

Adjustment Policies and the Environment: A Critical Review of the Literature

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Abstract

Adjustment programmes in developing countries have been the subject of an intense debate since their debut in the early 1980s. Consideration of the environmental consequences of adjustment has added a new dimension to the discussion. This paper seeks to review the existing literature, examining the links between adjustment policies, the environment and the use of natural resources. Special attention is paid to the evidence presented in selected country case studies. A wide diversity of findings suggests that there is no simple answer to the question of whether adjustment is good or bad for the environment. The complexity of adjustment itself makes generalisation impossible, as do the varying circumstances of adjusting countries.

Abrégé

Les programmes d'ajustement des pays développés sont devenus l'objet d'un intense débat depuis que les organismes financiers internationaux ont fait de leur adoption la condition préalable de leur intervention. La prise en considération de leurs conséquences environnementales a donné au débat une dimension nouvelle et le nombre des études portant sur cette question augmente rapidement. Le propos de ce texte est de présenter la littérature existante sur ce sujet, tout en démontant les articulations possibles entre politiques d'ajustement et utilisation des ressources environnementales et naturelles. On y apporte une attention particulière aux études de cas de différents pays spécifiquement consacrées au thème des rapports entre ajustement et environnement. La diversité des situations rencontrées suggère qu'il n'existe pas de solutions d'ordre général à ce problème. Pas plus l'approche optimiste de la Banque Mondiale («les programmes d'ajustement ont tendance à être bons pour l'environnement»), que celle, pessimiste, de ses critiques («les programmes d'ajustement ont tendance à être mauvais pour l'environnement»), ne reposent sur des résultats de recherche incontestables. Les situations varient d'un pays à l'autre et les études de cas demeurent donc essentielles pour parvenir à une meilleure appréciation du problème.

Resumen

Los programas de ajuste en países en vía de desarrollo han sido tema de intenso debate desde que su puesta en práctica se convirtió en condición necesaria para que intervinieran las agencias financieras internacionales. El tomar en cuenta las consecuencias del ajuste sobre el medio ambiente ha añadido una nueva dimensión a la discusión, aumentando rápidamente el número de estudios sobre este tema. Este ensayo tiene como objetivo revisar la literatura existente, organizando los vínculos posibles entre las políticas de ajuste y el uso de recursos naturales y de medio ambiente. Se presta una especial atención a casos de estudios que focalizan específicamente el interrogante entre el ajuste y el medio ambiente. La diversidad de las situaciones halladas sugiere que no hay respuestas genéricas al problema. Ni el enfoque optimista del Banco Mundial (que los programas de ajuste tienden a ser buenos para el medio ambiente) ni el enfoque pesimista de sus críticos (que los programas de ajuste tienden a ser malos para el medio ambiente) han sido respaldados con evidencia indiscutible. Dado que las situaciones varían de país en país, los estudios de casos son esenciales para entender mejor la problemática.

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1 INTRODUCTION

Over the past fifteen years many developing countries have undergone a wrenching process of economic reform and adjustment, with mixed results. Macroeconomic and sectoral reforms undertaken with the support of international donors have not always ensured a sustained return to economic growth, while in some cases they may have harmed the poor and exacerbated social tensions. Critics argue that the reforms have gone too far and too fast; defenders maintain that they need to go even deeper and that further delay would be dangerous.

Parallel to this debate, and until now largely unrelated to it, there has been increasing global concern about environmental degradation in the developing world. An emerging consensus on the conditions of sustainable development suggests that many developing nations have been pursuing an unsustainable model of development, which if successful would simply mean further environmental degradation and depletion of natural resources.

Towards the end of the 1980s, some authors started linking environmental degradation in developing countries to the process of economic adjustment. A common refrain was that developing countries were being pressurised, by the debt problem, "unfair" trade patterns and other structural factors, into adopting economic practices that were not only socially harmful but also environmentally damaging.

