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**Natural Resources, Structural Adjustment, and
Sustainable Growth in Sub-Saharan Africa:
A Critique of Policy Recommendations**

by
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and
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NATURAL RESOURCES, STRUCTURAL ADJUSTMENT, AND
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A CRITIQUE FOR POLICY RECOMMENDATIONS

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NATURAL RESOURCES, STRUCTURAL ADJUSTMENT, AND

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Aercio S. Cunha and Steven Kyle²

Introduction

1. Growth in a Resource Over-Dependent Economy

Exploitation of natural resources and environmental degradation are unavoidable consequences of human activity. As the law of entropy requires, increased production of any good is tantamount to increased utilization of natural resources of one kind or another. It follows that intensification of resource utilization is inevitable for economic growth and development. "The truth, however unpleasant, is that the most we can do is to prevent any unnecessary depletion of resources and any unnecessary deterioration of the environment..." (Georgescu-Roegen, 1976, p. 21). The difficulty, of course, is to determine the precise meaning of "unnecessary." Although no general definition of the term is possible, this is a difficulty that must be dealt with in order to make policy recommendations pertaining to specific resource utilization. In

¹ The ideas for this paper were formulated during the first author's stay at Cornell University on a sabbatical leave from the University of Brasilia. We gratefully acknowledge the financial support of CAPES/Fulbright Commission which made possible his visit to Cornell, and a grant from USAID.

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other words, one has to: (i) clearly specify a country's growth objectives (the benefits); and, (ii) figure what loss of resources and level of environmental degradation (the costs) is required to obtain these objectives.

The sub-Saharan African countries draw their means of subsistence mostly from direct exploitation of a few scarce natural resources (as have all countries at a similar stage of economic development and per capita income). Their main activity -- rainfed agriculture -- is heavily dependent upon agricultural land and water. For these countries, inappropriate or overexploitation of natural resources can usually be translated into inappropriate cultivation practices and agricultural expansion into unsuitable lands, forested areas, or wildlife habitats. "Unsuitable" should be understood to mean that the new production activities cannot be sustained for more than a few years before sufficient degradation of the resource base renders this activity no longer viable. Under such conditions, agricultural expansion can hardly be cost effective. By being most damaging to the environment, it is by definition, unsustainable.

Under the pressure of population growth, sustainable cultivation methods (e.g. fallowing and manuring) have become insufficient to feed increased numbers of people. Expansion of cultivated area, food imports, and village crowding have relieved some of the pressure but at the cost of excessive foreign indebtedness, tilling fragile soils, and endangering wildlife. As resources dwindle and the environment degrades, growth prospects become seriously impaired. As sources of foreign funds dry up, countries must dig ever deeper into their inherited wealth of natural resources.

Most development economists would agree that increased extraction of a slowly renewable resource for a temporary increase in consumption does not make much economic sense. Rather, continuous economic growth should be the objective.

For that objective to be achieved, a resource over-dependent economy must: (i) adopt resource-saving technology; (ii) generate an economic surplus, even through extraction of scarce resources; and (iii) reinvest that surplus in ways that will ultimately allow it to do without the resource. Most of the time, this will mean capital accumulation, diversification of the productive structure, and agricultural modernization. If resource depletion is the price of reducing resource dependency and ipso facto for sustainable growth, one may safely argue that the price is worth the objective and make a case for "necessary" depletion.

2. The Questions

To correct sub-Saharan Africa's macroeconomic imbalance between supply and demand, the IMF/World Bank are attempting to induce countries to undergo a set of economic reforms that have come to be known as "structural adjustment."³ The bottom line of the reforms is to, first, reduce aggregate demand so that macroeconomic equilibrium is restored, and second, to divert resources from the domestic to the traded goods sector, so that contractual obligations with foreign creditors can be met. The underlying presumption is that these policies will set the countries on the "right footing" for sustainable growth.⁴

The present study is concerned with the impact of structural adjustment on natural resources and, going one step further, on sustainable growth. In particular, the discussion is directed at the following questions:

³ Although the World Bank and IMF operate independently, it is often the case that both organizations are involved in policy conditionality in countries undergoing structural adjustment programs.

⁴ Comprehensive discussions of different aspects of structural adjustment are presented in Norton, (1987), Sarris (1987), Cleaver (1988), The World Bank (1988a and 1988b). Streeten (1987) present a survey of the issues involved.

1
(i) Do the policies have a chance of succeeding in promoting growth? Scarcity of natural resources, particularly of agricultural resources, is a major constraint to the development of most sub-Saharan African countries (FAO, 1986).⁵ Structural adjustment however takes either a light view of the resource constraint or ignores it altogether. We have outlined the conditions for sustainable growth which are explicitly recognized in all growth models (generation of a surplus, reinvestment) and the additional condition of diversification of the economic structure. Whereas structural adjustment may contribute to the first, it tends to ignore both the second (reinvestment) and the third (diversification). What this study will be questioning is the extent to which structural adjustment is an adequate growth promoting strategy for low-income, debt-distressed, resource over-dependent economies. We won't be questioning the principles which underlie the strategy (comparative advantage) - although the critics' views on this strategy are briefly discussed -- but rather, the overall objectives of structural adjustment in light of the structural growth constraints to the African countries. We do feel that structural adjustment programs have not paid enough attention to those constraints.

(ii) What is the likely impact of structural adjustment on natural resources? If natural resources in sub-Saharan Africa are one of the pillars of economic growth, the reverse is also true, that is, sustainable exploitation of natural resources is inconceivable without a certain degree of economic growth. Resource "conservation" requires appropriate extraction technology and diversification of the economy (reduced resource reliance). Conservation itself is a form of

⁵ A detailed discussion of the resources and environmental constraints to African development is presented in Lewis and Berry (1988).

investment. Only by stimulating investments can structural adjustment -- or for that matter any policy -- contribute to "proper" utilization of natural resources over the long run. In the short run, resources are depleted to satisfy immediate consumption needs. To conserve resources, the adjustment policies will need to reduce poverty and generate alternatives for those people whose day to day survival depends on natural endowments. From the outset, one thing is clear: if the adjustment policies fail to promote equitable economic growth or worse, if they concentrate income, they will almost inevitably be detrimental to environmental conservation.

Despite structural adjustment's drawbacks -- which we discuss in some detail -- the conclusion the analysis points to is not so much that structural adjustment is unnecessary, but that it is not enough. Take, for example, the case of adequate utilization of agricultural resources. Conservation of soil fertility in African agriculture is not mere avoidance of practices inherited from the past. Agricultural production systems in most of the tropics, based as they are on shifting field cultivation, must be credited for being remarkably sustainable over millennia. The problem with such systems is that they are stable only when there is an abundance of land relative to population. As population grows, pressure arises to shorten the duration of the fallow, putting sustainability at risk (Boserup, 1965). In sub-Saharan Africa, both the demographic explosion (at an average annual rate of 3.03%), and the need to balance foreign accounts, combine to strain traditional fallow systems beyond the soil's capacity to regenerate its natural fertility. The challenge of finding new farming systems that are sustainable in face of heightened present day pressures is no easy task; it requires investments in human and physical capital and investments in the generation and dissemination of new knowledge. This task

is not for years, but for decades. Unfortunately, structural adjustment's outlook is not so far sighted. Indeed, one of our principal criticisms of structural adjustment programs is not that they seek to promote undesirable goals, but that they try to force change too quickly.

3. Methodological Approach

A rigorous formal analysis of policy effects requires a well specified (preferably general equilibrium) model. Such a model, of course, would have to be purpose-and-country-specific, with particular policy instruments, closure rules, etc. all clearly stated. No model such as this is presently available, nor can such a country-specific model address the more general issues that concern us here.

Furthermore, the purpose of this study is not so much to trace the impact of specific measures on resource extraction, but to see how the overall aim of the policies squares with sustainable resource exploitation and sustainable development. For this more limited objective, the analysis focuses on a hypothetical "typical" sub-Saharan African (SSA) country and on "typical" structural adjustment (SA) policies. In addition, although the impact of some policies may not be the same under different circumstances, conventional policy effects will be assumed in order to derive more general results.

Very few countries have adopted, in full, the package of adjustment and stabilization policies. Moreover, for those who have adopted SA, it is too early to tell whether eventual gains outweigh the costs of the policies. While this more complete evaluation awaits the passage of time, there are several short and medium term effects which are already evident. It is these effects that we will concentrate on in the analysis that follows.

Economic Conditions in SSA

This section discusses some of the characteristics of the "typical" SSA country relevant to the analysis of SA. It encompasses a brief survey of indicators of the structure and performance of the economy, an analysis of the constraints to growth, and a review of the causes of foreign indebtedness and balance of payments problems. It is assumed that it was the imbalance of foreign accounts that prompted the IMF/WB to intervene and the government of SSA to accept the adjustment policies.

1. Economic Structure and Performance

Table 1 presents select indicators of SSA economic structure and performance. The indicators are averages for the entire region. Since SSA is intended to represent a typical sub-Saharan African country, extreme points, or "outliers," were eliminated for the computation of the average (arithmetic mean). Table 1 also presents the range of each indicator.

The picture that emerges from the analysis of these indicators is that of a country caught in the "poverty trap." With a population growth rate (3.03%) outstripping the rate of growth of GNP (1.3%), the economy is not just stagnant, it is moving backwards. The savings rate of 8.5% probably isn't enough to cover even depreciation of physical assets. Coupling that with the degradation of natural resources, a fair conclusion is that the erosion of the country's resource base will make a reversal of the declining trend very difficult.

