



Considering the impact of structural adjustment policies on forests in Bolivia, Cameroon and Indonesia

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A preliminary insight into how structural adjustment policies (SAPs) may have affected deforestation and forest degradation in the lowland tropical forests of Bolivia, Cameroon and Indonesia.

Developing countries around the world are using similar policies to improve their trade balances, reduce inflation and stimulate economic growth. These include: currency devaluation, export promotion, reduced government spending, tax increases, privatization of public enterprises, trade and financial liberalization and land reform. While specific policies differ between countries and the depth of reforms varies, the general trend towards "structural adjustment" seems almost universal.

How these reforms affect the environment under various institutional and environmental conditions and a range of management regimes is uncertain. Critics argue that economic growth and higher primary commodity exports increase pressure on natural resources, rising poverty leads poor families to depend more on overexploiting natural resources to survive and cuts in public spending limit the government's capacity to protect the environment (Reed, 1996). Supporters claim adjustment improves living standards, helps generate resources needed to protect the environment and eliminates economic distortions that cause environmental degradation. They deny that adjustment necessarily increases poverty or diminishes governments' ability to implement environmental policies (Warford, Munasinghe and Cruz, 1997).

Bolivia, Cameroon and Indonesia have substantial forest resources and in some senses are representative of the world's three largest tropical forest regions: the Amazon Basin of Latin America, the Congo Basin of Africa and Insular Southeast Asia. Based on available literature, the first section of this article offers tentative hypotheses on how SAPs affect forests; the second provides background information on the three countries and their SAPs; and the third presents findings regarding the effects of SAPs on forests.

The article focuses exclusively on the issue of SAPs' impact on forests. It does not address the broader issues of whether SAPs were appropriate or what alternatives might exist, nor does it discuss the many non-SAP factors that affected forests during the same periods,

although clearly these factors are important.

The material presented here is based on a recent review of some 140 economic models of deforestation (Kaimowitz and Angelsen, 1997) and case studies that examine the impacts of SAPs on forests in each country discussed in this article (Erwidodo and Sunderlin, 1997; Kaimowitz, Thiele and Pacheco, 1997; Ndoye, 1997). Readers can find more complete information about the basis for our conclusions in those studies.

With existing methodologies and data, it is difficult, if not impossible, to fully distinguish the impact of SAPs on forests from that of other factors. Nonetheless it is important to analyse them; faced with uncertainty it is better to make decisions based on partial information than to ignore key issues.

This article applies a "best guess" approach, the conclusions of which, while not definitive, are drawn from the authors' expert opinions based on the available evidence. As research progresses and more data become available, some of these conclusions will probably be modified or refuted. Nevertheless, this initial study represents an important starting point and hopefully can generate constructive debate.

SAPs and forests

This section presents tentative hypotheses regarding how changes in prices, costs, incomes and government services associated with SAPs affect forests (Kaimowitz and Angelsen, 1997). To simplify the presentation, each hypothesis focuses on only one variable.

The study these hypotheses are based on took into account practically all the available quantitative information that has been produced using household survey data, remote sensing information, government statistics and economic theory to analyse the processes underlying tropical deforestation models at the household, regional, national and global levels. For each of the 140 models reviewed, the study assessed the variables they included, their methodologies, data sources and quality and conclusions. Particular weight has been given to the results from models with a clear and consistent theoretical framework, high-quality data and econometric analysis, avoiding common methodological and data problems that often lead to spurious results.

With regard to a number of variables, one could plausibly argue that SAPs might either stimulate or discourage forest clearing or forest degradation (Table 1). In some cases this is because it is not certain how SAPs will impact on the economic variable in question; in others it is because of doubts regarding the effect of different economic changes on forests. This makes it particularly important to follow up this modelling work with additional research such as the case studies presented below.