This paper reviews the recent literature and empirical evidence on this issue. Starting with a brief review of macroeconomic adjustment programmes (Section 2), it highlights the main criticisms made in terms of their economic efficiency, social equity and political support (Section 3). An overall review of the environmental consequences of economic policy reform is presented in Section 4. The links between debt, adjustment programmes and the environment are explored in more detail in Section 5, where empirical and country case studies are summarised. Finally, Section 6 presents the key conclusions of this review.

2 ADJUSTMENT PROGRAMMES: ORIGINS AND OBJECTIVES

The roots of adjustment lie in the so-called "debt crisis" of the late 1970s and early 1980s, which resulted from a temporary mis-match between demand and supply on the international capital markets. Demand for credit by the developing countries resulted from chronic balance of payments pressures, often linked to deep structural imbalances inherited from the previous decade. At the same time, anti-inflationary monetary policies being pursued in many developed economies had a deadening effect on private capital markets. As commercial credit dried up, developing country governments turned to the international financial institutions, such as the International Monetary Fund (IMF). The latter, however, insisted on comprehensive economic reforms, including fiscal restraint, privatisation of public industry and greater openness to foreign investment and trade, as essential conditions for the release of further credits.

The various reforms are often grouped into two categories: stabilisation and structural adjustment (World Bank 1988, p.1). The two types of reform packages share certain overall objectives, such as improving the trade balance and altering the extent and nature of government involvement in the economy in order to improve efficiency. This is not surprising considering their common reliance on a neo-classical framework. They differ somewhat in their choice of instruments, time-scale and assumptions about the extent of reform required to set the economy back on the path of sustained growth. Nevertheless, stabilisation and structural adjustment programmes are intended to be complementary rather than exclusive. Their aims and means are described in more detail below.

2.1 Stabilisation

In a situation of spiralling fiscal deficits and balance of payments crisis, the first priority of economic policy is to restore equilibrium in the short-term, hence the term stabilisation. This was the most urgent task facing many developing countries in the beginning of the 1980s, and the IMF was probably the most active proponent in its role as lender of last resort. Stabilisation programmes typically emphasise the need to reduce domestic demand in order to narrow fiscal and trade deficits and thus slow the haemorrhage of scarce foreign reserves. The rationale for stabilisation derives from a monetarist approach to the balance of payments: by containing domestic demand through fiscal and monetary restraint, both inflation and imports can be curtailed. At the same time, devaluation of the exchange rate is often prescribed as an additional means of cutting import demand and as a spur to exports. The combined effect of these reforms, it is hoped, will improve the balance of payments situation and reduce the need for foreign credits.

A common assumption of the first stabilisation programmes was that adjustment could be achieved quickly. Short-term restraints on demand were thought to be sufficient to result in a resumption of economic growth, led by the export sector, after only one or two years of recession. Consequently, short-term loans were considered sufficient to "bridge" the adjustment period.

2.2 Structural Adjustment

The experience of many developing countries during the early 1980s demonstrated that short-term stabilisation was not sufficient to restore conditions necessary for sustained economic growth. The slow recovery of exports and persistent recession indicated the need for more profound structural change as well as continued external support. Hence additional measures were proposed under structural adjustment programmes, including changes in pricing policy and institutional arrangements.

The broad aim of structural adjustment was and still is to ensure favourable conditions for growth in output, by removing constraints on the efficient allocation of productive resources in the economy. Stabilisation objectives are not abandoned but rather complemented by more focused, medium and long-term measures.

Sectoral policy has received special attention under structural adjustment. In industry, increased efficiency and competitiveness is to be achieved through the removal of subsidies and restrictions on imports as well as the relaxation of regulatory impediments to investment. A related objective is to promote the reallocation of resources from less competitive sectors, eg. import-substitution, to more competitive export industries.

Agriculture is another key target of adjustment in many countries. Sector level reforms include the reduction or removal of taxes on inputs and outputs for both internal and export markets, as well as restrictions on trade. In addition, the realignment of relative prices in the economy as a whole is expected to eliminate the widely perceived bias against agriculture in many countries, spurring increased production while alleviating rural migration to urban areas.

