^s(p_d). \quad (3)$$

Exports are defined by the excess supply equation:

$$X = Q^s - Q^d, \quad (4)$$

and imports are defined as negative exports. World market equilibrium requires that the sum of exports for all  $i$  country groups equal zero:

$$\sum^i X_i = 0. \quad (5)$$

Substituting equation (2) for equations (1) and (3) and converting them into percentage change form and absolute change form, respectively, yields

$$dQ^d = Q^d [\eta_{q,p} (\hat{p}_w + \hat{e}) + \eta_{q,y} \hat{Y} + \eta_{q,n} \hat{N}] \quad (6)$$

for domestic demand and

$$dQ^s = Q^s \epsilon_{q,p} (\hat{p}_w + \hat{e}) \quad (7)$$

for domestic supply in each country group  $i$  except Sub-Saharan Africa, where domestic supply is assumed to be

$$dQ^s = Q^s [\epsilon_{q,p} (\hat{p}_w + \hat{e}) + \hat{z}],^6 \quad (8)$$

with  $\hat{z}$  being an exogenously given percentage increase in production.<sup>7</sup> Prefix  $d$  in equations (6), (7), and (8) and all following equations stands for absolute change; a  $\hat{\quad}$  over a variable indicates a percentage change.<sup>8</sup> Parameter  $\eta_{q,v}$  represents the demand elasticity of  $Q$  compared with  $v$ , with  $v = (p_d, Y, N)$ , and parameter  $\epsilon_{q,w}$  represents the supply

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<sup>6</sup>For  $\hat{e} = 0$ , world price changes are fully transmitted to domestic consumers and producers.

<sup>7</sup>Countries in Sub-Saharan Africa are assumed to increase domestic production by  $\hat{z}$  percent within a time frame of  $T$  years above and beyond the change in production that would follow changes in world prices due to natural demand growth (derived from income and population increases).

<sup>8</sup>All percentage changes are defined over a time horizon of  $T$  years as  $[(t + T) - t]/t$ .

elasticity of Q compared with w, with  $w = (p_d)$ . All changes (percentage or absolute) and parameters are defined over the model's time horizon of T years. Any percentage change for T years (R) can be derived from its annual percentage change ( $\hat{r}$ ) using the familiar equation

$$\hat{R} = \exp(\hat{r} t) - 1, \quad (9)$$

where exp stands for the antilog of the natural logarithm. For each country group i, the absolute change in excess supply is given by

$$dX = dQ^s - dQ^d. \quad (10)$$

Market equilibrium is achieved when the sum of the excess supplies  $\sum^i dX_i$  of each country group i equals zero or when  $\sum^i dQ_i^s = \sum^i dQ_i^d$ . For given values of  $\hat{Y}$ ,  $\hat{N}$ ,  $\hat{e}$ , and the initial values of variables  $Q^d$  and  $Q^s$  for each country group i, market excess supply is a function only of  $\hat{p}_w$ . Each commodity model can be solved by iterating the latter variable.

The price elasticities of export supply or import demand can be calculated for each country group i on the basis of equations (1) to (4) as

$$\epsilon_{x,p_w}^i = (Q_i^s \epsilon_{q,p}^i - Q_i^d \eta_{q,p}^i) / X_i. \quad (11)$$

Clearly, a price elasticity of export supply is only defined for country i if  $X_i$  is positive;  $X_i$  must be negative to define the price elasticity of import demand. The price elasticity of world export supply is defined as

$$\epsilon_{x,p_w}^w = \sum_i (X_i / \sum^i X_i) \epsilon_{x,p_w}^i, \quad (12)$$

$$X_i > 0,$$

and the price elasticity of world import demand is defined as

$$\eta_{m,p_w}^w = \sum_i (X_i / \sum^i X_i) \eta_{x,p_w}^i; \quad (13)$$

$$X_i < 0.$$

Neither the price elasticity of export supply nor that of import demand enters the computations explicitly. They do, however, implicitly codetermine the changes in exports and imports. Equally important are the implicit values for the income and population elasticities of import demand and export supply.

