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**Structural Adjustment, and Natural Resources:
An Overview of the Issues**

**by
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**STRUCTURAL ADJUSTMENT, AND NATURAL RESOURCES:
AN OVERVIEW OF THE ISSUES**

by

Steven Kyle*

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and Constraints: Macroeconomic Policy Impacts on Natural
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Abstract

This paper discusses the effects of World Bank structural adjustment programs on agriculture and natural resource use in Sub-Saharan Africa. The main thrust of these policy reform packages is to promote increased production of traded goods, many if not most of which are agricultural in origin. This implies a tendency toward increased intensification of agricultural production with consequent pressure on agricultural resources, particularly land. The paper concludes with recommendations to help ameliorate any adverse environmental effects of structural adjustment programs.

STRUCTURAL ADJUSTMENT, AGRICULTURE, AND NATURAL RESOURCES IN AFRICA

Steven Kyle**
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I. Introduction

Any attempt to reach general conclusions regarding the effect of structural adjustment (SA) programs and the environment (or, in fact, anything else) must first recognize the heterogeneity of such programs. A recent World Bank compilation of measures implemented under the auspices of SA lending agreements¹ shows that virtually the entire economy and the full range of policy instruments can be included. By the same token, very few of these instruments or economic sectors are always included.

So, general prescriptions for improvement in the sensitivity to environmental concerns shown by SA programs cannot be based on a strict enumeration of policies which must be altered or eliminated but rather must focus on the overall aims of such programs. In this sphere there is in fact a unifying theme, that of opening economies to international markets and this, together with the structure of African economies gives rise to some useful generalizations and some particular recommendations for the future.

The next section will elaborate on the degree to which SA programs provide generalizable effects on natural resources in Africa, with particular emphasis on agriculture and the resource base needed to

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support it. Most important in any evaluation of agricultural resources is the soil and water used to produce crops. It is here that the most pervasive and the most important effects are to be found. The following section elaborates on the importance, cost and degree of irreversibility of effects on African soils and waters, together with some projections of current trends. The final section presents conclusions and recommendations for SA programs undertaken in the future.

II. Common Aspects of SA Programs

A review of the policies common to SA (See Table 1) shows that devaluation of the currency together with removal of trade barriers are one of the sets of policies that most often constitutes a part of such programs. This fact points to the common theme uniting all such programs: to promote a country's comparative advantage by reorienting the economy outward toward world markets rather than inward toward protected domestic markets.

Comparative advantage states that a country will tend to produce those commodities which it can make relatively cheaply compared to its trading partners and will import those which it can make only at a relatively greater cost. This doctrine, well known since the time of David Ricardo in the early 19th century, provides the theoretical underpinnings for a policy of removing distortions (trade taxes, price controls, etc.) which prevent a country from following its comparative advantage.

Table 1. Overview of Adjustment Lending Policies in Selected Countries.

	Industrial Performance (1984-86)	Change in TOT against the country	Improve-ment in GDP growth ¹ (1982-86)	Incre-mental private cons. ² (1982-86)	MAJOR POLICIES			SECTOR POLICIES	
					Balance of ³ payments reform	Fiscal reform	Financial reform	Agriculture ⁴	Industry
Chile	Import pentra- tion	medium	medium	low	ALL QR elim. tariff reduced to uniform 10%; devaluation		Rescue financial inst.		Restructure to make it competitive
Colombia	Export expansion	medium	high	high	low exp. prom. & import ref; deval.	Major tax reform	Separate credit op. from phys. input supply		
Cote d'Ivoire	x	high	low	medium	strong trade ref.	Public enter-prise reform			
Ghana	x	low	high	high	trade ref. deval.	Increase in public spending	Rescue financial instit. raise interest rate	Reduce over-staffing	
Jamaica	x	high	medium	medium	strong trade ref; export prom; deval.	Major tax reform			
Kenya	x	high	medium	medium	low implement. cap.				
Korea	x	medium	high	low	5% QR & 20% tariff red.; exp. prom; devaluation				
Malawi		medium	medium	medium	deval.	Incr. excise & trade taxes		Emphasis needed on smallholder producer prices	

Table 1. Overview of Adjustment Lending Policies in Selected Countries - continued.