Economic models tend to show that higher *aggregate* agricultural and forest product prices encourage deforestation and logging in unmanaged forests (Barbier and Burgess, 1996; Von Amsberg, 1994). When farming and logging become more profitable, landowners expand these activities to additional land. This may not apply, however, if the *relative* prices between different agricultural and forest products also vary, since different activities generate distinct amounts of forest clearing. Thus, for example, an increase in perennial crop prices with respect to livestock prices could actually reduce deforestation by leading farmers to abandon extensive cattle ranching and pursue tree crop production, which usually requires less land to provide similar amounts of output or employment.

SAPs that improve the terms of trade for agriculture and timber, such as currency devaluations, removing price controls on food, and fiscal incentives for agricultural and forest exports probably increase forest clearing and degradation (Cruz and Repetto, 1992; Weibelt,

1994). Those that reduce average agricultural prices by eliminating price supports, opening domestic food markets to imports or taxing exports to obtain revenue should have the opposite effect. SAPs are more likely to generate additional forest clearing and degradation when the main source of these problems is production for export.

Road investments near forests in developing countries put pressure on them by making it cheaper to reach those areas and transport goods produced there to markets (Chomitz and Gray, 1996; Mertens and Lambin, 1997.) Theoretically, SAPs may either decrease such investments to curtail public spending or raise them to promote exports.

TABLE 1. Expected effects of selected SAPs on deforestation and forest degradation, based on previous econometric models

Type of policy	Effects	Comments
Devaluation	Increases	Raises agricultural and timber prices
Export incentives	Increases	Raises agricultural and timber prices
Removing price controls on food	Increases	Raises agricultural prices
Removing agricultural price supports	Decreases	Lowers agricultural prices
Removing agricultural import restrictions	Decreases	Lowers agricultural prices
Increased agricultural export taxes	Decreases	Lowers agricultural prices
Increased road investments	Increases	Lowers transport costs
Removing fuel subsidies	Decreases	Raises transport costs
Lower spending on settlements	Decreases	-
Lower credit subsidies for crops	Indeterminate	Has conflicting effects
Reduced input subsidies	Indeterminate	Has conflicting effects
Reduced spending on forestry	Indeterminate	Depends how money is spent
Reduced public employment	Indeterminate	Has conflicting effects
Restricted monetary supply	Indeterminate	Has conflicting effects
Industrial trade liberalization	Indeterminate	Has conflicting effects

SAPs generally reduce spending on directed settlement programmes and subsidies for fuel, livestock, agricultural credit and inputs. Less spending on settlements, fuel subsidies and livestock should discourage forest clearing since it then costs more for families to move to the agricultural frontier, transport their products and engage in extensive cultivation and cattle raising.

Higher agricultural input and credit costs have ambiguous effects. They discourage forest clearing by making agriculture less profitable, but encourage it by favouring more extensive production systems that utilize more land (Holder, 1996).

In the first few years after implementation, SAPs tend to depress economic growth, employment and personal consumption because they restrict government spending and the money supply, cut public sector employment and force inefficient local industries to compete with cheaper and higher-quality imports from abroad. The net effect of this on forests is uncertain, since fewer job opportunities may induce underemployed families to move to the agricultural frontier and clear additional forest while falling urban incomes depress food prices, and this makes land clearing for agriculture less profitable (Jones and O'Neill, 1995).

Over the longer term, SAPs may lead to economic growth, more job opportunities and higher per caput consumption of agricultural and forest products. This could reduce forest clearing by providing alternative employment outside agricultural frontier areas but promote clearing by

increasing demand for products produced in those areas.

Across-the-board reductions in public spending associated with SAPs could diminish governments' ability to manage forests or make it more difficult to establish such capacity. However, even before the SAPs most developing countries had little capacity in this regard. In addition, greater foreign assistance, if partially channelled into forestry projects, may compensate for any decline that might occur.