The percentage change in export earnings ( $\hat{FEX}$ ) for country group i can be computed independent of the actual level of world prices as

$$\hat{FEX}_i = [(1 + \hat{p}_w) (X_i + dX_i) - X_i] / X_i. \quad (14)$$

## DATA AND RESULTS

Four country groups are considered: Sub-Saharan Africa (SSA), which excludes South Africa; Developed Market Economies (IC-ME), which includes North America, Western Europe, Oceania, Israel, Japan, and South Africa; Centrally Planned Countries (CP); and all Market Economy Developing Countries except Sub-Saharan Africa (other DCs).

Data for X (gross exports minus imports) are from FAO's *Trade Yearbook*, and data for  $Q^s$  are from FAO's *Production Yearbook*.  $Q^d$  is calculated as the difference between domestic production ( $Q^s$ ) and net exports (X). The quantities for 1984, the base year, are assembled in 1,000 metric tons in Table 21.

Table 21--Base year quantities for all commodities and country groups, 1984

Commodity	SSA	IC-ME	CP	Other DCs
Production ( $Q^s$ )				
Cocoa beans	1,048	...	...	714
Green roasted coffee	1,160	1	27	3,952
Tea	234	98	619	1,238
Cotton lint	607	3,462	8,496	5,739
Raw sugar	3,916	29,055	18,428	48,168
Groundnuts in the shell	3,348	2,209	5,029	9,747
Consumption ( $Q^d$ )				
Cocoa	158	926	246	406
Coffee	263	3,243	266	1,208
Tea	65	508	556	1,014
Cotton	338	3,767	8,835	5,542
Sugar	3,585	30,238	25,759	39,495
Groundnuts	2,982	3,279	4,744	9,437

Source: FAO (Food and Agriculture Organization of the United Nations), *FAO Trade Yearbook* (Rome: FAO, various years); and FAO, *FAO Production Yearbook* (Rome: FAO, various years).

Notes: SSA is Sub-Saharan Africa, IC-ME is developed market economies, CP is centrally planned economies, and Other DCs are all market economy developing countries except those in Sub-Saharan Africa.

Domestic demand and supply elasticities are taken from a number of studies. The elasticity assumption and their most important sources are collected in Table 22. For cocoa, coffee, and tea, domestic demand and supply elasticities are adjusted to conform with the price elasticities

Table 22--Assumptions of domestic demand and supply elasticity

Product and Country Group	Demand Elasticities			Supply Elasticity Price	
	Price	Income	Population	Long-run	Short-run
Cocoa					
SSA	-0.20	0.3	1	1.0	0.4
IC-ME	-0.22	0.5	1	...	...
CP	-0.22	0.5	1	...	...
Other DCs	-0.2	0.3	1	1.0	0.2
Coffee					
SSA	-0.2	0.4	1	0.5	0.4
IC-ME	-0.23	0.5	1	0.1	0.1
CP	-0.23	0.5	1	0.1	0.1
Other DCs	-0.2	0.4	1	0.6	0.2
Tea					
SSA	-0.4	0.3	1	0.6	0.4
IC-ME	-0.3	0.5	1	0.5	0.2
CP	-0.2	0.5	1	0.5	0.2
Other DCs	-0.25	1.0	1	0.6	0.2
Cotton					
SSA	-0.2	0.4	1	0.5	0.4
IC-ME	-0.1	0.5	1	0.8	0.2
CP	-0.1	0.5	1	0.5	0.2
Other DCs	-0.3	0.4	1	0.8	0.2
Sugar					
SSA	-0.4	0.5	1	0.6	0.4
IC-ME	-0.1	0.2	1	0.6	0.2
CP	-0.1	0.2	1	0.4	0.2
Other DCs	-0.4	0.5	1	0.6	0.2
Groundnuts					
SSA	-0.4	0.4	1	1.0	0.4
IC-ME	-0.1	0.5	1	0.4	0.2
CP	-0.1	0.5	1	0.4	0.2
Other DCs	-0.4	0.4	1	0.5	0.2

Sources: Data from the World Bank, Economic Analysis and Projections Department; Subrata Ghatak and Ken Ingersent, *Agriculture and Economic Development* (Baltimore: Johns Hopkins University Press, 1984); Askari and Cummings, "Estimating Agricultural Supply Responses with the Nerlove Model: A Survey," *International Economic Review*, June 1977); Iqbal Sobhan, "Agricultural Price Policy and Supply Response--A Review of Evidence and an Interpretation for Policy" (Washington, D.C.: World Bank, July 1977); and Alberto Valdés and Joaquim Zietz, *Agricultural Protection in OECD Countries: Its Cost to Less-Developed Countries*, Research Report 21 (Washington, D.C.: International Food Policy Research Institute, 1980).