	MAJOR POLICIES					SECTOR POLICIES	
	Industrial Performance (1984-86)	Change in TOT against the country	Improve-ment in GDP growth ¹ (1982-86)	Incr-mental private cons. ² (1982-86)	Balance of ³ payments reform	Fiscal reform	Financial reform
Mexico	Import expansion x	high	low	medium	strong trade ref; exp. prom; deval.		
Morocco	x	high	high	high	Strong trade ref;	Incr. excise & trade taxes	Link farm p. to intern p. thru a p. band
Pakistan	--NA--	low	high	medium	Remove QR on inputs; exp. prom; deval	Public inv. in infrastructure for private sector	Limit agencies power in the sector
Philippines	--NA--	high	low	medium	Conflict with need to incr. rev. thru' higher custom duty	Incr. excise & trade taxes	Restructure to make it competitive
Thailand	x	high	low	medium	Reversed reduction of prot.: exp. prm; deval.; trade ref.	Incr. excise & trade taxes	
Turkey	--NA--	-----NA-----	-----NA-----	-----NA-----	20% QR and tariff protection; exp. prm; deval.	Public inv. in infrastructure for private sector	
Zambia	--NA--	-----NA-----	-----NA-----	-----NA-----	Reversed policy; deval.		

high indicates an increase in the growth rate and growth of more than 1 percent.

low indicates a decline in the growth rate and growth of less than 3 percent.

medium indicates a decline in growth rate but growth of more than 3 percent: or little growth despite an increase in the rate (less than 1 percent).

¹ Based on an improvement during 3 years after AL compared to 3 years before, and the level of GDP growth in 1982-86.

² Per capita growth

³ Quantitative restrictions (QR) and tariff reduction with exchange rate depreciated and fiscal disequilibrium corrected. Result: Increase in export, volume at lower prices, lower imports (except Turkey and Pakistan).

⁴ Phase out producer price control: reduce subsidies on inputs: improve services in the sector: reduce disincentives, e.g., overvalued exchange rate.

Source: World Bank.

The empirical case has been elaborated in great detail by Anne Krueger and associates in an exhaustive set of studies sponsored by the National Bureau of Economic Research.²

While there is still some debate as to whether the efficiency gains predicted by theory are truly the source of the superiority of outward oriented development strategies, the studies demonstrate that in fact such strategies can produce higher growth rates and higher rates of growth in employment at least in some countries.³ This observation, most clearly demonstrated in the cases of East Asian export economies such as Korea and Taiwan, is reinforced by the impact of external shocks on African economies in the decade of the 1980's, where it seems clear that at least some degree of outward reorientation would be beneficial. This statement, however, falls far short of recommending immediate removal of all government interventions in trade and agriculture. Nevertheless, the extreme anti-export bias of macro policy in many SSA countries has clearly been excessive. However, it is important to realize that realignment of prices will not by itself generate the desired reorientation of economies in the African context. Various institutional and infrastructural problems must also be addressed.

The 1980's have witnessed a drying up of foreign capital flows for most developing nations together with higher real interest rates and generally adverse terms of trade shocks. These problems have provided an added incentive to promote the export expansion that outward oriented strategies emphasize, as foreign exchange shortages have become increasingly constraining.

The principal goal of the various policies designed to promote an outward oriented strategy is to achieve a devaluation of the "real exchange rate". The real exchange rate is defined as the relative prices of goods which are internationally traded and those which are produced and consumed only domestically. A devaluation implies an increase in the relative price of tradeables, both exports and imports. An increase in the price of exportables will tend to create an incentive to expand their production while an increase in the price of importables will create an incentive to decrease their consumption. Both of these effects work to increase the available supply of foreign exchange.