Another central issue in many adjustment programmes is the reform of the public sector. This often includes measures to reduce or freeze the civil service wage bill, as well as winding down or privatising loss-making public enterprises. Wherever possible, state intervention in the economy is reduced and market discipline is introduced.

3 CRITICISM OF ADJUSTMENT

Adjustment policies have been the subject of controversy since their inception. This section reviews some of the criticism levelled at adjustment programmes on economic, social and political grounds (discussion of the environmental impacts of adjustment is provided in Section 4). The economic achievements of adjustment are reviewed first, followed by a brief consideration of their social costs.

The section ends with a short discussion of the issue of political "ownership" of adjustment programmes by the countries that implement them.

3.1 Economic impacts

Although all adjustment programmes proceed from a common conceptual framework - sometimes called the "neo-liberal consensus" - and although they share many typical features, the programmes adopted in different countries are not identical in every regard. Similarly, the economic impacts of adjustment vary according to the particular political, historical and socio-economic characteristics of the countries that implement them. It is therefore not surprising perhaps that the record of adjustment in restoring developing countries to a path of long-term economic growth is somewhat equivocal.

This patchy performance is acknowledged by the leading proponents of adjustment, who nevertheless argue that the economic gains posted by countries undertaking adjustment have, on average, surpassed those of countries which rejected such policies (World Bank 1991). Clear differences were observed in cross-country studies which separate adjusting countries into low-income and middle-income groups. Both groups enjoyed renewed growth following adjustment. Nevertheless, low-income countries performed far less satisfactorily, with growth rates only slightly higher than those recorded during the 1970s, when they were barely growing in per capita terms (World Bank 1992a: 2). Note that the apparent growth effects of adjustment policies vary significantly according to the methodology used and the period of analysis.

Export achievements were also dissimilar across the two groups. The ratio of exports to GDP increased significantly in middle-income countries, while negligible improvements were posted in the low-income countries (World Bank 1992a:18). In regional terms, Latin America and Asia recorded more satisfactory results than African countries.

An important issue highlighted by critics of adjustment is the failure to anticipate potential deterioration in the terms of trade. Adjusting countries were typically advised to specialise in their "comparative advantage", which usually means labour-intensive or natural resource-based activities.

During much of the 1980s, however, falling prices for many internationally-traded commodities undermined such export promotion strategies. In the face of global economic recession, combined with widespread (albeit disguised) protectionism in the developed economies, many adjusting countries found it difficult to improve their trade balance despite greatly increased export volumes (Miller 1991).

These problems were aggravated by the anti-inflationary policies pursued by many developed countries during the same period, which resulted in significant increases in real interest rates and a reduction in the availability of commercial credit. The ratio of debt servicing to export revenues thus continued to deteriorate throughout the 1980s, in spite of efforts by adjusting countries to increase their exports (Reed 1992: 32).

Problems associated with trade reform policies were not confined to the export sector. Immediate and undifferentiated reduction in import tariffs under adjustment programmes typically provided little

opportunity for domestic industry to cut costs or improve quality in order to compete with overseas firms. Adjustment may thus have contributed to deindustrialisation and erosion of the fragile industrial base in many adjusting economies, especially in Africa (United Nations 1989).

Another problem is related to fiscal policy measures which form a key part of adjustment. These were typically dominated by short-term considerations and an obsession with reducing public expenditure, to the detriment of medium- and long-term growth. In many adjusting countries the average ratio of investment to GDP was dramatically reduced, contributing to infrastructure bottlenecks and creating potentially long-lasting obstacles to economic development. This problem was aggravated by the failure of private domestic and foreign capital to fill the gap in investment created by reduced state spending, despite optimistic assumptions to the contrary on the part of lending agencies. The theory that public sector spending was "crowding out" private sector investment was not borne out in practice. Recent empirical work confirms the negative relation between adjustment and aggregate investment (Mosley *et al.* 1991).