The three countries and their SAPs

Bolivia, Cameroon and Indonesia all have between 40 and 60 percent of their land under tropical forest (Table 2). Annual deforestation rates during the early 1990s were highest in Indonesia (0.7 to 1.1 percent), followed by those in Cameroon (0.5 to 0.6 percent) and then Bolivia (0.2 to 0.4 percent).

The countries' populations range from almost 200 million people in Indonesia to 13 million in Cameroon and 7 million in Bolivia. Differences in population density are smaller but substantial. Bolivia is more urbanized but all three are urbanizing rapidly.

All three countries had a per caput GNP of between US\$700 and US\$900 in 1993. Cameroon's per caput income has been falling rapidly, while Indonesia's has done the opposite and Bolivia's has barely changed.

During the late 1970s and early 1980s, all three countries depended heavily on petroleum and/or mineral exports. In Bolivia, these activities have dominated the economy for centuries, while for Cameroon they represented a short-term boom, after which the country reverted to exporting mostly cocoa and coffee and began to export a growing amount of timber. Plywood and other industrial exports have become quite important in Indonesia in recent years, although oil remains the dominant export. The three countries' major agricultural exports include: soybeans (Bolivia), cocoa and coffee (Cameroon and Indonesia) and rubber, palm oil and coconut products (Indonesia).

Bolivia was the first to experience severe economic difficulties, beginning around 1979. Excessive borrowing, poor performance of mining and natural gas exports, political instability, macroeconomic mismanagement and severe drought caused GDP to fall by 2.6 percent annually in the early 1980s and inflation to rise from less than 10 percent to more than 11 000 percent (Anderson, Constantino and Kishor, 1995).

Cameroon entered an economic crisis seven years later (in 1986). Falling international petroleum, cocoa and (later) coffee prices, declining oil reserves, the depreciation of the US dollar and poor economic policies caused GDP to fall by 6.4 percent in 1987, 13.3 percent in 1988 and another 3.4 percent in 1989 (Mama, 1996).

TABLE 2. Background information on Bolivia, Cameroon and Indonesia

Variable	Year	Bolivia	Cameroon	Indonesia
Land area ('000 km ²)	1084	465	1812	
Forest area ('000 km ²)	1990	493	203	1 157
Forest area (%)	1990	45	43	64
Population (millions)	1995	7	13	198
Population density (per km ²)	1995	68	284	1 091
Urban population (%)	1995	61	45	35
GNP per caput (US\$)	1993	740	820	760

GNP growth (average annual) 1983-93	3	-2	6
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Source: WRI (1996).

In comparison, Indonesia's economic problems were mild and mostly related to the sharp decline in international petroleum and agricultural prices in the early 1980s as well as the appreciation of the Japanese yen a few years later. Real GDP growth declined from an annual average of 7.5 percent between 1973 and 1981 to 4 percent between 1982 and 1986, but only became (slightly) negative in one year, 1982. Inflation remained below 10 percent during the entire period (Hill, 1996).

The SAPs used to respond to these economic difficulties included: currency devaluations, reduced public spending, increased taxation, trade liberalization, financial market liberalization and promotion of foreign investment (Table 3). Bolivia implemented most of these policies in 1985, six years after its crisis began. In contrast, Indonesia devalued for the first time in 1978, long before it began encountering economic difficulties (around 1983), responded quickly when those difficulties occurred and, by 1987, was back on course. Cameroon went through three years of severe crisis before it timidly began to adjust in 1989 and avoided major adjustment until the early 1990s. Because Cameroon's currency is tied to the French franc, it could not devalue its exchange rate unilaterally. As a result, its currency became increasingly overvalued until 1994 when it was finally devalued.

In keeping with its more modest difficulties, Indonesia's reforms were more mild, except for its major currency devaluations in 1978, 1983 and 1986 the first of which was largely pre-emptive, coming even before the country faced economic difficulties. It was more selective with regard to the sectors in which public spending was reduced and many cuts were only temporary. For most of the last decade, the Indonesian Government largely maintained public employment and fertilizer subsidies, avoided privatization and only partially liberalized trade and foreign investment.