Note: SSA is Sub-Saharan Africa. IC-ME is industrialized countries and the Middle East. CP is centrally planned economy. DC is developing country.

of world import demand as published in the World Bank, *Price Prospects for Major Primary Commodities*. Average annual percentage changes in real income and population for 1965-85 and 1985-2000, respectively, are taken from the *World Development Report 1987* using approximations to match the country groupings of the report with those of this study. Table 23 presents the pertinent assumptions.

Table 23--Average annual percentage change in real income and population

Indicator	SSA	IC-ME	CP	Other DCs
Per capita GNP	0.010	0.024	0.010	0.030
Population	0.033	0.004	0.008	0.019

Source: World Bank, *World Development Report 1987* (Washington, D.C.: World Bank, 1988).

Notes: SSA is Sub-Saharan Africa, IC-ME is developed market economies, CP is centrally planned economies, and Other DCs are all market economy developing countries except those in Sub-Saharan Africa.

The real exchange rate is assumed to be constant for all country groups ( $\hat{e} = 0$ ). The rates of inflation in Sub-Saharan Africa are higher than those in western industrialized countries, which implies a continuous depreciation of nominal exchange rates in Sub-Saharan Africa to compensate for the differences in inflation rates. Also, centrally planned countries may not permit all world price changes to be transmitted fully to consumers, producers, or both. Either case could be accommodated by an appropriately signed  $e$  compared with  $p_w$ .

The assumed time horizon for all adjustments to take place is  $T = 5$  (years). Table 24 provides a summary of the benchmark model results ( $\hat{z} = 0$ ) for this time frame. The results presume that government intervention, other than adjustments in the nominal exchange rate to keep the real exchange rate constant, is absent. They are in a sense conditional forecasts of actual changes in world price, SSA foreign exchange earnings, and SSA production.

Compared with the benchmark model run ( $\hat{z} = 0$ ), government intervention is assumed to result in an exogenous, price insensitive increase in domestic production of  $\hat{z}$  percent. Four different values of  $\hat{z}$  are considered: percentage increases of 10, 20, 30, and 40 percent, respectively, over a five-year horizon. According to equation (8) an exogenous increase of production of, say, 10 percent over five years is bound to increase net production less than 10 percent over five years if world price drops as a result of the exogenous expansion in production. The reason is that a decrease in world price causes domestic production to be reduced endogenously in all country groups, including Sub-Saharan Africa, because of a positive price elasticity of supply.

Table 24--Results of benchmark run of the model

Change Indicator	Cocoa	Coffee	Tea	Cotton	Sugar	Groundnuts
	(percent)					
World price	8.7	13.3	20.0	12.6	13.4	16.2
Sub-Saharan Africa						
Foreign exchange	16.4	17.4	34.7	4.0	-64.8	60.7
Production	8.7	6.7	12.0	6.3	8.0	16.2
Consumption	17.7	17.3	11.5	17.5	15.1	13.5

The world price effect of an exogenous increase in production and its impact on foreign exchange revenue as well as net production are summarized in Table 25. The recorded percentage changes are attributable solely to the exogenous increase in Sub-Saharan African production.

The computed changes represent the percentage differences between the model runs with  $\hat{z}$  assuming values between 10 and 40 percent and the benchmark model run with  $\hat{z} = 0$ . The results of Table 25 are equivalent to a model run with  $Y$  and  $N$  in equation (3) set equal to zero while  $\hat{z}$  varies between 0.1 and 0.4.