Finally, decreasing public expenditure has been linked to a deterioration in health and education services, with potentially significant long-term adverse effects on labour productivity, social welfare and economic development. This point is highlighted in the following section, which focuses on the social costs of adjustment.

3.2 Social and political consequences

Published criticism of adjustment programmes has emphasised their adverse social consequences. The absence of explicit social objectives in early adjustment programmes, or of mechanisms to protect the poorest and most vulnerable groups from their short-term effects, has been the subject of several studies. Foremost among these was a comprehensive analysis sponsored by UNICEF (Cornia *et al.* 1987).

Adjustment policies, it was claimed, are particularly hard on the poor. Liberalisation of agricultural markets, cuts in public subsidies and exchange rate devaluation all tended to increase prices of food, thereby reducing the real income of most urban populations as well as net consumers of food products in rural areas - among them the poorest households. At the same time, widespread recession due in part to public spending cutbacks, depressed wages and employment, especially in the informal sectors where most of the poor earn a living. Some critics have also argued that the poor suffered disproportionately from a reduction in public services, although evidence for this is mixed.¹

Contrasting argument and evidence of the social consequences of adjustment are presented in 7 country case studies sponsored by the OECD (Bourguignon and Morrisson 1992). The authors conclude that adjustment policies do not necessarily aggravate inequality or hurt the poor disproportionately since their impact varies widely from case to case. Nevertheless, where some improvement in family living standards was detected, corrective policies had been undertaken by governments in order to mitigate the social costs of adjustment.² In fact it is not clear from the

¹ In many countries the middle classes have historically enjoyed the lion's share of public spending. It is not clear to what extent they have been able to maintain this advantage in the face of general spending cutbacks.

² The cases described as showing improvement are Indonesia, Malaysia and rural areas of Ghana and Morocco. Malaysia was spared much of the pain of adjustment since it had relatively few debts, while Indonesia was easily able to repay its debts with petroleum revenues. Moreover, both of these countries deliberately safeguarded social expenditures in order to protect the poor during the adjustment period. In Indonesia, education and health spending were cut less than most other budget items, while in Malaysia expenditure on education and health actually increased, in per capita terms, during the period of analysis. Ghana anticipated the

evidence presented if social improvement was a consequence of adjustment itself, or the result of these accompanying measures.

Although the social impacts of adjustment are often difficult to discern, the current consensus - even within the main lending agencies - is that they are significant. A recent internal review of structural and sectoral adjustment operations by the World Bank acknowledges that "adjustment is not a painless exercise, and some social groups are bound to suffer, at least in the short run" (World Bank 1992b). Accordingly, adjustment programmes are increasingly accompanied by measures intended to mitigate their adverse social consequences. Nevertheless, the fundamental aims and means of macroeconomic reform remain intact.

Adjustment programmes have also been criticised for the "top down" manner in which they are usually designed and implemented. In most cases, adjustment programmes are negotiated in secrecy between the staff of international lending agencies and high-level economic policy-makers in borrowing countries. The resulting programmes often lack political support and may quickly crumble in the face of opposition from powerful interest groups which perceive some disadvantage in the new policies. Popular resistance to adjustment is eloquently demonstrated by public demonstrations and occasional violent confrontations with the authorities in several adjusting countries. Governments with weak political mandates have been severely shaken while others have had to rely on coercive measures to force through unpopular reforms.

Acknowledging this weakness, the international agencies increasingly stress the importance of cultivating domestic political support for policy reform (referred to as "local ownership" of adjustment programmes). In practice, however, this has been difficult to achieve, as the Bank itself admits:

"Despite the significance attached to borrower ownership, the notion remains conceptually elusive and insufficiently explored in the Bank's policy and practice of adjustment lending. Notably, it is seldom made clear as to what constitutes adequate ownership, or what can be done to increase and sustain that fundamental commitment to the adjustment program" (World Bank 1992b: 173).

potential social impacts of adjustment and instituted a special programme to mitigate them. Finally, in Morocco, although educational and health spending declined, the impact of cutbacks was mitigated by falling public sector wages. Morocco was also able to continue its food programmes targeted at the poor.