Given that African governments are reorienting (or being induced to do so) toward their "natural" comparative advantage via adjustments in the real exchange rate, the logical next question is to ask where their comparative advantage lies. First we must ask which sectors of the economy comprise the "traded" sector whose production is to be expanded. In Africa, traded goods are primarily agricultural (except for mineral exporters). In addition, agriculture is virtually always the most trade oriented sector of the economy, at least potentially, since the other obvious candidate, manufacturing, is unlikely to provide a substantial contribution to exports within the time frame envisioned by SA programs in Africa.

Another consideration supporting the conclusion that promoting tradeables means promoting agriculture is the fact that many versions of comparative advantage focus on relative abundances of the factors of production. In this respect Africa is, relatively speaking, well endowed with agricultural land and has low wages. The relatively low

cost of both of these factors compared to trading partners reinforces the designation of agriculture as the sector most likely to be stimulated by a depreciation of the real exchange rate.

It is important to emphasize that depreciating the real exchange rate is not by itself a strategy for agricultural development. Many non-price aspects of agriculture such as technology institutions, infrastructure and education must be taken into account and the need for them will vary not only according to the physical conditions of agricultural production, but also according to level of development. On both scores, Sub-Saharan Africa exhibits substantial diversity. Not only are agro-climatic zones very different from country to country, but common measures of the level of development such as per capita GNP vary by a factor of ten or twenty. "Getting prices right" may be good advice but it far from a fully articulated development strategy. The record for African economies in the 1980's demonstrates that growth is dependent on a variety of factors, not limited to those that can be addressed in medium term adjustment programs.

III. Environmental Effects of Stimulating Agricultural Incentives

The previous section reached the conclusion that SA programs are in general intended to promote a faster pace of agricultural development and within agriculture, a higher level of production of export and import-substituting crops though it questioned the efficiency of the policy packages applied in SSA. What does this mean for the environment?

Before answering this question, it is important to recognize that agricultural development means changing the environment. Growth in agricultural production comes mainly from two sources:

- extension of the area under cultivation
- intensification of cultivation on areas already cropped

Both of these sources of growth necessarily imply changes in the environment in the sense that patterns of land and water use are changed (usually permanently) from what they were previously. Indeed, this process has been occurring since sedentary agriculture was first practiced millennia ago.

Two propositions related to this observation underlie the remainder of this paper: First, agricultural development and its consequent environmental changes are inevitable in the sense that no country can expect to achieve substantially higher levels of development without agricultural development as described above. Second, the process of agricultural development is desirable in spite of its environmental consequences since the alternative is to consign millions of Africans to a life of poverty and deprivation. The need for intensification becomes especially apparent when account is taken of the projected effects of population growth on the area of arable land per person. (See Table 2).

The pressure for increased intensity of land use becomes still stronger when the composition of growth is biased toward agricultural production. Increased prices for agricultural exports will, according

Table 2. Actual and Projected Per Capita Arable Land in Selected Countries.

Country	Year	
	1985	2000
	---hectare per person---	
Kenya	0.73	0.42
Malawi	0.48	0.30
Tanzania	2.30	1.44
Cameroon	3.34	2.09
Nigeria	0.71	0.48
Senegal	0.70	0.45

Source: World Bank.

to well known theorems of international trade, increase prices of factors used intensively in their production.⁴ This implies that land prices will rise which, in turn, will draw more marginal land into production and require more intensive use of already cultivated land in order to generate an adequate return. This relationship between increased exports, land prices, and intensity of land use has been well documented in various studies.⁵

So, if we accept the inevitability and desirability of accelerated agricultural development together with its unavoidable changes in the environment, the case for environmental concerns due to SA must rest on the sustainability of the new land and water use patterns rather than the fact that they alter or destroy previous ecological patterns. This is not at all intended to suggest that we place no value on preservation of valued habitats. It is for precisely these concerns that national parks and preserves are created, and why the need to create such preserves is an important component of any study of the relationship between SA and natural resources. This discussion is directed at agriculturally valuable land which is devoted to crop production.