The results of Tables 24 and 25 provide some guidance for formulating an export strategy for Sub-Saharan Africa. A do-nothing strategy, which would only keep the real exchange rate constant, can be expected to provide a perceptible though far from dramatic percentage change in export earnings over a five-year time horizon. The growth prospects for tea and groundnuts appear to be by far the best, with overall percentage increases over five years of 35 and 61 percent, respectively. This is the consequence of two effects: Sub-Saharan Africa's initial market share is small and an above-average production response is combined with a below-average consumption response. Sugar exports are predicted to fall because domestic consumption is estimated to outgrow production. This occurs because of rapid population growth in combination with an initial consumption level that is higher than domestic production, a characteristic not found for cocoa, coffee, tea, or cotton in Sub-Saharan Africa.

Table 25 helps answer the question of the extent to which export promotion above and beyond the natural export growth predicted in Table 24 is a sensible strategy for Sub-Saharan Africa in order to maximize the foreign exchange earnings of its traditional primary export products. Increasing the production of cocoa, for example, clearly has a negative or no effect on foreign exchange earnings. Hence, promoting

Table 25--Percentage change in world price and Sub-Saharan Africa's foreign exchange earnings and net production due to an exogenous increase in production of  $\hat{z}$  percent over five years, various commodities

Change Indicator	Cocoa	Coffee	Tea	Cotton	Sugar	Ground-nuts
	(percent)					
$\hat{z} = 0.10$						
World price	-4.5	-2.5	-1.1	-0.4	-0.4	-1.7
Sub-Saharan Africa						
Foreign exchange	0.7	7.7	9.9	23.4	361.1	45.9
Production	4.7	8.0	8.2	9.2	8.9	6.9
$\hat{z} = 0.20$						
World price	-9.4	-5.1	-2.2	-0.7	-0.9	-3.4
Sub-Saharan Africa						
Foreign exchange	0.8	14.9	19.7	46.6	718.8	90.0
Production	9.3	16.1	16.4	18.4	17.9	13.8
$\hat{z} = 0.30$						
World price	-13.6	-7.6	-3.3	-1.1	-1.3	-5.1
Sub-Saharan Africa						
Foreign exchange	0.5	21.7	29.2	69.7	1,073.7	132.5
Production	14.0	24.1	24.7	27.6	26.9	20.7
$\hat{z} = 0.40$						
World price	-18.1	-10.1	-4.4	-1.4	-1.8	-6.8
Sub-Saharan Africa						
Foreign exchange	-0.3	27.8	38.4	93.1	1,425.3	173.4
Production	18.7	32.1	32.9	36.9	35.9	27.6

Note: The percentage changes pertain to the differences in world price, foreign exchange earnings, and production between the model run identified by a positive value for  $\hat{z}$  and the benchmark run ( $\hat{z} = 0$ ), rather than the values observed in 1984, the base period.

production of cocoa beyond the levels achieved without additional government intervention is senseless.<sup>9</sup> Channeling extra resources into cocoa production would clearly be a waste. The conclusion is different, however, for the other five commodities. Any exogenous expansion of production above and beyond the natural level corresponding to Table 24 results in higher export earnings, at least for the range of production increases analyzed (that is, up to 40 percent over a five-year time horizon).

<sup>9</sup>Again, the results are contingent on a constant real exchange rate. Government intervention may be needed to achieve this.

However, the increase in export earnings expected from a given government-induced increase in domestic production above the natural level varies widely for the five commodities. A clear ranking emerges for the foreign exchange potential. Sugar offers by far the highest gains, a conclusion similar to that of Valdés and Zietz (1980) and subsequent studies by the same authors. Groundnuts rank second, followed by cotton, tea, and coffee, in that order. Table 26 presents the ratios of the percentage of foreign exchange increases to net production increases over a five-year time horizon that are the results of various values of  $\hat{z}$ .<sup>10</sup> These ratios express the gain in foreign exchange earnings as their net domestic resource cost (that is, gross government-induced production increases plus price-induced production changes). Two elasticity values are provided for each commodity and value of  $\hat{z} > 0$ . The value in the upper frame of Table 26 compares the

Table 26--Five-year elasticities of foreign exchange earnings from net domestic production, for various values of  $\hat{z}$