4 ENVIRONMENTAL CONSEQUENCES

All economic activity impinges on the environment to some degree. Likewise all economies rely to a certain extent on the use of natural resources. The same applies to the policies which direct or distort economic activity. However, because most economic policies are not designed with environmental objectives in mind, their environmental impacts, positive or negative, are generally accidental and usually unanticipated.

In recent years the linkages between economic policy, the environment and sustainable development have come under increasing scrutiny. This section reviews the evidence available on the environmental effects of sectoral policy reforms, focusing on agriculture, forestry and fisheries, industry and energy and the public sector. Empirical examples are provided where available. The following section focuses more specifically on recent studies of the linkages between external debt, adjustment and the environment.

4.1 Agriculture

Sectoral policy reforms in agriculture in developing countries are generally intended to create a favourable climate for producers, through a combination of price and trade liberalisation, tax reduction (but also reduced input subsidies) and, in some cases, exchange rate devaluation. The resulting increase in agricultural output may exacerbate environmental problems, at least in the short-term, due to more intensive use of soil resources and expansion of farming onto marginal lands (Southgate 1988). One illustration of this effect is presented in a study which links increased grain prices to the expansion of cropped areas and accelerated removal of native vegetation in the Sahel (Josserand 1989).

Substitution effects

Another common aim of agricultural policy reform is to encourage a shift from the production of non-traded subsistence crops towards tradeable or export crops. Devaluation of the exchange rate, a key feature of adjustment programmes in many developing countries, can likewise create strong incentives in favour of exportable crops. The environmental consequences of any resulting change in the pattern of land use depends in part on the nature of the crops grown. Soil resources may benefit from increased protection if there is a switch away from annual crops to perennials or to agroforestry. Such an effect is suggested in a study of the impact of exchange rate distortions in the Dominican Republic (Veloz *et al.* 1985). Similarly, a reduction in export taxes may have stimulated production of less erosive crops in Thailand (see section 5.2.3).

In other cases, policy reforms may favour a shift to more erosive crops. Southgate (1988), for example, reports that devaluation of the exchange rate could lead to an expansion of groundnut cultivation (a major export product but also a highly erosive crop) in certain areas of West Africa. A similar phenomenon was reported in a case study of Côte d'Ivoire, where agricultural price liberalisation prompted a shift from perennial crops (cocoa and coffee) to annual food crops, such as rice, which are more destructive of soil fertility (see section 5.2.3).

Efforts to improve efficiency through price reforms can have perverse short-term effects, depressing output and real incomes in agriculture. Reduced subsidies and increased prices for modern or imported inputs will discourage production of crops requiring heavy use of machinery, fertilizers or chemicals. Reduction of subsidies for irrigated farming can also affect both crop choice and agricultural returns. Intensive use of labour is stimulated, while the use of modern inputs such as machinery, chemicals and fertilizers is discouraged.

The environmental consequences of price reforms may be positive, encouraging more efficient use of natural resources (eg, irrigation water) or alleviating health problems associated with the use of agro-chemical products (Southgate 1988). On the other hand, higher prices for agricultural inputs or declining output prices may slow the adoption of more productive methods. Moreover, where forested or other uncultivated lands are easily accessible, farmers may be tempted to compensate for more expensive modern inputs or declining output prices by increased land clearing, resulting in accelerated loss of wildlife habitat and other resources. In effect, chemical fertilizer may be seen as a substitute for natural soil fertility; as one becomes more expensive farmers will increase their use of the other (see the Côte d'Ivoire case study in section 5.2.3).

Income effects

Reform policies can also have indirect effects on the environment and the use of natural resources. One link is through changes in the level of real incomes. Studies of trade policy and food markets indicate that the impacts of relative price changes depend crucially on how the real incomes of the poor are affected (Weil *et al.* 1990). Price liberalisation leading to higher prices for agricultural commodities may improve terms of trade from farmers' perspective but will also depress the real incomes of consumers, especially if the commodities are traded internationally.