Sustainability is important in the most basic sense because it is important not to degrade assets which underlie the long run wealth and productivity of the country. Prime among these assets are soil and water which regenerate only very slowly, if at all (see below). However, even if maintenance of long term assets isn't held to be paramount, it makes little sense to undergo a painful restructuring process only to achieve a structure which can't be sustained and will

eventually require yet another SA at a later date. For example, it makes little sense to restructure an economy on the basis of an export crop that mines or erodes the soil and so can only be grown for 10 or 20 years.

While there are any number of ways agriculture can be made more environmentally benign or sustainable, one common denominator is the need for investment. That is, it is possible to get impressive short term gains if the need to maintain productive assets is ignored. A more sustainable pattern of growth will forgo such short term gains in order to avoid deterioration. This implies either investment in sounder cultural techniques, investment in machinery or soil fertility, or merely the avoidance of disinvestment in the soil and water resources inherited from the past. In all of these areas, current knowledge is far short of what is needed for optimal resource use.

A second common denominator is the need for a long time horizon when making development and investment decisions. Individual farmers living at the subsistence level do not have this choice; they must do whatever they can to stay alive and often cannot afford to forgo current consumption in order to promote long run sustainability. It is then up to the government to provide the incentive and the wherewithal to take such a long view. This might mean actually intervening to make investments directly, or to promote increased awareness, or providing services such as credit to allow individuals the time needed to survive while necessary investments gestate.

All of this indicates that SA programs which fail to address the long-term need for investment in human and institutional capacity as

well as physical capital in an effort to induce development primarily through price policy and deregulation may well have adverse environmental effects.

IV. Possibilities for Policy Reform

Given the involvement of the World Bank in the formulation, financing and implementation of SA programs it seems clear that it has more options and certainly more power to induce change than do other organizations. While it is certainly the case that a prerequisite for environmentally sound development strategy is the awareness and commitment of the national government, there is much that can be done from outside to promote that awareness.

This fact is illustrated by the disproportionate amount of investment in African nations which is financed from abroad. In Senegal, to take one example, an average of 75% of government expenditure has been financed by foreign capital flows since the late 1960's.⁶ Given that counterpart funds are needed for virtually all development projects it is clear that the Senegalese government has very little scope to engage in activities not promoted by foreign donors or lenders. In this somewhat extreme case (It is common for other African countries to have been funded to the extent of 25 or 30% of government spending⁷) it is necessary for those financing expenditures to attach a high priority to environmental investments if any are to be made at all.

Given the need for World Bank involvement, and the potential for the Bank to have a significant influence, there are a variety of ways to improve performance. Some of these relate to long term effects of SA programs or Bank operations while others are of a short run or transitory nature.

Long-Term Actions

1. Slow-Down - If we accept the premise that the goal is development and within that sustainable agriculture development, positive results will come only gradually. Programs must allow for this and also be evaluated on that basis.
2. Restraint in Privatization - The environment is in many respects a public good in that it is not in the interests of individuals to make needed investments even though on a societal basis such expenditures would be optimal. This implies that the private sector can be depended on not to pursue optimal policies with respect to maintaining environmental quality or sustainability of resource use in most cases. In many areas only the government can enforce such policies, and then only if it has the resources to do so. For example, government intervention to promote good cultural practices or to induce adoption of desired technologies may generate benefits beyond those recouped by the individual farmer. In such situations a good case can be made for retaining some degree of government involvement.

Another example which follows from the Bank predilection to remove all governmental interventions in markets is the standard prescription

to eliminate all subsidies on inputs, particularly on fertilizer. While it must be recognized that such subsidies have been far too generous in some places, there are good reasons to promote the use of fertilizers. Africa in many parts has poor or fragile soils and is also the continent which has the lowest fertilizer application per hectare of arable land. (See Table 3) In some situations, such as areas where droughts and total crop loss are a real threat, the consequent risks will lead farmers to use less fertilizer than they otherwise would, leading to possible loss in fertility.⁸ A government might rationally want to subsidize the cost and distribution of fertilizer under these circumstances since it is able to take a longer view than an individual farmer. Indeed, this argument holds for other stages in the food production chain such as marketing. In a risky production environment undercapitalized local entrepreneurs may be unable or unwilling to take on the risk involved, leaving a choice between government provision of inputs and marketing or complete absence of needed services.