Under such circumstances, it is no surprise that the country is "living beyond its means." The fiscal deficit is equivalent to 5% of GNP, while the current account deficit is 132 million dollars. Obviously this is not a

TABLE 1. Select Indicators or SSA Economic Structure and Performance - 1986

| Indicator | Average | Range |
|--|---------|--|
| <u>General Economic Indicators:</u> | | |
| GDP growth rate (1980-86) | 1.3% | Min: -9.0% (Mozambique) Max: 11.9% (Botswana) |
| Income per capita | \$ 400 | \$120 (Ethiopia) \$1200 (Mauritius) |
| Savings rate | 8.53% | - 7.0% (Burk. Faso) 30.0% (Congo) |
| Structure of GDP: | | |
| Agriculture | 35.5% | 4.0% (Botswana) 76.0% (Uganda) |
| Industry | 24.0% | 6.0% (Uganda) 58.0% (Botswana) |
| Services | 40.5% | 18.0% (Uganda) 55.0% (Gabon) |
| Inflation rate (1986) | 17.3% | 1.1% (Liberia) 74.9% (Uganda) |
| Fiscal budget surplus/deficit (% of GNP) | - 5.03% | - 16.3% (Zambia) 1.6% (B. Faso) |
| Growth rate of agric. production (1980-86) | 0.9% | -15.9% (Mozambique) 7.9% (Somalia) |
| Index of food production per capita (1979-81 = 100) | 96 | 76 (Botswana) 114 (Benin) |
| <u>Demographic Indicators:</u> | | |
| Rate of population growth (1980-86) | 3.03% | 2.3% (Mali) 4.4% (Gabon) |
| % of population in rural areas | 74% | 46.0% (Mauritius) 52.0% (Zambia) |
| Population density (person/square km) | 20.3 | |

Balance of Payments Indicators:

| | | | |
|--|-------------------|-----------------------------------|--|
| Current acc. balance | \$ -132.4 million | | |
| Reserves (mos. of import coverage) | 2.3 | | |
| Rate of export growth (1980-86) | 0.51% | -13.4 (Niger) 13.8 (Cameroon) | |
| Terms of trade (exp/imp ratio) 1980 = 100 | 87.3 | 44.0 (Nigeria) 133.0 (Rwanda) | |
| Merchandise import structure (% of total): | | | |
| Food | 15.4% | 4.0% (Zambia) 32.0% (S. Leone) | |
| Fuel | 9.2% | (Chad) 24.0% (Benin) | |
| Machinery | 33.5% | 17.0% (Benin) 47.0% (Somalia) | |
| Other primary | 3.4% | 1.0% (Zambia) 11.0% (Niger) | |
| Other mfg | 17.0% | (Togo) 56.0% (Burundi) | |

External Debt Indicators:

| | | |
|--------------------------------------|------|-------------------------------------|
| External debt (% of GNP) | 70.3 | 23.9% (Cameroon) 240.5% (Zambia) |
| External debt service (% of exports) | 19.7 | 2.2% (Chad) 62.1% (Somalia) |

Sources: The World Bank, World Development Report 1988.

sustainable situation given unwillingness of creditors to continue funding the gap. "Aid (for the entire sub-continent) stagnated at \$6.9-\$7.3 billion . . . while net private flows turned negative and took out \$480 million in 1985" (World

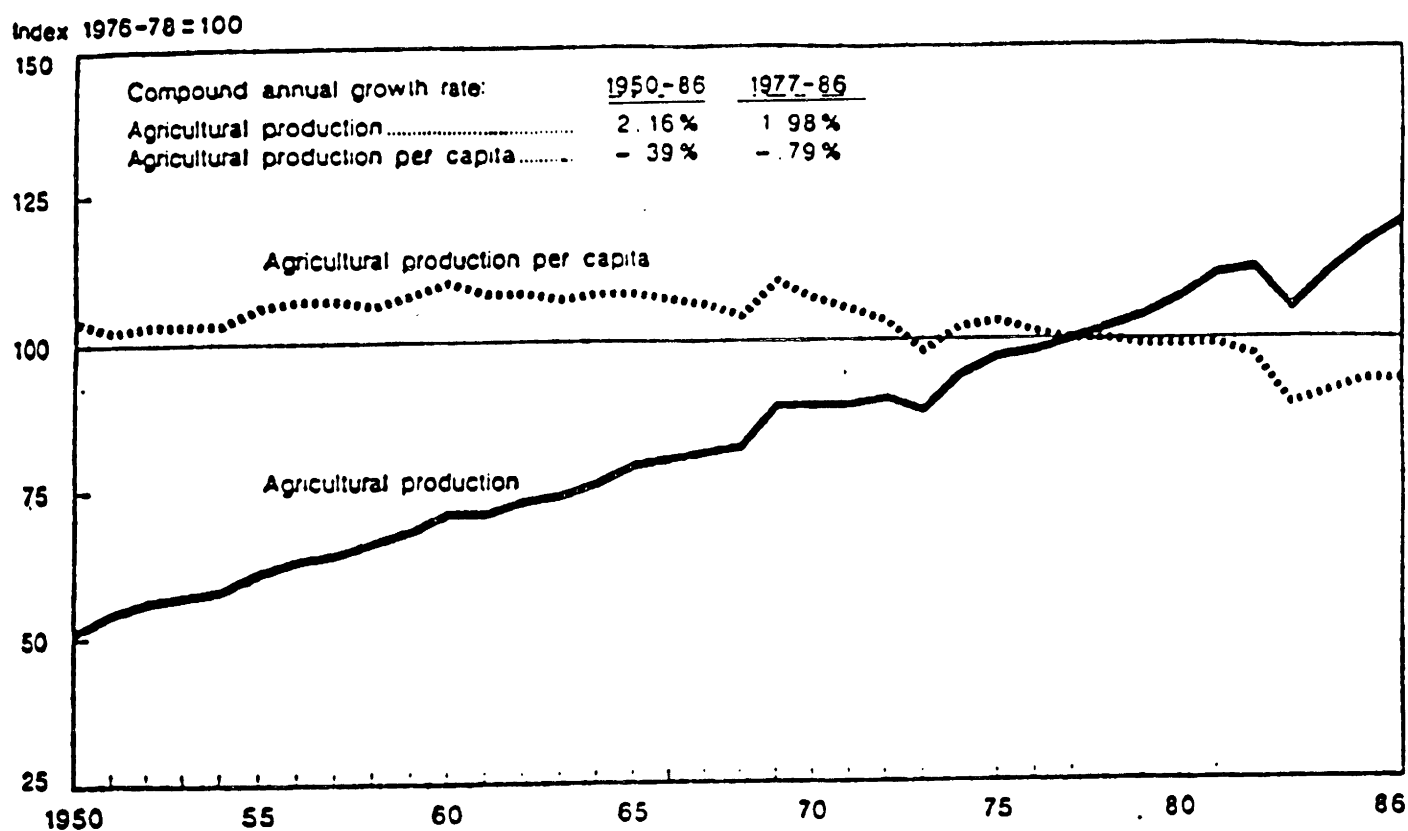
Resources, 1988, p. 222). As of 1986, the accumulated foreign debt had reached 70.3% of the value of GNP, and debt service amounted to 19% of the value of exports (33% in 1985 according to World Resources, p. 222). Another sign of macroeconomic disequilibrium, the inflation rate has reached 17% per year (in 1986).

Sectorally the situation is not much different. Agriculture, which employs 74% of the population and is responsible for 35% of GNP, is also declining. The growth rate of agricultural production reached only 0.9% in the 1980-86 period, with the index of production per capita falling to 96 in 1986 (1979/81 = 100). Worse, as Figure 1 indicates, the decline in food production per capita resembles more a trend than a short term phenomenon. Agricultural output per capita has been declining at an annual rate of -.39% since 1950. In more recent years, the decline has accentuated (-.79% per year since 1977). Food imports represent 15.4% of total imports. To make a difficult situation worse, the terms of trade index is also declining. From the base period of 1980 (= 100), the index reached 87.3 in 1986, making it doubtful that a policy of incentives to traditional exports can by itself be an adequate growth strategy.

2. Constraints to SSA Economic Growth

We have stated that SA has typically taken a light view of some of the important constraints to SSA economic growth. In the following paragraphs we examine some of the factors that must be taken into account in the formulation of a growth strategy. The factors are: the endowment of natural resources, the scarcity of capital, the relative immobility of resources, the limited size of the domestic market, SSA's colonial heritage, competition for international resources, and the backwardness of the public sector.

Figure 1. Sub-Saharan Africa: Index of Agricultural Production



Source: USDA, World Indices of Agricultural Food Production, 1977-1986, p. 122.

a) Endowment of Natural Resources

Despite the fact that agriculture is the most important sector in the SSA's economy, fertile land is the exception rather than the rule. Only 20% of SSA's soils have no inherent fertility limitations whereas roughly 55% have severe or very severe impediments to cultivation.⁶ Most of SSA lies outside of the humid zone where rainfall is highly variable and "occurs in erosive downpours." Two-thirds of the land area faces high risk of drought and soil erosion. Irrigation is a possibility which so far has been largely unexplored; only about 1.0% of the cultivated area is irrigated at present.⁷ Even though most of SSA's hinterland is thinly to moderately populated, when allowance is made for the quality of the soil and variability of rain pattern, it is evident that the land/labor ratio is comparable to many countries of Asia.⁸ Over-exploitation of scarce agricultural resources is a fact of life in SSA. Over-grazing of traditional range lands and cultivation of marginal lands are both common. Technological change which economizes on natural resources offers the best way out of the resource endowment constraint, but much of the new technology currently available "off the shelf" is ill suited to African conditions. In addition, insecure tenure and imperfect land markets cause farmers to under-estimate the value of soil fertility. Furthermore, new agricultural technology is often site-specific and is only available where a well developed agricultural research/extension system is in place. The more widespread use of

⁶ FAO, 1986, Atlas of African Agriculture.