Even within the farming sector, the benefits of increased output prices may be distributed very unequally. Some studies find that small-scale farmers typically benefit less than large farms, especially when price increases are concentrated in exportable crops, due to the relatively low participation of poorer farmers in the production of such crops. A review of structural adjustment operations in five countries (Côte D'Ivoire, Ghana, Indonesia, Philippines and Jamaica), by the World Bank, suggests that the main benefit to the poor from the expansion of export crops in these countries was indirect, through increased demand for their services as wage labourers. Income inequality in rural areas has increased in some of these countries, although the absolute incomes of most groups have increased.

The net effect of crop price increases on poor farmers depends on whether their revenue derives mainly from growing crops or from wage labour. Higher food prices can have a negative impact on the real income of farmers who are unable to meet their subsistence needs and must buy more than they can sell, or if rural wages do not increase in line with the prices of staple crops. Weil *et al.* (1990) provide examples of country case studies, highlighting the wide variation in the effects of relative price changes on poor farmers' income according to the specific circumstances of each country (see Johnson and Salop, 1980 for a discussion on Bolivia, Ghana, Indonesia and the Philippines; Addison and Demery 1985, for Thailand).

The environmental impacts of changes in the real income of poorer, small-scale farmers are related to their time horizon, ie the extent to which they are able to plan for the long-term. Rising income generally favours longer planning horizons, which theory suggests will reduce the rate of extraction or depletion of natural resources, provided that property rights are clearly defined and enforced. Mink (1992) provides a summary of the arguments, explaining how short time horizons and risk aversion strategies typically associated with extreme poverty can lead to more rapid resource degradation.

Land prices and tenure

Higher profits in agriculture associated with rising output prices will tend to increase demand for farm land, boosting prices of existing farms and possibly encouraging investment in soil conservation. However, rising prices can also increase pressure to clear additional forested areas, especially if the

property rights of small farmers are not well-defined or enforced, or if the authorities are unable to prevent illicit encroachment on unoccupied or forested land (Reardon and Vosti 1992, Southgate and Pearce 1988).

Land reforms programmes which provide secure tenure to small farmers can thus have indirect benefits for the environment. Where private land ownership is clearly established, farmers are more likely to grow perennial crops and adopt intensive, agroforestry methods in favour of traditional annual crops and extensive cultivation practices (Southgate 1988, Southgate and Pearce 1988). This in turn favours soil conservation efforts, since perennial crops tend to be less erosive. A shift to perennials can also reduce demand for chemical fertilizers, with potential health benefits (although the same is not necessarily true of pesticide use, since many tree crops require heavy application of toxic pesticides).

Secure property rights can also facilitate farmers' access to bank credit, by providing collateral against loans (see below). This in turn enables farmers to increase their productivity and incomes as well as providing security against short-term losses from drought or other unforeseen events. As noted above, higher and more stable incomes enable farmers to be more far-sighted in their use of natural resources, stimulating investment in soil and water conservation and possibly reducing pressure to clear marginal forest land (Southgate 1988). Feder *et al.* (1988) reports that farmers in Thailand benefitting from secure title to their land enjoyed better access to credit and exhibited higher levels of investment in land improvement.

Note, however, that where land clearing is a prerequisite for obtaining legal title, or a means of avoiding tax, conservation practices may be significantly undermined. Moreover, the transition from common property management of agricultural land and forest reserves to a system of private property rights may benefit some more than others. Relatively prosperous or well-connected households are often better able to establish effective claims to land, especially where the process of securing title involves much administrative red tape (Mink 1992). Collusion between rural elites and government officials can lead to very inequitable distribution of public lands, as documented in Nigeria by Jagannathan (1989). Similarly, Jodha (1990) describes how increasing land scarcity and commercialisation of agricultural production in India has led to privatisation of land previously accessible to the poor. This has increased incentives for small farmers to exploit the remaining common lands as quickly as possible, for fear of imminent dispossession.