Values of $\hat{z}$	Sugar	Groundnuts	Cotton	Tea	Coffee	Cocoa
Model simulation results compared with base-year figures (absolute incidence)						
0.0	-8.07	3.74	0.63	2.89	2.60	1.89
0.1	3.51	5.55	1.76	2.27	1.74	1.24
0.2	6.86	6.36	2.02	2.01	1.47	0.92
0.3	8.42	6.80	2.14	1.87	1.32	0.71
0.4	9.33	7.03	2.21	1.77	1.22	0.55
Model simulation results compared with benchmark figures ( $\hat{z} = 0$ ) <sup>a</sup> (differential incidence)						
0.1	40.37	6.67	2.54	1.21	0.97	0.14
0.2	40.10	6.50	2.53	1.20	0.93	0.09
0.3	39.85	6.40	2.52	1.18	0.90	0.04
0.4	39.72	6.28	2.53	1.17	0.87	-0.02

Note: Net production is defined as the exogenous increase in domestic production as determined by  $\hat{z}$  plus the endogenous change resulting from its price dependency.

<sup>a</sup>These elasticities are obtained directly from Table 25 by dividing the percentage change in foreign exchange earnings by that of net production.

<sup>10</sup>The ratio can also be expressed as the elasticity of foreign exchange earnings potential to domestic production.

simulated foreign exchange and production values after five years with those actually observed in the 1984 base year. The value in the lower frame contrasts the simulated foreign exchange and production values after five years with those of the benchmark run ( $\hat{z} = 0$ ) after five years. The latter ratios are directly comparable to the figures in Table 25 and are similar to the so-called differential incidence of government intervention as opposed to absolute incidence. The concept of absolute incidence is behind the calculations presented in the upper frame of Table 26.

Table 27 presents results similar to those of Table 26 except that the predicted percentage change in foreign exchange earnings is contrasted with the percentage of gross (government-induced) production ( $\hat{z}$ ) rather than of net production. These ratios or elasticities provide some idea of the opportunity cost to the government rather than to society of funding the expanded production of a particular commodity. Thus the elasticities of Table 27 are akin to what is sometimes called the "bang" for the "bucks" that are leaving the government coffers.

Table 27--Five-year elasticities of foreign exchange earnings with respect to government-induced gross domestic production, for various values of  $\hat{z}$

Values of $\hat{z}$	Sugar	Ground-nuts	Cotton	Tea	Coffee	Cocoa
Model simulation results compared with base year figures (absolute incidence)						
0.1	6.22	13.44	2.83	4.81	2.65	1.71
0.2	9.40	10.27	2.62	3.06	1.74	0.87
0.3	10.43	9.12	2.55	2.47	1.43	0.57
0.4	10.91	8.49	2.52	2.16	1.25	0.40
Model simulation results compared with benchmark figures ( $\hat{z} = 0$ ) <sup>a</sup> (differential incidence)						
0.1	36.11	4.59	2.34	0.99	0.77	0.07
0.2	35.94	4.50	2.33	0.98	0.75	0.04
0.3	35.79	4.42	2.32	0.97	0.72	0.02
0.4	35.63	4.34	2.33	0.96	0.70	-0.01

Note: Gross production is defined as the exogenous increase in domestic production as determined by  $\hat{z}$  and brought about by government intervention.

<sup>a</sup>These elasticities are obtained directly from Table 25 by dividing the percentage change in foreign exchange earnings by that of gross production ( $\hat{z}$ ).

An example may clarify the interpretation of Tables 26 and 27. A government-induced (that is, funded) 20 percent increase in the domestic production of sugar over five years above and beyond what would occur because of natural changes in the world price that occur because world demand grows would produce a 9.4 percent increase in foreign exchange earnings for Sub-Saharan Africa as a whole, compared with 1984 levels.<sup>11</sup> Clearly, the 9.4 percent reflects both the effect of government intervention in production and the underlying natural growth of world demand. Increasing groundnut production by the same percentage would yield a foreign exchange gain of 10.3 percent over five years compared with 1984 levels. One could, however, pose the question differently. Isolating the effect on foreign exchange earnings of a government intervention in production from the effect of the underlying natural demand growth is attempted. In other words, the effect that can be attributed solely to government intervention is determined. The answers are given in the lower frames of Tables 26 and 27. To continue the example, a government-induced, price-insensitive 20 percent addition to 1984 levels of sugar production would supply Sub-Saharan Africa with about 36 percent more foreign exchange after five years than if the government did not generate the 20 percent production increase. The figure for groundnuts would be 4.6 percent.