The economic impact of the SAPs has also differed among the countries. After a sharp recession in 1986 and 1987, Bolivia's economy has grown by 3 to 4 percent per year and inflation has remained low. Indonesia returned to its previous growth pattern, growing by 6.7 percent annually between 1987 and 1992 and more rapidly after that (Hill, 1996). Cameroon's economy, on the other hand, shrank by 4.1 percent annually between 1990 and 1994 and has not improved much since.

TABLE 3. SAP measures in Bolivia, Cameroon and Indonesia

Measure	Bolivia	Cameroon	Indonesia
Exchange RATES			
Official exchange rate devalued	X	X	X
Eliminated multiple exchange rates	X		
GOVERNMENT SPENDING			
Public employment reduced	X	X	
Government salaries frozen	X	X	X
Investment projects suspended	X	X	X
Agricultural credit subsidies reduced	X	X	
Agricultural input subsidies reduced	X	X	X
Elimination of agricultural price supports		X	
Food subsidies reduced			X
Spending on settlements reduced	X	X	X

Closure/sale of parastatal enterprises		X	
Public road construction maintained	X		X
GOVERNMENT REVENUE			
Value added taxes created/raised	X	X	X
Agricultural export taxes raised		X	
Fuel prices raised	X	X	X
Fiscal incentives for exporters	X	X	
TRADE			
Domestic agricultural markets liberalized	X		
Agricultural export markets liberalized		X	
Import tariffs reduced	X	X	X
OTHER			
Financial markets liberalized	X	X	X
Foreign investment promoted	X	X	X

Impact on forests

In all three countries forest clearing and degradation has increased since adjustment. While this cannot be entirely attributed to the SAPs and most, if not all, the underlying trends already existed to some extent prior to their implementation, the SAPs seem to have been an important contributing factor.

Logging for export expanded markedly following the SAPs. Bolivia's sawnwood exports rose from 30 900 m³ in 1984 to 161 700 m³ in 1991 (Anderson, Constantino and Kishor, 1995). Cameroon produced 34 percent more logs in 1994, after devaluation, than in 1993. Plywood and sawntimber exports in Indonesia grew from US\$1 481 million in 1986/87 to US\$4 752 million in 1993/ 94 (Erwidodo and Sunderlin, 1997).

Over the last decade, farmers have cleared increasing amounts of forest for mechanized soybean production in Bolivia and for oil palm, rubber, cocoa and coffee production in Indonesia (Table 4). Cameroon has no reliable national food crop statistics, but more limited survey and case study data suggest that forest clearing for food crops and forest degradation through unmanaged harvesting of fuelwood and non-timber forest product extraction increased under structural adjustment (Courade, 1994; Demenou, 1997; Mama, 1996; Ndembou, 1994).

As noted earlier, this growth in activities that negatively affect forests was clearly affected by multiple factors having little or nothing to do with SAPs. Nevertheless, for the reasons explained below, we believe the SAPs contributed substantially.

Currency devaluations have been the most important factor increasing forest clearing and degradation under the SAPs, at least in the short term. Devaluations greatly encouraged forest product exports in all three countries, soybean exports in Bolivia, and cocoa, oil palm and rubber exports in Indonesia (Akiyama and Nishio, 1996; Anderson, Constantino and Kishor, 1995; Barbier *et al.*, 1994; Larson, 1990; Nancy, 1988).

In a few instances, devaluations may have reduced deforestation but those effects were less immediate and perhaps weaker. For example, Indonesia's competitive exchange rates helped fuel a rapid growth of industrial exports, and this has created new off-farm employment opportunities for people who might otherwise have migrated to forested areas up until 1997. So far, however, this has had no demonstrable effect on migration patterns or deforestation rates (Resosudarmo, 1997). Similarly, the 1994 devaluation in Cameroon probably slowed a

shift from coffee and cocoa to more extensive swidden agriculture food crop production that began in the late 1980s, but apparently did not revert it.