⁷ FAO, 1977, Production Yearbook.

⁸ Cleaver, K. M., "The Use of Price Policy to Stimulate Agricultural Growth in Sub-Saharan Africa." The World Bank Agricultural Symposium, January 6-8, 1988, p. 4. The author is quoting FAO's "Report on Agro-Ecological Zones Project."

farm machinery facilitates incorporation of marginal lands and contributes overall to more intensive soil depleting cultivation.

An undisturbed tropical forest which covers 703 million ha of SSA's territory is still an important natural resource. However, it is being cleared at the rate of 0.6% per year by encroaching settlers as well as the logging industry (World Resources, 1988). "Local rates range from 0.2% for the vast Cameroon-Congolese forest up to 4% a year in West Africa" (World Resources, p. 222). At present clearing rates, the forest is expected to last for no longer than 10 to 15 years in many areas. Fuelwood shortages, already noticeable, are expected to be exacerbated. Large mammals are both a tourist attraction and a (culturally) valued source of meat in SSA, but face the same prospect as the moist forest; at present rates of extraction these animals will practically disappear over the next few decades.

b) Capital Scarcity

Scarcity of capital is a major impediment to SSA economic growth. Three aspects of the capital constraint have a bearing on policy. The first is the extreme scarcity of capital itself. SSA's savings rate of 8.5% is hardly enough even for maintenance of the capital stock (Table 1). In addition, the poorly developed financial system is unable to mobilize whatever resources there are for productive investments. Without a network of private financial institutions to mobilize resources, the government ends up assuming that responsibility and, with it, the role of allocating the resources.

The second aspect of the capital scarcity problem is evidenced by the wasteful utilization of economic surplus. Part of the blame goes to inefficient government allocation. In addition, factors such as population growth, rapid

urbanization, etc., increase demand for social infrastructure and other investment projects with low output/capital ratios.

The third factor to be noted is that capital is the most mobile factor of production. If no artificial barriers to capital movement are in place, existence of profitable projects are often all it takes to attract capital. Shortage of capital is, in many respects, a symptom reflecting the absence of various complementary factors such as small size of markets, poor endowment of natural resources, inelastic supply of factors of production, and inadequate technology. One of the most important obstacles to attracting capital is the riskiness of investing in the uncertain political and economic climate in the country.

c) Resource Immobility

Relative resource immobility hinders growth by making the economy less responsive to price incentives. Africans are certainly as motivated to material incentives as anybody else, but cannot always respond to these incentives. A partial list of possible constraints would include: inadequate infra-structure, lack of credit, inelastic supply of qualified labor, monopolistic control of markets (barriers to entry), government controls and bureaucratic red-tape, imperfect information, risk aversion, indivisibility of capital or high project break even point, overall small size (or nonexistence) of an entrepreneurial class, and a hostile environment to investors. Labor mobility, in particular, is further hampered in SSA by language barriers, cultural barriers among ethnic groups, and tribal rivalries.

In agriculture, it is also possible that defective price signaling compounds relative factor immobility. Both para-statal enterprises (in food and input distribution as well as in banking) and private local monopolies flourish in SSA, the second because of the favorable environment created by the deficient system

of transport and communications, and the first to "correct" the abuses of the monopolists. Either way, prices fail to properly signal abundance or scarcity.

One indication of the seriousness of resource immobility in SSA is given by studies of agricultural supply functions. While in individual crop studies it has been found that supply may be responsive to prices, aggregate supply elasticity coefficients are nil.⁹ Farmers, in other words, respond to prices within the limits of their capacity, by substituting crops, but are unable to expand their scale of operations no matter what the incentive.

Needless to say, resource immobility can render ineffective any policy instrument based on manipulation of price incentives, as economists of the structuralist tradition have emphasized. A corollary is that a policy priority should be the removal of the factors hindering mobility of resources.

d) Limited Size of the Market

Since Adam Smith, economists have known that the size of the market limits the scope for division of labor. While this is an important factor in SSA, it is equally important to recognize that, because of widespread poverty, SSA agricultural producers face a highly price inelastic demand function for food that, furthermore, crosses the vertical axis at a rather low price level. The situation is such that, if production increases, prices will fall steeply due to the market's limited capacity to absorb the extra output at going (or slightly lower) prices; on the other hand, if prices go up by any significant amount, there will be no buyers. The policy implication of this situation is that, unless consumption is subsidized, there isn't much room for price incentives to

⁹ See Cleaver, A. Annexes 1 and 2, for empirical evidence. The point is recognized by Streeten (1987, p. 1473). Rigidity of the agricultural supply function has been one of the mainstays of the structuralists' arguments since the 1950's.

agricultural producers for the domestic market. It would be wonderful for SSA agriculture if farmers could receive for their grains what German consumers pay; the problem is that they would have to sell to Germans! This has in fact been recommended. However, trade barriers sharply limit the prospects for increased agricultural exports to developed countries.

e) Colonial Heritage

Most countries in SSA have been politically independent for less than 30 years and have not yet overcome distrust of foreigners... and not without reason! It is therefore understandable that there is resistance to extending privileges to foreigners, no matter what the long term benefits to the country. Suspicion of aliens has made much needed foreign capital and entrepreneurs less than welcome in SSA. This is a non-economic barrier which policy proposals to "open" the economy will have to face.

f) Other Countries' Competition for International Investments

If on the one hand Africans are suspicious of foreigners, on the other, foreign investors are in no rush to put money in SSA, with the probable exception of enclave type exploitation of rare minerals. Fast growing East Asian countries, resource rich Latin American countries, the post-perestroika Soviet Bloc, and the developed countries themselves are all eager to attract as much foreign capital as possible. How can resource poor, politically unstable, Africa beat the competition? For them, the safest assumption one can make is that they are on their own.

The same is true of foreign loans. SSA is a high debt risk and banks that have "burned their fingers" in the Third World debt crisis are not likely to voluntarily resume lending no matter what "solution" to the present debt

situation is reached. Policies designed to improve SSA's standing with creditors will not bear fruit for a long time.

g) Underdevelopment of the Public Sector

When foreign advisers make policy recommendations a fair presumption is that there is a government in power to carry them through. Such is not always the case. Many less developed countries' governments are extremely vulnerable to pressure of interest groups, lack effective self-control mechanisms, and have a very limited capacity to levy taxes. If on the one hand governments don't have many resources to control, on the other, they don't have the means to make effective use of the resources.

One would like to think that government can be a force in modernizing society whereas what we see is that only by modernizing society can one hope to modernize the government. For the econometric minded reader, there is an identification problem here (all variables are endogenous). For development policy, it means that society's and government's modernization, part as they are of the same problem, are to be tackled together. This is probably the most difficult constraint to structural adjustment, or for that matter, to any kind of policy.

3. Causes of SSA Foreign Indebtedness

Correction of the foreign accounts imbalance is the prime reason for enactment of a SA program. Whereas "external shocks" are the recognized prime culprits for the debt crisis, proponents of SA tautologically argue that the potential for shock damage would not be so great had the country's economic structure been less vulnerable. To form a background picture against which SA

can best be seen, this section discusses some of the reasons for the spiralling debt accumulation.

a) Chronic Currency Overvaluation

Foreign exchange scarcity is the most binding constraint and most difficult to substitute "factor of production" in SSA's economies. A fall in foreign exchange earnings has a direct and immediate depressing effect on consumers' welfare. SSA depends on imports for most of its non-farm final consumer goods (including essential items such as medicines), for almost all of its capital and intermediate goods, including oil, and in many countries for food. A depressing effect on consumers' welfare is observed when prices of imported goods are raised across the board through currency devaluation. The presence of imports is, in some cases, so pervasive that there is little room for product substitution in response to price increases. As a result, the fall in welfare is almost proportional to the increase in prices, at least in the short run.

Not all consumers suffer, however. The vast majority of the population in rural areas or on fringes of towns have access to imported items anyway. It is the middle and upper urban classes who lose the most when import prices go up. It is therefore understandable that these groups use their political influence to prevent any devaluation of the national currency. In fact, the major political conflict in the country pits export farmers, who stand to gain from a devaluation, against urban consumers who would lose from it.

Historically, the urban classes have had the upper hand in the conflict and the exchange rate has been chronically overvalued, implicitly taxing the tradeable goods sector. Exports are assumed to have fallen short of their full potential and import substitution to have been discouraged. Being historically discriminated against, these activities have failed to develop. As a

consequence, with or without the debt burden, vulnerability to foreign exchange shortfalls is a permanent problem.

b) Instability of Export Earnings

Price instability is a well known characteristic of primary export products. The instability is brought about by supply fluctuations in face of inelastic world demand. For the exporting countries, instability of prices means instability of foreign exchange earnings as the price fluctuations are not offset by changes in export volume.