<sup>11</sup>One can think of this as the government starting its own production of the crop in question on previously unused land, employing previously unemployed workers, and maintaining production levels at  $\Sigma$  percent of base year levels regardless of any world price fluctuation. See column 2 in the upper frame of Table 27.

### APPENDIX 3. SUPPLEMENTARY TABLES

Table 28--Export similarity indexes for agricultural exports to the world from Sub-Saharan Africa, 1981/84

Country	Came- roon	Angola	Zaire	Benin	Ethiopia	Ghana	Côte d'Ivoire	Kenya	Madagas- car	Malawi	Mali	Niger	Nigeria	Senegal	Sierra Leone	Somalia	Uganda	Tan- zania	Burkina Faso
Cameroon	...	56.37	61.22	35.41	61.06	20.73	62.49	46.94	49.06	6.45	12.88	1.97	27.06	8.80	41.11	2.45	58.01	56.32	17.04
Angola	...	...	77.62	14.74	71.34	1.75	32.92	43.07	43.45	1.51	0.27	0.85	3.49	1.03	19.11	0.62	97.52	40.46	0.89
Zaire	...	...	...	24.39	72.35	1.98	38.04	42.71	43.83	3.26	1.37	0.29	24.36	3.30	19.32	0.01	77.76	40.64	8.88
Benin	...	...	...	...	22.26	6.91	31.78	19.96	19.49	4.64	25.60	2.19	41.34	20.89	21.73	6.78	16.49	46.73	35.76
Ethiopia	...	...	...	...	...	2.39	37.10	50.44	47.08	5.60	8.31	8.70	9.38	9.16	24.68	2.10	72.54	47.05	17.02
Ghana	...	...	...	...	...	...	48.42	3.40	3.07	2.08	0.87	0.43	36.67	1.05	74.50	0.15	1.56	3.05	1.10
Côte d'Ivoire	...	...	...	...	...	...	...	41.97	59.84	5.56	5.26	1.62	43.19	7.51	65.68	4.90	34.69	45.29	10.41
Kenya	...	...	...	...	...	...	...	...	53.73	27.47	2.28	8.24	4.17	4.84	21.64	4.74	41.64	55.58	8.97
Mada- gascar	...	...	...	...	...	...	...	...	...	10.83	2.74	1.20	4.60	3.94	22.52	1.61	44.49	59.29	5.14
Malawi	...	...	...	...	...	...	...	...	...	...	4.13	1.25	4.83	4.35	5.90	0.58	1.67	12.21	5.58
Mali	...	...	...	...	...	...	...	...	...	...	...	61.22	4.73	11.92	3.67	60.74	2.09	16.34	52.87
Niger	...	...	...	...	...	...	...	...	...	...	...	...	0.31	3.24	0.70	73.12	0.21	4.72	21.31
Nigeria	...	...	...	...	...	...	...	...	...	...	...	...	...	14.60	42.64	0.03	3.30	5.19	16.79
Senegal	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2.70	2.08	2.10	10.05	15.32
Sierra Leone	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1.51	19.11	22.95	5.81
Somalia	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0.00	7.93	17.29
Uganda	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	40.44	2.23
Tanzania	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	20.93
Burkina Faso	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987. Computer printout.

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Table 29--Export performances of the major agricultural products of select Sub-Saharan African countries, 1971/75, 1976/80, and 1981/84