Despite general reductions in public investment, Indonesia maintained its previously high level during the adjustment period and, after a brief decline, Bolivia intensified its road construction efforts in forested areas beginning in the late 1980s. These investments, coupled with unclear land tenure, contributed to deforestation in both countries. Expenditure on roads declined in Cameroon during the initial SAP period but then partially recovered and are expected to rise again shortly, since transportation investments have high priority under the SAP and the World Bank recently approved a large transportation loan (IPS, 1997).

Direct government incentives for non-oil and mineral exports have expanded in both Indonesia and Bolivia since the SAPs began. This has promoted agricultural and forestry exports. Indonesia has used allocation of public lands, subsidized credit, direct investment by public enterprises and official transmigration programmes to support the expansion of cocoa, oil palm, rubber and wood pulp exports (Akiyama and Nishio, 1996;

TABLE 4. Expansion of tree crop area in Indonesia and soybean area in Bolivia, 1986-1996

	1986	1988	1990	1992	1994	1996
			('000 ha)			
INDONESIA						
Oil palm	607	863	1127	1 467	1 804	2227
Rubber	2873	2944	3142	3289	3445	3534
Cocoa	98	253	357	496	597	606
Coffee	935	1 026	1 070	1139	1140	1178
Total	4513	5 086	5696	6391	6986	7545
BOLIVIA						
Soybean	63	80	172	192	331	452

Source: Erwidodo and Sunderlin (1997); Kaimowitz, Thiele and Pacheco (1997).

Erwidodo and Sunderlin, 1997; Larson, 1990). Bolivia implemented drawback schemes to lower the price of imported goods for non-traditional exporters to the benefit of timber and soybeans exporters, among others.

In the four-year period (1989-1993) preceding devaluation in Cameroon, the government greatly reduced official cocoa and coffee prices, causing farmers' incomes in the humid forest zone to fall sharply. In response, farmers diversified their income sources by producing more food crops, non-timber forest products (NTFPs) and fuelwood for sale (Demenou, 1997; Gockowski, 1997). This led to greater deforestation and degradation since, on average, families clear more land for commercial swidden agriculture than for coffee and cocoa farming and certain NTFP and fuelwood harvesting practices degrade the resource base.

During this period, the Cameroonian Government also eliminated subsidies for fertilizers and fungicides. Since farmers in the humid forest zone used those inputs mostly for cocoa and coffee production, this increased production costs for those crops more than for food crops, further reinforcing the shift from coffee and cocoa to food crop cultivation.

In Cameroon, producer prices for cocoa and coffee improved after devaluation in 1994, but a new export tax on coffee and cocoa, monopolistic practices by local traders, the collapse of government technical, financial and marketing services for tree crops and input price

increases caused by the devaluation and removal of input subsidies limited the devaluation's positive effects (Ndoye, 1997). Thus, the growing emphasis on food crops and forest products continues.

Two other policies that have stimulated agricultural expansion are regional trade liberalization and policies favouring foreign investment. In Bolivia, preferential access to the Andean Common Market resulting from regional trade liberalization greatly encouraged this country's soybean exports. In Indonesia, new foreign investment regulations led foreign investors to enter the oil palm business, and helped promote that sector.

In Cameroon the lack of urban employment opportunities resulting from the economic crisis and cuts in public employment and spending led some urban dwellers to return to farming and may have discouraged migration from the forest zone to the cities (Gubry *et al.*, 1996). This probably added to forest clearing related to rural population growth, although no one knows how much.

Reduced public employment in mining and SAPs that adversely affected traditional highland agricultural communities promoted some migration to agricultural frontier areas in Bolivia. Overall, however, migration to agricultural frontier areas in Bolivia did not increase following structural adjustment because declining availability of high-quality land and agricultural wage employment and other factors made most migrants prefer to move to cities instead (Kaimowitz, Thiele and Pacheco, 1997).