3. Provide Money for Investment - Without doubt the most important thing the international and bilateral organizations can do is to provide the funds needed to make investments which will promote environmentally sustainable development. In many cases this will mean simply taking a longer view so that sustainability is not sacrificed to the desire for a quicker return. For example, some tree crops are known to be less damaging to the environment or can promote soil fertility but may require a relatively long period of time to generate an economic return.

Table 3. Fertilizer Use Per Hectare of Arable Land, 1975 and 1985.

<u>Region</u>	<u>Kg. of Nutrient/Ha.</u>	
	1975	1985
Africa	13	20
Latin America	29	41
Oceanic	29	32
Developing Countries	27	58
Asia	37	85
North America	87	85
Western Europe	188	228
World	63	87

Source: FAO, Fertilizer Yearbook, 1986.

But in general, it involves investment in the broadest sense; human, institutional and physical.

One problem that has been noted with many development projects funded by both multilateral and bilateral donors has been the inadequacy of funding for recurrent costs. Donors prefer to fund capital investments but are less eager to fund continuing operating expenses or maintenance. This means that it is often difficult for countries to maintain projects as intended and often to meet recurrent expenditures needed for proper operation.

4. Increased Emphasis on Research and Extension - Given the pressures for intensification of land use stemming both from economic growth and the reorientation caused by structural adjustment programs, an increase in research on sustainable cultivation techniques is necessary. This research must be locally based, since results are often nontransferable. To date, funding for such research has been inadequate, with little research infrastructure, either physical or institutional, built in most of SSA.

It is tempting to propose a massive increase in funding for agricultural research in Sub-Saharan Africa. In fact, the World Bank has proposed exactly this in recent statements on agricultural research in SSA.⁹ From a level of \$314 mn. over the 1981-86 period, the Bank plans to mobilize \$1.5 bn for agricultural research in Africa over the next five years.¹⁰ While this increased emphasis on research is commendable, it is not at all clear that sinking \$300 million a year into Sub-Saharan

Africa's research centers will yield results that can significantly ameliorate adverse environmental effects of current SA programs. These large sums may well generate improved physical infrastructure for agricultural research, but will not address the binding constraints of weak institutions, human capacity development and links with governments, extension agencies or "consumers" of research: the rural population. In fact, the problem of current costs may well be exacerbated.

These considerations imply that architects of SA programs in Africa must allow more time than is generally needed in other countries at different levels of economic and institutional development. The history of agricultural research in SSA demonstrates that given time, it is likely that high rates of return can be generated from research.¹¹ Insofar as improved cultural techniques can enhance the sustainability of agricultural production, there will be a need for extension services to educate farmers. It is important that these extension efforts precede or at the least be concurrent with incentives to increase production. To wait for the degradation to become apparent following a reorientation of incentives to favor agricultural production is clearly not the optimal course, especially when degradation is irreversible.

5. Role of Risk and Irreversibility - There is a temptation when implementing large projects such as SA programs to proceed on the assumption that they will succeed. In SSA there is ample reason to question the degree to which SA will generate intended results. To

date, economic growth and agricultural production remain stagnant in many countries in spite of several years of adjustment. The possible irreversibility of resource effects of SA together with the uncertainty of the outcome dictates a greater degree of caution in implementation. In particular, projections underlying policy recommendation should include risk explicitly, something often not done in standard project appraisals.