Instability of earnings naturally leads to borrowing to smooth consumption. The problem arises as countries attempt to stabilize consumption at income peaks, rather than averages. If an increase in export prices lead to transitory windfall gains, imports are adjusted upwards on the assumption that the "good times" will last forever. Development plans are redrawn on the basis of this optimistic assumption and availability of consumer goods also increases. When the "hard times" hit, countries find it all the more difficult to adjust to reality.¹⁰

c) "Irresponsible" Lending

Lenders, on the other hand, also have difficulties in distinguishing random, zero average, earning fluctuations from structural shifts in the markets for LDC's exports. For instance, the 1981-82 slowdown in OECD economies led primary goods export prices to plunge, but recovery didn't seem to have much of an effect in bringing them up to pre-recession levels. What was a permanent downward demand shift was mistaken for a temporary problem. Forecasts of OECD economic growth in the eighties were grossly overestimated and interest rates have remained a

¹⁰ For an interesting discussion of this problem in connection with the fluctuations in oil prices see Gelb et. al. (1988).

few percentage points above what was previously considered its "normal" level. Worse still, developed countries have become more protectionist, permanently lowering demand for LDC's exports. A profound change for the worse had taken place in the international economic environment, with disastrous consequences for much of the Third World; this was not recognized until a long time had elapsed.

Structural Adjustment Policies for SSA

1. Policy Objectives

Structural adjustment programs were initiated in 1980 with the objective of helping less developed countries adjust to balance of payments problems. (The World Bank, 1988a and 1988b). Those problems in SSA stem from a combination of "external shocks" and a policy of implicit and explicit subsidies to consumption. The external or exogenous shocks were: (i) deterioration in the terms of trade because of the rise in price of imported oil combined with the price decline of the country's traditional exports, (ii) rise of interest rates on accumulated debts, and (iii) droughts which led to a decline in exports and the need to import food. The subsidies to consumption, particularly in the form of chronic overvaluation of the national currency, stimulated overspending, including public sector overspending. Aggravating the imbalance, production was penalized. Exchange rate overvaluation is a tax on the tradeable goods sector which in SSA means mostly agriculture. Production disincentives contributed to country failure to modernize key food production sectors and to fully exploit export potential.¹¹

¹¹ One of the main purposes of SA, as stated in World Bank official documents (for instance, The World Bank, 1988a) is to make the economy "less vulnerable to future shocks." In the words of P. Streeten (1987, p. 1470) this means increasing flexibility, or reducing rigidities in the economy. "Unless (such rigidities) can be removed, structural adjustment can be very costly, or

As the imbalances became serious, the countries lost their ability to service their accumulated foreign debt. Trade flows were impaired, as were international payments flows. To correct the disequilibrium, the debtors were induced to adopt the IMF stabilization program by conditioning loan reschedulings to acceptance of IMF programs. The disequilibrium, according to standard IMF stabilization procedures, was to be fixed through reduction of aggregate expenditures, obviously at very high social costs for countries already at the margin of subsistence. The social costs of stabilization were simply unacceptable to many countries and therefore politically unviable. The pains of stabilization had to be cushioned and that, precisely, is the objective of structural adjustment. (The World Bank, 1988a, Chapter 1). To put it bluntly, not only were these policies insufficient by themselves but one had to sugar coat the IMF medicine.

From its inception structural adjustment has sought to enable debtors to resume servicing their debt. The program was created to stave off a break down of the international economic order, to allow debtors to keep their contractual obligations and creditors to receive interest payments on schedule. For that, economic growth per se is not enough; a particular kind of growth is required which we shall call outward oriented growth (OOG).

While following comparative advantage clearly has benefits, the generation of a trade surplus has no such firm theoretical basis. It is, however, a

altogether out of reach." When one talks about "shocks," one must be referring to "sudden or large, often unexpected changes." Streeten goes on to say "For slow and gradual change, the price mechanism is one of the best instruments of adaptation" (p. 1469). But we are not talking about small changes. To reduce structural rigidities and to adjust the economy to large sudden changes, "price manipulations" cannot be the first instrument we reach for in our tool box. This, however, is not what we usually see in the daily experience of SA.

prerequisite to remaining current on international debt payments if no new lending is forthcoming. In fact, the historical experience of developed countries suggests that SSA should not attempt to generate a sustained trade surplus at current levels of per capita income. The pressure to do so comes from creditors who have neither this historical experience nor the best interests of SSA in mind.

In the short run, a trade surplus can be generated through a contraction of income and imports. But that is not sustainable. In the long run, if countries are to emerge from the debt crisis by their own means, they will need OOG, the only way a trade surplus can (hopefully) be maintained for a long period of time. These are the objectives and the rationale of the structural adjustment policies.

2. Structural Adjustment Policy Instruments

Structural adjustment can best be understood as an evolving set of policies since new programs have been instituted in response to unforeseen problems and to correct deficiencies or side effects of previously undertaken measures.¹² Examples are the poverty relief measures which have been added to the adjustment programs in countries like Ghana, Cote d'Ivoire, Tunisia, Korea, and Chile (The World Bank, 1988a). The program is also flexible enough to address specific countries' problems such as those contemplated in the sectoral adjustment programs. This feature makes a taxonomy of the policy instruments of structural adjustment particularly difficult. However, focusing on the core of the program, two sets of measures are apparent: realignment of administered prices (exchange rate, interest rates, tariffs, public employee nominal wages, etc) and

¹² Iona Sebastian, "Overview of Adjustment Lending Policies," presentation at Cornell University Workshop of Structural Adjustment and Natural Resource Use, November 1988.

liberalization of the market by trimming both the size of the public sector and the scope of government intervention. In the specific case of SSA, because of the overwhelming importance of agriculture, the reform measures tend to be related to agricultural prices and agriculture related governmental institutions.

In the words of an official World Bank document, the following is a diagnosis of the SSA difficulties:

"Central to their problems have been a bias against agriculture, inefficient state enterprises, unproductive government investment, a tendency to emphasize public service employment over maintenance and rehabilitation expenditures, and severe shortages in qualified manpower." (pp. 84 and 85).

Regarding solutions to those problems, the Bank prescribes a reform of agriculture and public sector institutions:

"... emphasis has been placed on raising producer prices, reducing the taxation of farmers through the high profits of low efficiency of marketing boards, and improving the quality of public services in such areas as extension and research. Programs for public sector enterprises and agencies have emphasized improving profitability by raising prices and efficiency, reducing overmanning, restructuring activities and finances, and divesture" (pp. 84 and 85).

And to reverse price disincentives to farmers, the following is proposed:

" changes in prices set by marketing boards; price decontrol; exchange rate depreciation; and macroeconomic policies to reduce inflation" (p.74).

With respect to devaluation, the Bank's report concedes that it:

"...should normally benefit traded sectors, such as agriculture, if the exchange rate increase is passed on to producers" (p.74).

Based on the reading of these quotations and adding well known elements of IMF programs, a "bare bones" structural adjustment/stabilization package for our "typical" Sub-Saharan African country would include the following measures: (i) Currency devaluation followed by inflation stabilization measures such as:

- cuts in the fiscal deficit,
 - restriction of monetary expansion,
 - restrictions on bank lending.
- (ii) Elimination of subsidies to agricultural credit and inputs.
- (iii) Decontrol and/or privatization of the food marketing system with elimination of marketing boards.
- (iv) Elimination of quantitative restrictions on imports and exports together with reduction of import tariffs.

The price realignment in this "package" is aimed at increasing farmgate product prices in proportion with the devaluation while making farmers pay the "true" opportunity cost of agricultural inputs. Regarding the role of the government, it is at once removed from control of foreign trade and from the marketing of agricultural products. The size of the public sector is reduced through expenditure cuts in connection with the trimming of the fiscal deficit. Removal of inefficiencies brought about by government intervention in markets and the price stimuli to farmers is expected to promote growth of the critical agricultural sector as well as of exports. Meanwhile, macro level stabilization -- a pre-requisite for resumption of growth -- should be achieved through restrictive monetary and fiscal policies.

A Critical Evaluation of Structural Adjustment

1. A Critique of the Programs' Objectives

Structural adjustment seeks to promote trade through outward oriented growth. The idea is that by growing outward toward world markets, heavily indebted countries will not only be able to keep (or resume) servicing their debts but will also become more resilient to future external shocks. This objective can be challenged on several counts:

First, to require SSA to run trade surpluses to repay debt at current low levels of development, runs counter to experience and to the clear need to invest what funds are available in development of the economy. No currently developed country had such a debt burden at a comparable stage of development; it is unreasonable to expect SSA to perform better than did the U.S. or Western European countries. Even if they succeed in repaying debt, it is not at all clear that this would improve creditor perceptions of credit worthiness enough to generate renewed capital flows. On the contrary, commercial creditors seem to be averse to extending new loans to SSA under any circumstances.

Second, it is based on the overly optimistic assumption that SSA can grow its way out of the debt crises. Promotion of African development is an awesome enough task even without the extra burden of the debt. The presumption that Africa can grow while paying requires (i) an unrealistic assessment of its resource potential, (ii) an unwarranted optimism about the international economic environment, and (iii) naive expectations about developed countries' cooperation.

Despite an overwhelming dependence on natural resources, SSA is not resource rich. At present rates of growth, population will double in less than

two decades, putting additional pressure on the resource base. One simply cannot count on exploitation of those resources for payment of foreign debt.

With respect to international cooperation, it is well established that developed country policies are geared towards their own domestic problems. One cannot imagine the American Fed or European Central Banks refraining from raising interest rates in the face of a threat of inflation just out of concern for the impact of the policy on Africa's debt burden. It is equally improbable that the United States would eliminate subsidies, let's say, to peanut farmers to promote demand for Africa's vegetable oils. The trend, on the contrary, is toward more, not less protectionism. With Europe readying its trading bloc, and the United States and Japan all looking for ways to match the initiative, Africa will likely be left out in the cold.