The adjustment measure with the largest impact terms of lowering deforestation was reduced public spending on directed settlement programmes in Indonesia and Bolivia. In Indonesia, in particular, the number of government-sponsored migrants to forested provinces fell substantially after 1984, although this was largely compensated for by an increase in spontaneous migration (Resosudarmo, 1997).

As noted earlier, Indonesia's rapid economic growth (at least until the crisis of late 1997), fostered by SAPs, reduced the factors "pushing" poor families in Java to move to agricultural frontier areas and timber concessions. Nevertheless, expanding employment opportunities in timber, wood pulp, oil palm, rubber and cocoa production apparently continued to exert a substantial "pull".

Government subsidies for agricultural credit and fuel declined in all three countries under adjustment. There is no evidence, however, that this significantly slowed agricultural expansion.

The hypothesis that SAPs make it more difficult for governments to control inappropriate forest clearing and unsustainable logging practices finds little support in either Bolivia or Indonesia, but may be relevant for Cameroon. In the first two countries, government capacity and will to carry out such policies was already weak before the SAPs and, if anything, marginally improved as a result of greater foreign support for environmental projects and greater public concern for the environment. On the other hand, Cameroon's Forestry Department may have had slightly more control over logging activities before the public sector entered into severe crisis and the country began to depend heavily on timber exports to survive (Enviro-Protect, 1997). This is hard to measure, however.

TABLE 5. The effect of SAPs on forests in Bolivia, Cameroon and Indonesia

Policies	Bolivia	Cameroon	Indonesia
Devaluation	Negative	Mixed	Mixed
Export incentives	Negative	n.a.	Negative
Removing agricultural price controls	Minor	ma.	n.a.

Removing agricultural price supports	n.a.	Negative	n.a.
Road construction	Negative	n.a.	Negative
Reduced support for directed settlement	Positive	Minor	Positive
Reduced public agricultural credit	Minor	Minor	n.a.
Reduced input subsidies	Minor	Negative	Minor
Reduced fuel subsidies	Minor	n.a.	Minor
Reduced public employment	Minor	Negative	n.a.
Reduced spending on forestry	n.a.	Uncertain	n.a.

n.a = not applicable.

Conclusions

Exchange rate policies can have important impacts, at least indirectly, on deforestation and forest degradation. Where the activities that negatively affect forests are mostly for export, devaluations generally worsen these problems, at least in the short term. The same applies to export promotion policies.

When governments greatly reduce overall spending, public road construction and maintenance may not be greatly affected or may even grow, because policy-makers and multilateral banks consider infrastructure investment to be key for promoting exports. When these roads are located in forested areas, they generally increase deforestation and forest degradation, especially where unclear or unfair tenure situations exist.

The three cases examined provide little to support the idea that SAPs lower deforestation or forest degradation by eliminating distortions associated with previous government interventions. In some cases this is because those distortions have been maintained under the SAPs (e.g. subsidies in Indonesia, excessive taxation of coffee and cocoa in Cameroon), while in others they have been eliminated, but with little effect on forest cover (e.g. reduction of agricultural credit and fuel subsidies). The only example identified where less government intervention lessened the negative impacts on forests was reduced government support for directed settlement programmes in Indonesia and Bolivia. In the case of the elimination of input subsidies in Cameroon, less government intervention may have led to greater forest clearing.

The indirect effects of SAPs on forests resulting from changes in overall economic growth, inflation rates, employment and consumption are difficult to measure and predict. The experience of Cameroon and Indonesia indicate that SAPs that succeed in creating new off-farm employment opportunities probably reduce deforestation, while those that do not succeed have the opposite effect, but this is still inconclusive.

There is little evidence that government spending restrictions associated with SAPs diminished governments' ability to promote sustainable forest management or control deforestation, largely because there was minimal capacity in the first place. It remains to be seen whether SAPs will favour or hinder the development of such capacity in the future.

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