Short Term Actions

The fact that most, if not all, SA programs have a significant element of stabilization policies (or are adopted in conjunction with IMF programs) in addition to adjustment policies means that there can be a variety of short term effects. Most of these arise from the fact that stabilization measures are aimed primarily at reducing the level of aggregate demand in the short run so as to lessen the need for foreign financing of current expenditures. In effect, stabilization in the short run is bought at the expense of a contraction of the economy. Here it must be realized that the "short run" may not be so short. SA programs are implemented over several years, and desired effects may not be evident for quite a while, and in at least some cases have been difficult to find at all.

The contraction in the economy will generate unemployment in the short run. Transitional unemployment can also be caused by the frictions inherent in a major reorientation of the economy. This is generated by the massive restructuring of incentives which cause broad categories of activities to decline in favor of others. It is virtually

impossible for this to occur without some interim dislocation and unemployment. This transitional unemployment can cause increased reliance on subsistence production in agriculture in the short run. As noted above, subsistence producers have little capacity to defer consumption in order to make environmentally sound investments.

Another factor which can cause short run problems is the common policy prescription of decontrolling or raising food prices. In a context of increased unemployment and short term recession such a policy can induce significant numbers to return to a reliance on subsistence production or to retard movements into urban areas that would have otherwise occurred. Clearly, this has positive as well as negative effects.

In some cases, it may be necessary to implement reforms more slowly in order to minimize adverse impacts on vulnerable populations. The reallocation of resources that occurs in response to changes in incentives will take time. In the case of agricultural production, it is bound to take at least the length of the crop cycle, and usually more. Forcing drastic changes in a shorter time frame may be pointless in that it can cause pain without any gain over a slower pace of reform. In some cases, such as the need for improved extension noted above, time will be needed to get supporting policies under way. In general, it is important not to overestimate the degree of flexibility in SSA economies. Resources are not always mobile, and responses to incentives may well be delayed or even nonexistent without complementary investments and time for adjustment.

Short term employment or food rationing programs can go far to alleviate some of these transitional problems. In fact, such programs have been implemented in several countries which have undergone SA programs. However, these programs have sometimes been put in place only after the problems have become apparent, as much as two years after the beginning of implementation of reforms. Environmental concerns add to the case for implementation of these programs as soon as SA policies are put into effect.

V. Conclusions

This paper has outlined some general effects on natural resources that can be expected to accompany the implementation of SA programs. Given the inevitability and general desirability of reforms to promote growth and to reduce dependence on foreign capital, the paper has outlined several ways for the World Bank to modify or add to its standard policy package to minimize adverse effects. These suggestions are not painless, but they are not at all beyond the capacity of the World Bank to implement. What is needed is recognition of the problem and a will to implement "reforms of the reforms".

One possibility which has not yet been alluded to but which could potentially provide greater benefits than any other measure is that of debt relief. While it is indeed a virtue to repay debts, it makes little sense to damage a country's resource base and hence its future productive capacity in the name of remaining current on foreign debt service. This is especially so since in spite of years of sacrifice and

effort most countries have been hard pressed to cover interest payments much less repay principal. So, not only is the resource base in danger of being sacrificed to maintain current debt service, but this means that eventual repayment of principal becomes less and less likely, since it is that same resource base that is to support future production and repayment. Since sustainable development requires additional investible funds it is difficult to make a case for continuing to transfer these funds abroad to creditors.

Recognition that the debt is unlikely ever to be repaid provides the best argument for forgiving it now. Not to do so risks exacerbating resource degradation in reaching for a target that cannot be attained.

Finally, the issue of debt relief has become linked with the idea of "debt for nature" swaps in which external debt of developing countries is exchanged for investments in national parks or environmental preserves. There are a few cases in SSA where this idea could prove useful; however, it is important to realize that debt swaps are no more a substitute for a development strategy than is a policy of merely raising prices. Parks and preserves are important, and debt swaps may prove a useful vehicle for financing them. Nevertheless, the primary reason to forgive debt must be to facilitate growth and development rather than swapping it for nature, attractive though the possibility may sometimes seem. Alleviation of poverty together with development, not financing tricks, will remain the key to relieving pressure on fragile environments.

NOTES

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