Region/or Country/Product	Period	Share of Total Agricultural Exports	Revealed Comparative Advantage Index	Comparative Export Performance Index
<b>Sub-Saharan Africa</b>				
Coffee	1971/75	25.70	2.77	4.76
	1976/80	33.31	3.57	5.11
	1981/84	39.03	3.73	8.07
Cocoa	1971/75	31.05	4.13	11.02
	1976/80	35.73	3.80	12.13
	1981/84	17.54	3.73	12.80
Tea	1971/75	2.11	0.34	2.24
	1976/80	2.84	1.16	3.21
	1981/84	4.51	2.04	5.21
Live animals	1971/75	1.32	-0.57	0.62
	1976/80	1.62	0.09	0.81
	1981/84	5.21	0.38	2.33
Cotton	1971/75	5.30	0.32	1.20
	1976/80	3.77	1.24	1.07
	1981/84	5.47	1.54	1.99
<b>Kenya</b>				
Coffee	1971/75	36.13	5.24	6.69
	1976/80	48.00	4.10	7.37
	1981/84	40.63	8.07	8.41
Tea	1971/75	20.94	3.11	22.26
	1976/80	21.34	4.25	24.11
	1981/84	25.23	4.03	29.14
Fruit preserves	1971/75	2.09	1.26	1.54
	1976/80	3.72	2.09	2.51
	1981/84	5.51	3.10	3.11
<b>Tanzania</b>				
Coffee	1971/75	21.81	7.68	4.04
	1976/80	36.78	6.28	5.65
	1981/84	38.03	8.02	7.87
Fruit, fresh	1971/75	10.93	3.09	2.68
	1976/80	7.07	2.52	1.86
	1981/84	15.34	5.51	4.07
Cotton	1971/75	17.69	4.43	4.00
	1976/80	11.51	2.83	3.27
	1981/84	14.46	6.76	5.27

Table 29--continued

Region or Country/Product	Period	Share of Total Agricultural Exports	Revealed Comparative Advantage Index	Comparative Export Performance Index	
Madagascar	Coffee	1971/75	33.36	4.88	6.18
		1976/80	58.53	8.40	8.98
		1981/84	42.15	8.79	8.72
	Spices	1971/75	29.68	6.08	72.07
		1976/80	23.62	6.36	74.56
		1981/84	41.04	9.16	121.12
	Tea	1971/75	0.00	-6.68	0.00
		1976/80	0.11	1.89	0.12
		1981/84	6.10	3.25	7.04
Burkina Faso	Cotton	1971/75	20.87	3.37	4.72
		1976/80	40.77	8.41	11.57
		1981/84	40.19	9.56	14.64
	Oilseed, oil nuts	1971/75	25.84	3.73	4.99
		1976/80	15.96	2.70	3.08
		1981/84	19.82	5.86	4.16
	Live animals	1971/75	36.74	3.36	17.06
		1976/80	24.22	4.64	12.14
		1981/84	15.05	5.69	6.72
Mali	Live animals	1971/75	24.20	3.92	11.24
		1976/80	11.72	4.35	5.88
		1981/84	60.74	6.77	27.14
	Cotton	1971/75	36.98	4.05	8.36
		1976/80	56.15	4.40	15.94
		1981/84	32.83	4.20	11.96
	Oilseeds, oil nuts	1971/75	13.64	4.48	2.63
		1976/80	11.17	5.01	2.16
		1981/84	3.52	8.10	0.74
Niger	Live animals	1971/75	23.31	3.66	10.82
		1976/80	45.56	4.70	22.83
		1981/84	72.02	5.18	32.18
	Unmanufactured tobacco	1971/75	3.06	-0.58	2.92
		1976/80	3.79	-0.89	2.86
		1981/84	19.21	1.26	11.81

Table 29--continued

Region or Country/Product	Period	Share of Total Agricultural Exports	Revealed Comparative Advantage Index	Comparative Export Performance Index
<b>Senegal</b>				
Fixed vegetable oils	1971/75	39.48	4.32	19.71
	1976/80	38.32	2.45	18.92
	1981/84	39.34	1.38	18.65
Crude fertilizer	1971/75	24.17	9.82	27.45
	1976/80	20.21	10.72	23.02
	1981/84	28.74	4.84	37.70
Animal feed	1971/75	16.88	4.60	4.10
	1976/80	14.33	3.28	3.15
	1981/84	12.26	4.35	2.27
<b>Côte d'Ivoire</b>				
Cocoa	1971/75	34.36	5.87	12.20
	1976/80	39.30	3.27	13.34
	1981/84	45.12	5.66	32.95
Coffee	1971/75	41.18	5.58	7.62
	1976/80	45.26	4.59	6.95
	1981/84	32.60	5.92	6.74
Fresh fruit	1971/75	5.07	1.86	1.24
	1976/80	2.36	1.16	0.62
	1981/84	4.39	1.34	1.16

Source: Alberto Valdés, "Inter-LDC Trade Data Base," International Food Policy Research Institute, Washington, D.C., 1987.

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