Third, the outward oriented growth strategy, despite its merits, needs a few qualifications. Let's start with the merits. OOG is justifiable because it is a way to relieve the constraint imposed on the economy by the smallness of the domestic market. Foreign trade can provide "a vent for surplus" which can be transformed into investible capital for diversification of the economy. Trade also offers the quickest way to modernize the economy. Africa depends on foreign inputs and technology which it can only acquire through exports. Finally, OOG is based on the efficiency enhancing principle of comparative advantages that allows the country to exploit its full production potential. In other words, there is an economic cost attached to violations of the comparative advantages principle.

One can ask whether the principle of comparative advantage can be safely applied to resource over-dependent economies. Doesn't it run counter to the objective of reduction of resource dependency? If SSA were to follow the

comparative advantage principle it would have to specialize in extraction of a resource that, although relatively abundant today, is slowly renewable (or exhaustible), and for that precise reason, won't be the most abundant tomorrow. In other words, we are talking about temporary comparative advantage.¹³ For sustainable growth, the country has to exploit all the productive opportunities it may have in the present -- and this means stimulating resource extraction and exports -- but with a view toward acquiring the means of diversifying the economy, not specializing. The only proper way a resource over-dependent country can utilize its resource is to use it to change its comparative advantage.¹⁴

Also, one shouldn't neglect a problem of fallacy of composition. No one disputes that expansion of exports promotes economic growth. To have several African countries competing with each other to export the same product does not. Export oriented growth on a continental scale requires, to be successful, export diversification by the national economies.

For OOG to succeed, there is a need for policy coordination on a global scale. What good would it do to have the less developed countries go through a costly effort to reorient resources towards the export sectors when the more

¹³ The presence of exhaustible resources constitutes one of the classic cases of "market failure" (Fisher, 1981, Georgescu-Roegen, 1976 and 1979). Prices of exhaustible resources, in other words, are not reliable guides to abundance or scarcity. For this reason, it is difficult, even conceptually, to determine where a country's comparative advantage lies. Failure to compute the opportunity cost of used up resources or degradation of the environment (a public good), we suspect, is a reason why countries are wrongly said to have a "comparative advantage" in many resource overdependent activities.

¹⁴ Comparative advantage is a static efficiency enhancing principle which is not necessarily compatible with "dynamic efficiency." As Krueger (1980) states, ". . . there is nothing in theory to indicate why a deviation from the optimum should affect the rate of economic growth. Most growth models suggest that there are once-and-for-all losses arising from nonoptimal policies with lower levels of income resulting from them but no change in growth rates" (p. 2).

developed ones are striving hard to reduce their imports? Without coherent world-wide policies, OOG is risky. One of the aims of structural adjustment is to make the countries more resistant to future external shocks. However, just the opposite may be true. If countries grow outward towards world markets they will become more, not less, vulnerable to world market fluctuations. It makes sense to gear the economy in such a way that it can take advantage of favorable external market conditions and generate a margin over and above subsistence levels in order to be better able to bear risk. But should a non-risk loving country put all its eggs in that basket? Resources are not so mobile that one year they can be used to produce exportable goods and in the next domestic consumption goods. Many sub-Saharan African countries are so poor that they cannot afford the risk of submitting their economies to the vagaries of developed countries' policies.¹⁵

¹⁵ Since the times of David Ricardo, few economic issues have been more controversial than the question of free trade (implied in OOG) versus protectionism (and inward oriented growth). However, for the World Bank/IMF there is no controversy. It surprises the independent observer that "donor" agencies would attempt to induce countries to accept costly SA programs without a word of caution being mentioned about the possibilities of failure. The fact of the matter is that there is neither theoretical nor empirical evidence to support the superiority of OOG and free trade over protectionism and IOG as strategies to accelerate growth of countries in the early stages of development such as those of SSA. The asymmetry of the distribution of gains from trade between producers of manufacturers and producers of primary goods is what lies at the heart of the controversy. Is there any way to explain why countries stand for protectionism before and for free trade after development? The names that quickly come to mind in a discussion of this subject are those of Prebisch (1949 and 1959), Singer (1950 and 1974), Hirschman (1958), and Lewis (1958). A recent theoretical work of excellent quality on the subject is that of Pinto (1987). Others who have questioned the advisability of OOG cum free trade include Bacha (1978), Ocampo (1986), Taylor (1986), and Agarwal (1988). Empirical evidence on the subject is hampered by difficulties of cross-country comparisons. Pointing against OOG are the works of Taylor (1986), and Grilli and Yang (1988) and Agarwal (1988). In favor of OOG are Krueger (1978 and Bhagwati (1978). Surprisingly, however, one reads in Krueger "while there are numerous microeconomic changes that accompany devaluation, liberalization and altered (trade policy) bias, it was not possible to detect significant effects of these changes on growth performance" (quoted from Agarwal, p. 25). Tang and Worley

2. A Critique of the Adjustment Policies

We have argued that structural adjustment programs in SSA pursue what are, in our judgement, unrealistic objectives and also that programs are based on inaccurate assessment of the constraints facing the African countries. Now, we take a critical view of specific instruments and policies. There is no question that some form of adjustment is necessary and that most of the recommended policies are a step in the right direction. However, we feel that the appropriateness and probability of success of many policy recommendations have been exaggerated.

a) Exchange Rate Devaluation

Currency devaluation in order to depreciate the real exchange rate is the cornerstone of the outward oriented growth strategy. The real exchange rate is defined as the relative price of internationally traded goods vis-a-vis those which are produced and consumed only domestically (Dornbusch and Helmers, 1988, Edwards, 1988). A devaluation implies an increase in the relative price of tradeables, both exports and imports. By making imports dearer, devaluation discourages "waste" of scarce foreign currency while promoting foreign exchange earnings. The assumption implicit in the argument is that higher prices will attract resources to export as well as import substitution sectors.¹⁶ Other

(1988) present several articles on the lessons of East Asian countries, obviously in favor of OOG. The emphasis of the studies supporting OOG, however, is on industrialization policy and, we think, bear little relevance to SSA.

¹⁶ As far as agriculture is concerned, it is not at all certain that devaluation of the currency can have a significant effect in promoting import substitution in SSA. The problem is that rice and wheat constitute the main imported food items, neither of which can be easily or widely grown in many African countries. "The large and growing market that should exist for African farmers has therefore become illusory: the market prefers products that few farmers can grow, and it can obtain imported food for less than the price for which it is economic for the rural population to grow it (because of developed countries' food subsidies)" (FAO, 1986, p. 5). The impact of a devaluation on

advantages of bringing the real exchange rate closer to its "equilibrium" level are the following: it attracts foreign capital while discouraging capital outflow; it is a broad price incentive that can dispense with inefficient government management of specific instruments (subsidies, tax breaks, quantitative restrictions on trade, etc.); it is the only effective way to protect the service sector; and within limits it can enhance a country's competitive position, being for instance an alternative to wage squeezes.

On the negative side, two major problems with a real devaluation can be singled out: difficulties of implementation and uncertainty about its effectiveness.

Any change in relative prices, particularly such an over-reaching change as in the prices of tradeables vs. non-tradeables, is bound to have important consequences for income redistribution. Potential losers will not stand idle in face of a policy damaging to their interests. However, political opposition is only part of the problem. As the different segments of society attempt to maintain their share of real income, the resulting inflationary pressure "undoes" devaluation by causing an appreciation of the real exchange rate. For a devaluation to be successful, it must be accompanied by recessive price stabilization policies. Indeed, devaluation itself causes contractionary pressures due to its negative impact in the value of real balances (Krugman and Taylor, 1978) and to its impact on the "aggregate supply side of the economy" (Van Wijnbergen, 1986). Of course, the magnitude of the recession depends upon

prices of imported agricultural inputs will further reduce its effects on import substitution of food products. On the other hand, we recognize that exchange rate overvaluation is not a distortion which exists by itself, on the contrary, as the need to ration scarce foreign currency arises, it commonly leads to all sorts of government controls and to inefficiency. If the devaluation is accompanied by decontrol, side benefits can be reaped.

the extent of the intended change in relative prices and on the structure of the economy (share of tradeables in GNP, strength of trade unions, degree of oligopolization of the economy, etc.).¹⁷

If the economic (lost income) and social costs of a devaluation can be high, its effectiveness may fall short of expectations. First, a devaluation works by providing price incentives; but there is no guarantee that the economy will respond to the incentives at a desirable speed. As we have seen, resources in SSA are not only extremely scarce but often slow moving. With so many "structural" constraints to economic growth, the price incentives are more likely to increase rents (to scarce factors) than production. The speed at which resources respond to price incentives is a major difference between developed and less developed economies. This difference should be recognized if workable strategies to implement structural adjustment are to be devised.

Second, a successful devaluation must meet conditions which are not always present. A devaluation tends to increase exports and reduce demand. The question is: by how much? Although the answer to this question requires an empirical investigation, one can determine a priori the relative magnitude of the relevant parameters. Accordingly, the more inelastic is the demand for imported products,

¹⁷ These are all factors which make prices inflexible downwards. The problems with currency devaluation, however, go far beyond those treated in the limited space of this paper. It is conceivable, for instance, that changes in the nominal exchange rate will have little effect on the real exchange rate; the structure of the economy may be such that a devaluation will have negative effects on both output and price level; it may even happen that, given a large initial deficit, a devaluation will magnify that trade imbalance (Katseli, 1983). Structuralists maintain that all along a devaluation causes "stagflation" (Taylor, 1987). If the country is running a trade surplus, a devaluation may contribute to the fiscal deficit, working against the other objective of SA. The trade-off between reductions in the resource balance (goods and non-factor services) in the balance of payments and increases in the GDP growth rate (pp.2-3, Figure 1).

the less effective a devaluation will be in reducing imports. To the extent that SSA depends on basic necessities or hard to substitute goods (oil, medicines, certain food items) the decline in imports will probably be less than proportional to the price rise and the foreign exchange savings smaller than otherwise.

With regard to exports, the effectiveness of a devaluation in promoting foreign exchange earnings depends on the elasticity of the export supply function (which in view of resource immobility is expected to be small) and on the elasticity of the import demand function for the country's exports. Problems will arise if a large number of countries with similar export products adopt the same policy. Developed country demand for primary products are, in many cases, inelastic with respect to price as well as to income. An orchestrated effort to increase primary good exports will under these circumstances lead to more than proportional price decline and all exporting countries will lose.¹⁸

Nevertheless, devaluation is a step in the right direction for the many countries which have extremely overvalued currencies. What we want to emphasize is that beneficial results are likely to be slow in coming and may, in fact, never materialize if complementary policies are absent.¹⁹

¹⁸ The discussion refers to the Marshall-Lerner conditions. See for instance, Krueger (1983) and Agarwal (1988).

¹⁹ Discussing the complementary policies in the case of agricultural development, Streeten (1987) calls attention to the "futility" of applying only price measures. "It so happens that the six prongs which are necessary to achieve an agricultural supply response each begin with In so that we can call them the six Ins. Prices are the first in because they serve as incentives" (pp. 1473-1474). The others are: inputs, innovation, information, infrastructure, and institutions."

b) Agricultural Pricing: Stimulating Prices Vs. Input Subsidies

To increase agricultural profitability -- and attract resources to food production -- one can either increase farm product prices or lower agricultural costs. In Africa, it seems, the latter has been the most often chosen option. While agricultural prices have been kept "artificially" low, governments have tried to compensate farmers with subsidies to agricultural inputs and credit. By lowering "modern" input prices and providing cheap credit, it is hoped that farmers will be induced to modernize production techniques, increase productivity, and actually lower production costs. The implicit assumption, of course, is that appropriate modern technology in fact exists. The subsidies and the credit would be required to lead farmers into experimenting with it and to finance the overhead costs of the transition to the new farming methods. The subsidies could then be rationalized as temporary "educational" costs that will bear fruit in the form of increased agricultural productivity.

The opposite view is that it is more efficient to stimulate agriculture through higher product prices than through lower input costs. Against the subsidies, one can convincingly argue that: (i) subsidies are hard to manage. A few farmers end up receiving most of the benefits, there is no way to assure that the funds will actually be used for the intended purposes, and the possibilities for corruption are unacceptably high. Very likely, the subsidies will be nothing more than transfer schemes to well connected individuals. (ii) Subsidies distort relative factor prices. The subsidies lower the price of capital and that of imported inputs with respect to the price of labor, encouraging the use of more scarce factors at the expense of more abundant labor, thereby reducing employment opportunities. (iii) Subsidies raise land rents, not food production. The benefits of the subsidies are directed towards

ownership of the land, not actual production. By raising land prices the subsidies make access to land all the more difficult to landless workers, concentrating wealth still further. (iv) The subsidies represent a high percentage of fiscal expenditures to governments which are notoriously incapable of raising tax revenues. They are an important contributor to the public sector deficit.

Opponents of agricultural subsidies are entirely correct: it is very hard to subsidize agriculture and not create pernicious distortions. However, even in this overwhelmingly agreed upon instance of superiority of price incentives over subsidies, substitution of the one for the other is not completely cost free. A major reason is the dualistic structure of African agriculture. Although no figures are available, with 74% of the population living in rural areas, it is safe to presume that a high proportion of the agricultural product is non-traded. While there may be some overlap, for the most part, agriculture consists of two quasi-separate sub-sectors: commercial and subsistence agriculture. The higher prices that would result from a devaluation would benefit the first, not the second. In fact, the food producing subsistence sector could be harmed as the two sub-sectors compete for the same factors of production. As, say, the prices of coffee, tea, or palm oil rise, land and labor tend to be shifted away from staple food grains and roots into the more

profitable crops, with consequent decline in food production and increased dependence on food imports.²⁰

c) Trimming of the Public Sector

A fiscal deficit occurs when government's revenues fall short of public expenditures. Although, by itself, the deficit is not a macroeconomic imbalance, it nonetheless contributes to one since at least one of the sectors of the economy -- the public sector -- lives beyond its means. To keep aggregate demand equal to aggregate supply, "excessive" public sector consumption has to be matched by a reduction in someone else's consumption. In other words, someone has "to pay" for the fiscal deficit. If you can't levy taxes to make the private sector pay for the government's excessive expenditures you still may resort to borrowing, in which case future generations will pay. Borrowing is a tempting option not only because it is a way of postponing the problem but because, in a growing economy, the future reduction in consumption will come out of a higher income level and therefore the sacrifice in welfare is lessened.²¹

The difficulty with borrowing is that it requires fairly sophisticated capital markets, something which SSA does not have. If the public sector is going to borrow, the private sector must be doing the savings. With a low savings rate, the private sector just does not have the wherewithal to finance the government. As a consequence, in general, public sector deficit does lead

²⁰ From sugar-cane, in colonial times, to coffee, in the early 20th century, to soybeans in the present day, Brazilian history is full of examples in which expansion of export crops has led to decline in food production for the domestic market. Brazil's example, of course is far from unique. What is remarkable about it is that the country is one of the world's leading exporters of food even though as much as one third of the country's population is underfed. To increase food production alone isn't the answer.

²¹ Under the assumption of declining marginal utility of money.

to macroeconomic imbalance (aggregate demand larger than supply) and to inflation. To correct for the imbalance, structural adjustment prescribes the "obvious solution": cut fiscal expenditures.

The real deficit problem -- even Milton Friedman would agree -- is not that the government spends too much but that it spends badly (Thomas, 1988). Any solution to the problem would require a reshuffling of expenditure priorities. This means interference with a sovereign country's most basic claim that it is no one's business but its own to decide where its money should go. Definition of expenditure priorities is what the political struggle is all about; it is how political power asserts itself. There is thus no way one can effectively alter priorities in a government's budget without changing the balance of political forces in the country.

When forced to, the government may cut expenditures but, most likely, the "wrong" ones. Politically motivated expenditures, because of their very nature, may well escape the axe, while critical items for social are trimmed. Prime candidates for cuts are, as always, education, public health, agricultural research and extension, infrastructure maintenance, environmental protection, modernization of the State's bureaucracy, etc. Salaries would be cut, compelling the most competent public servants to leave the government, but retrenchment of idle public employees will hardly occur. On the other hand, military expenditures, transfers to powerful political supporters (under some rubric like fiscal incentives), conspicuous consumption, and so on, will scarcely be touched. What this all adds up to is that deterioration in the quality of bureaucratic machinery is inseparable from reduction in the size of government.

From the point of view of international lending agencies, politically motivated expenditure priorities of sovereign governments can be a most troublesome constraint to development of resource poor economies. But to tell this government to cut expenditures without realigning priorities is "to throw out the baby with the bath water." Simply stated, it is counter-productive. To modernize the government, not just to reduce its size, seems a more appropriate objective of structural adjustment.²²

The Third World debt crisis and the emergence of structural adjustment programs point out the extent to which the management of national economies have become internationalized. The present discussion illustrates how difficult it is to manage African economies from Washington, D.C.

d) The Stabilization-Growth Trade off

As painful as it is, a recession has become recognized as an unavoidable component of structural adjustment. It is needed to reduce imports, to prevent inflation from undoing the devaluation, and it is a consequence of expenditure cuts and monetary restraint. Devaluation itself is recessive as it reduces the value of real assets. A recession, of course, means both lower income and unemployment. In addition to the unemployment that comes from the lower level of activity, there is still another kind of unemployment to worry about in the course of adjustment. It is the "frictional" unemployment that takes place as factors of production leave the penalized non-traded for the stimulated traded goods sector. Supporters of structural adjustment admit as much. They are,

²² The World Bank recognizes this problem and has taken steps to deal with it (World Developments Reports, 1983 and 1988). The effort so far, however, has been "a drop in the bucket."

however, quick to add that the recession will be short lived. "Sound growth" will make the social costs of the recession well worth its while.

That might be so in well structured developed economies, but not in countries in the early stages of development. Boom and recession are not symmetrical opposites. A recession can come quickly but reconstruction is much slower. There is nothing automatic about resumption of growth in a less developed country and, contrary to the prevailing view in the World Bank and the IMF, we think that the recession may last a rather long time.²³

We back up our position with the following arguments: first, because of the exploding population, economic growth is, in some respects, a race against time. Every year lost just adds to constraints. There are more mouths to feed, more environmental degradation to cope with, more jobs to find, and more pressure on savings.

Second, the savings rate itself declines with the recession, as we know from Duesenberry's "ratchet effect". Under conditions of extreme capital scarcity, reduction of savings will make it harder to finance the recovery.

Third, rearticulation of the economy is a slow and not always successful process. Even though there may be price incentives for resources to move to other sectors, incentives alone probably won't be enough. In face of all the barriers to resource movement, response to incentives tends to be painfully slow.

Fourth, recovery is not based on utilization of idle capacity as it would be in a more developed country. Just remember that structural adjustment might

²³ Although it is often implied the adjustment caused recession to be a "short-term" event, the duration of the Bank's structural adjustment loans (initially expected to continue for three to five years) suggests that a much longer period of difficulties is to be expected.

be shifting resources to the export sector. Under adjustment, as capital is being scrapped in the non-tradeable goods sector, recovery requires the building up of productive capacity in the tradeable sector, such as planting new coffee, tea, or cocoa trees, and improving harbors and roads to take increased production out to market. Although investments do stimulate demand, they take time to mature; years will go by before supply catches up.²⁴

Fifth, one crucial element, the entrepreneur, may be absent from SSA. "Privatization" is difficult if the private sector is weak, non-existent, or undercapitalized.

Sixth, a recession is more serious when you are at the brink of survival. There is no featherbedding, no social security in Africa, natural resources being the only cushion to soften the fall. Under such conditions, the risks that a recession might evolve into social unrest and political instability are just too great.

Implications of Structural Adjustment for Sustainable Exploitation of Natural Resources

Generally speaking, there are three basic ways through which structural adjustment can influence the way natural resources are exploited and utilized: (i) by creating incentives/disincentives for more intensive extraction; (ii) by reducing/increasing either people's motivation to conserve or their capacity to do it; and (iii) by affecting the government's will to enact or its ability to enforce protective legislation. In the short run we expect all three to be

²⁴ A related phenomenon is the "J" curve which describes the impact of an exchange rate devaluation on the balance of payments. At first, a devaluation is expected to worsen the trade deficit, improvement coming only after a period of time has elapsed. The reason for the "J" curve is that it takes time for supply to respond to the price stimulus of the devaluation (Krugman and Taylor, 1978).

operative, to the detriment of conservation. The problem is that the picture might not be so different even in the long run.

If adjustment succeeds in promoting growth, the people and the government alike will be in a better position to take a more far-reaching view of resource exploitation. That is the positive effect. However, as comparative advantage promoted specialization increases, reliance on resource exploitation will increase, not diminish. In fact, the structural adjustment growth strategy is to concentrate on exploitation of the relatively more abundant factor of production which, in SSA, is said to be natural resources. The flaw of this strategy is that the most abundant resources -- soil fertility, fish, natural forests, wildlife -- not only are not so abundant in absolute terms, but are also either exhaustible or slowly renewable. The reason extractive based activities are said to have a comparative advantage is because the cost of used up natural resources are normally not imputed in cost estimates.

If, on the other hand, after inducing a recession, the adjustment policies fail to promote growth, people will fall back on resource extraction, and the environment will be just one more victim of policy failure. As shall become clearer in the following paragraphs, the cause of conservation cannot win unless it becomes part of the objective function of the adjustment policies.

1. Incentives to Extraction

Under the assumption that structural adjustment will succeed, price stimulated African agriculture is expected not only to modernize but also to expand horizontally. As better quality lands go into cultivation of export and import substitution crops, subsistence agriculture will be pushed farther into marginal lands. There might be a compensating effect, however. If agricultural product prices go up, land value will also rise, creating an incentive for

*Not ex-ante. The present
is a mis-estimation*

conservation. But the opposite situation may also be true. Farmers may decide to take advantage of the high prices and cultivate as intensively as they possibly can, in effect trading short term profits for long run benefits. Risk aversion may explain the farmers' high implicit discount rate. Familiar as they are with the record of primary product price fluctuations, they may well prefer "a bird in the hand to two in the bush." But there is still another problem. Profits and losses are not always measured by the same scale. Farmers may have a fairly clear idea of how many dollars and cents they will forego if they decide not to cultivate a certain patch of land, but it is very difficult for them to figure out the consequences of tilling soils that are fragile or unfit for agriculture.

2. Capacity to Conserve

Structural adjustment influences the way natural resources are exploited through its impact on the level of income, on income distribution, and on the level of employment. SSA does not have an institutionalized system of social security, benefits to the unemployed, etc. The country's reserves of natural resources, together with the extended family system, tribal solidarity, and a host of formal or informal arrangements, such as public sector hiring of "surplus employees", constitute the de facto system of "social security". When recession strikes, this system is stretched as people reach out to the country's inventories of natural resources and to "godfathers" in government. A prolonged recession will cause dislocated people to probe the limits of the available means of survival, which includes digging deeper into resource reserves.

Over the long run (still under the assumption that structural adjustment will succeed in promoting growth), the ultimate effect of the adjustment policies on natural resources rests on its capacity to reduce income inequality,

create employment opportunities for people who would be "slashing and burning", and reduce poverty. Growth, in other words has to be "broadly based." Developing agriculture is, of course, a promising way to do it. However, it is important to recognize that it takes more than price incentives to develop agriculture.

3. The Government's Attitude

For resource conservation as well as for sustainable extraction, government regulation is indispensable. An immediate effect of adjustment policies is to reduce the government's ability to enforce environmental protection statutes. It is very unlikely that a government compelled to cut expenditures will let protection of the environment remain a priority -- if it ever was one. In the face of social pressure, the government's attitude towards enactment and enforcement of protective legislation is bound to be lax. Worse still, as recession or "narrowly based" growth compounds social problems, the government may well turn to new resource frontiers -- if the country has one -- in search of "escape valves" for social tension. As that happens, the government will not just look the other way; it will officially promote devastation of the country's resource reserves.²⁵

Conclusions and Recommendations

Since independence, most countries in sub-Saharan Africa are said to have pursued an inward oriented growth strategy which has emphasized production for

²⁵ Such is precisely the Brazilian policy with respect to the Amazonian frontier. The government has a commitment to give land to landless peasants, but an even stronger commitment to protect the property rights of the large land holders, so it launches the peasants against the forests.

domestic market.²⁶ In most cases, this strategy has failed in that it has not generated adequate growth in per capita income. At present time, multilateral lending agencies are pushing those countries into adopting an outward oriented growth strategy, and that -- the study has concluded -- cannot be expected to yield results within the time frame envisioned. Regarding the relationship between structural adjustment, natural resources, and sustainable growth, analysis has concluded:

- First, that it is unlikely that structural adjustment can, by itself, generate a process of sustainable growth.
- Second, disregard for natural resource constraints is one of the factors that can contribute to failure of the adjustment policies.
- Third, insofar as economic performance falls short of expectations, structural adjustment will compound socio-economic problems, thereby increasing pressure on natural resources.

In short, degradation of the country's resource base can be both a cause and a consequence of failure of the adjustment policies. The primary objective of structural adjustment in sub-Saharan Africa is to reverse present foreign sector imbalance from deficit to surplus and to promote GNP growth (in the future). Generating a trade surplus is the only way debt distressed countries can hope to meet their external obligations and regain access to external markets for goods and (maybe) capital. As a means to this end the policies have, without

²⁶ SSA has pursued a policy of subsidizing consumption, heavily tilting the balance against production. This is why we don't think it correct to say that they have pursued an inward oriented growth strategy. If one looks at the set of policies that have been implemented, one can only conclude that they haven't pursued any growth strategy at all. The policies, by and large, tend to favor consumption while discriminating against production.

much question, adopted outward oriented growth as their basic underlying strategy.

Policies of outward reorientation of the economy are accompanied by policies to also correct public sector imbalances. While it is clear that neglect of comparative advantage has been a problem in the past, it is important to recognize that this in no sense constitutes an argument for requiring SSA to generate a trade surplus to allow repayment of external debt. In fact, historical experience indicates that countries at SSA's stage of development should not attempt to export capital but should instead devote available resources to investment.

It is unquestionable that the problems which structural adjustment addresses have exacted a heavy toll from sub-Saharan African economies in terms of diminished efficiency. It is therefore impossible to deny that some sort of corrective measures are called for. However, this study concludes that structural adjustment is not all that is needed.

One of the problems with structural adjustment is its disregard for natural resources in countries whose development possibilities are almost entirely dependent on sustainable extraction and efficient utilization of such resources. Resource conservation, by which we mean the non-wasteful utilization of resources, is neither an objective of, nor a constraint of, structural adjustment. However, resource scarcity -- particularly scarcity of agricultural resources -- is a grim reality in sub-Saharan Africa. In spite of this, structural adjustment seeks to induce the African economies to specialize in resource intensive activities, leading to over-extraction pressures.

Worse still, the policies do not include any mechanism which could eventually reduce dependency on the resources, such as diversification of the

economic structure. On the contrary, the adjustment policies tend to lock the economy into the position of exporter of resource intensive primary products. Even if one abstracts from all the problems of primary product exports which the literature on "unequal exchange" emphasizes, sustainable growth is constrained by the regeneration capacity of the resources on which the activity is based. Increased production above the long term sustainable level in one period implies that less production will be possible in the next. Disregard for resource scarcity, and a short view on outward growth as a means to normalize trade relations, makes one think of structural adjustment as a remedy to short run disequilibrium, not a solution to long term growth.

But there are other problems. Structural adjustment can also be viewed as an attempt to transplant to the African context policies that may be adequate for countries in much more advanced stages of development (as the middle income countries). As such, the policies take a light view not only of the constraint imposed by natural resource endowments, but also of the massive structural constraints facing the African countries. Such constraints include: lack of an entrepreneurial class, scarcity of human resources, resource immobility, low savings rate (capital scarcity), rudimentary financial intermediation, difficulties of attracting foreign capital, fragile institutions, incapable state bureaucracy, overall poverty level that reduces the size of the market and leaves little leeway for expenditure restriction measures, etc. By failing to tackle these problems, structural adjustment runs the risk of backfiring. It provokes a recession, compelling people to dig deeper into reserves of natural resources, but does not guarantee a recovery.

Outward oriented growth is a good strategy if the policies' aim is to allow countries to liquidate past debts. In addition, it is foolish not to take

advantage of export opportunities to generate an economic surplus and relieve the constraint of foreign exchange scarcity. However, correction of static inefficiencies is not nearly enough if the goal is promotion of growth over the long term. Natural resources must be used to generate foreign exchange and increase the economic surplus; but it is also necessary to modernize and diversify the economy so that resource dependency can be reduced. Outward orientation of the economy is fine, as long as it is part of coherent policies on a global basis. Comparative advantage per se is an efficiency enhancing principle, but the country's objectives should be to change its comparative advantage. This will serve to lessen the economy's dependence not only on slowly renewable natural resources, but also on slowly expanding price inelastic primary product markets.

One can argue whether or not SSA should attempt to pay its foreign debt. But with a savings rate of 8.5% -- probably not enough to cover depreciation - - a high rate of population growth, extremely low income levels, a small endowment of natural resources, and no prospects of continued inflow of foreign loans or investments, there is no way an effort to liquidate the debt can be justified on economic grounds. Credits to SSA should be transformed gradually into grants on the condition that certain agreed upon policy objectives are met. There is no place where foreign aid is more needed than SSA. Of course, donors should require that investment, not consumption, stimulating policies be implemented.

In addition, and as part of the adjustment-cum-aid package, the SSA countries should be assisted in: implementing environmental protection policies; developing educational and health care systems; enacting population control programs; building a transportation, communications and energy supply

infra-structure; developing a banking system; modernizing governmental institutions; and in developing sustainable agricultural practices. A major difficulty is that SSA isn't prepared even to (productively) absorb the aid. Continuous technical assistance over a long period will be necessary. While major price distortions should be corrected, major efforts should be made to avoid a recession. Also, it is vitally important that the macro and microeconomic policies be coherent with one another.

Finally, one simply cannot think of sustainable extraction of natural resources without a policy to reduce poverty. The immediate effect of structural adjustment is to raise food prices. While some farmers may benefit from this, urban as well as landless rural workers will be confronted with a higher cost of living and lower real income. Increased poverty is the short run effect of structural adjustment. In the long run, the odds that the policies might succeed in starting a growth process are open to debate. But even if they do succeed, if we wait for sub-Saharan Africa to "travel" all the way up its "Kuznets curve," we might discover, to our disappointment, that the countries' supply of natural resources will be exhausted long before the end of the journey.²⁷

²⁷ Reference to Kuznets' suggestion that the degree of income concentration increases in the initial phases of the process of economic growth but decreases as the process advances (Kuznets, 1966).

References Cited

- Agarwal, M., 1988. "Trade and Development: A Review of the Issues," (mimeo).
- Bacha, E., 1978. "An Interpretation of Unequal Exchange from Prebisch-Singer to Emmanuel." Journal of Development Economics, Vol. 5.
- _____, 1987. "IMF Conditionality: Conceptual Problems and Policy Alternatives," World Development, Vol. 15, No. 12 (1457-1467).
- Bhagwati, J., 1978. Anatomy and Consequences of Exchange Control Regimes Ballinger Publishing Company.
- Boserup, E., 1965. Conditions of Agricultural Growth. Aldine Publishing Co.
- Cleaver, K. M., 1988. "The Use of Public Policy to Stimulate Agricultural Growth in sub-Saharan Africa." The World Bank Agricultural Symposium, January 6-8.
- Dornbusch, R. and F. L. Helmers, (eds.) 1988. The Open Economy Tools for Policy Makers in Developing Countries. Oxford University Press.
- Edwards, S., 1988. "Real Exchange Rates in the Developing Countries: Concepts and Measurement," Paper presented at the Annual Meeting of the International Agricultural Trade Research Consortium, San Antonio, Texas, December 14-15.
- F.A.O., 1977. Production Yearbook.
- _____, 1986. Atlas of African Agriculture.
- Fisher, A. C., 1981. Resources and Environmental Economics. Cambridge, University Press.
- Gelb, A. and associates. 1988. Oil Windfalls, Blessing or Curse? Oxford University Press.
- Georgescu-Roegen, N. 1976. Energy and Economic Myths. Pergamon Press (Chapter 1).
- _____, 1979. "Comments of the Papers by Daly and Stiglitz." In: Smith, V.K. (ed.) Scarcity and Growth Reconsidered. The Johns Hopkins University Press.
- Gillis, M. 1988. "West Africa: Resource Management Policies and the Tropical Forest." In: Repetto, R. and Gillis, M. (eds.) Public Policies and the Misuse of Forest Resources. Cambridge University Press, (Chapter 7).
- Grilli, E. R., and M. C. Yang, 1988. "Primary Commodity Prices, Manufactured Goods Prices, and the Terms of Trade of Developing Countries, What the Long Run Shows," The World Bank Economic Review. Vol. 2.

Gulhati, R. 1986. "The Political Economy of Reform in Sub-Saharan Africa." Economic Development Institute of the World Bank, An EDI Policy Seminar Report No. 2.

Hansen, S. 1986, "Structural Adjustment Programs and Sustainable Development." Paper presented at the annual session of the Committee of International Development Institutions (CIDIR), Washington, D.C., June 13-17, (mimeo).

Hirschman, A. O. 1958. The Strategy of Economic Development. Yale University Press.

International Institute for Environment and Development and World Resources Institute, 1987. World Resources 1987. Basic Books.

Katseli, L. T. 1983. "Devaluation: A Critical Appraisal of the IMF's Policy Prescriptions." AER Papers and Proceedings. Vol. 73, May pp. 359-363.

Krueger, A. O. 1978. Liberalization: Attempts and Consequences. Ballinger Publishing Company.

_____, 1980. "Trade Policy as an Input to Development." Working Paper No. 466. National Bureau of Economic Research (Chapter 9).

_____, 1983. Trade and Employment in Developing Countries: Synthesis and Conclusions. National Bureau of Economic Research (Chapter 9).

Krugman, P. and L. Taylor, 1978. "Contractionary Effects of Devaluation." Journal of International Economics, Volume 8, August 445-456.

Kuznets, S., 1966. Modern Economic Growth. Yale University Press. (Chapter 10).

Lewis, L. A. and L. Berry., 1988. African Environment and Resources. Unwin Hyman Ltd.

Lewis, W. A., 1958. "Economic Development with Unlimited Supplies of Labour." In: Agarwala, A. N. and S. P. Singh (eds.), The Economics of Underdevelopment. Oxford University Press.

Norton, R. 1987. "Agricultural Issues in Structural Adjustment Programs." FAO (Mimeo).

Ocampo, J. A., 1986. "New Developments in Trade Theory and LDC's." Journal of Development Economics, Vol. 22.

Pinto, M. B. de P. 1987. Comercio, Crescimento e Distribuicao. Instituto de Pesquisas Economicas, Universidade de Sao Paulo.

Prado, Jr., C. 1938. Historia Economica do Brasil. Editora Brasiliensis.

Prebisch, R. 1949. "The Spread of Technical Progress and the Terms of Trade." Economic Survey of Latin America. United Nations.

- _____, 1959. "Commercial Policies in Underdeveloped Countries." American Economic Review, Vol. 49.
- Repetto, R., 1986. "Economic Policy Reform for Natural Resource Conservation," World Resources Institute. September (Mimeo).
- Sarris, A. H., 1987. "Agricultural Stabilization and Structural Adjustment Programs in Developing Countries." FAO. (Mimeo).
- Sebastian, I., 1988. "Overview of Adjustment Lending Policies," Presentation at Cornell University Workshop on Structural Adjustment and Natural Resource Use. November.
- Singer, H. 1950. "The Distribution of Gains from Trade and Investing in Borrowing Countries," Journal of Development Studies. Vol. 40.
- _____, 1974, "The Distribution of Gains from Trade and Investment Revisited." Journal of Development Studies. Vol. 11.
- Streeten, P. 1986. "Structural Adjustment and Stabilization Policies in Developing Countries." Journal of Developing Economics. Vol. 23, No. 12, pp. 1469-1482.
- Taylor, L. 1986. "Economic Openness: Problems to the Century's End." Paper prepared for WIDER, Helsinki, Finland.
- _____, 1987. "Macro Policy in the Tropics: How Sensible People Stand." World Development. Vol. 15, No. 12, pp. 1407-1435.
- Tang, A. and J. Morley (eds.), 1988. "Why Does Overcrowded Resource Poor East Asia Succeed - Lessons for LDC's?" Economic Development and Cultural Change. Supplement Issue, Vol. 31, No. 3, April.
- Thomas, R. 1988. "The Magic of Reaganomics." Newsweek, Dec. 26.
- USDA, World Indices of Agricultural Food Production, 1977-1986.
- Van Wijnbergen, S., 1986. "Exchange Rate Management and Stabilization Policies in Developing Countries," Journal of Development Economics, Vol. 23, pp. 227-247.
- The World Bank, 1988a. Country Economics Department. "Report on Adjustment Lending," Washington, D.C., August 3.
- _____, 1988b. World Development Report 1988. Oxford University Press.

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