A related issue is the potential impact of privatisation on access to other common property resources. Poor rural households often rely heavily on the consumption and sale of wild resources, such as edible plants and fuel wood, which are typically collected by women and children from common land. In sub-Saharan Africa, for example, up to 90 per cent of households rely on fuel wood for cooking, while in some African cities spending on fuel wood represents up to 20% of total income among poorer households (Barnes 1990). Land privatisation may force farmers in some areas to purchase fuel wood in the market. The net effect on farm incomes will depend on the balance between fuel wood prices and the value of labour savings from not having to collect fuel (Cleaver and Schreiber 1992).

Agricultural credit

Adjustment reforms in financial markets often aim to increase the availability of credit to poorer, small-scale farmers. As noted above, credit facilities can stimulate a shift to perennial crops, which are often less erosive of soils but which small farmers traditionally avoid because of their long maturation period (Mink 1992). More generally, improved access to credit will lead to increased investment in farm improvements, greater use of modern inputs and higher levels of productivity.

On the other hand, increased availability of credit may encourage the expansion of cultivated area and also allows more intensive use of machinery and industrialised inputs, such as agro-chemicals. These allow farmers to recover more easily from declining natural soil fertility, reducing incentives for soil conservation in the short-term and contributing to eventual exhaustion of land in the long-run. A notorious case of environmental destruction linked to the availability of agricultural credit is the expansion of cattle ranching in Brazil during the 1980s. Subsidised credit for large-scale ranching is identified by several authors as one of the most significant causes of deforestation in Amazonia during that period (Browder 1985, Binswanger 1989, Mahar 1988).

The environmental impact of agricultural credit reforms under adjustment is therefore ambiguous; improved access to credit can improve incomes and encourage more far-sighted farming practices but may also stimulate the expansion of cultivated area and the use of polluting inputs. These and other linkages between adjustment policy reforms, economic impacts and the use of natural resources are summarised in Table 1.

Table 1. Sectoral Adjustment Policies: Agriculture

Adjustment Policies	Economic Consequences	Environmental Impact
Increase prices Export tax reduction Exchange rate devaluation	Switch to tradable crops Increase in cultivated area Income effects	Increased/decreased soil erosion depending on crop choice Higher incomes may encourage forest conversion if uncultivated land is available
Reduction of input subsidies	Crop choice may be affected Switch to alternative inputs Production may be reduced Income effects	Use of polluting agro-chemicals may decline Impact on soil conservation and deforestation depends on availability of uncultivated land
Land tenure to small farmers	Income effects Access to credit	Secure tenure increases time horizon but may be negative consequences if land clearing is a prerequisite for obtaining title
Credit facilities to small farmers	Higher investment levels Expected increases in input use and productivity However, stabilisation measures may increase interest rates, with the opposite effect	Improved access to credit increases planning horizon and investment in conservation, but increased production may entail land clearing and/or soil erosion

4.2 Forestry

The historical pattern of forest industries in many countries is characterised by a boom-and-bust cycle.³ The sequence begins with the establishment and rapid expansion of highly profitable logging and processing activities. Usually, however, timber harvesting is not accompanied by appropriate management of secondary forests and the industry eventually collapses when the primary forest reserves are exhausted (Vincent 1994). This may or may not be followed by slow recovery through silvicultural investment and management of secondary forest regrowth.

The main causes of this boom-and-bust pattern are undervaluation of stumpage prices, low investment in forest management and poor enforcement of regulations. Certain features of international timber markets may also have created perverse incentives for rapid extraction of timber

³ Problems in fisheries are similar, in many respects, to those observed in forestry. Lack of well-defined property rights stimulates over-exploitation, resulting in the same pattern of rapid expansion and inevitable crash. Fishing is initially profitable due to a high rate of catch per unit of effort, but harvest levels are unsustainable. Eventually the resource becomes scarce, profits decline and the sector stagnates. Adjustment policies interfere in this process through changes in the relative prices of inputs and outputs, as well as income effects.

resources. Sectoral adjustment policies have attempted to address both problems, although there is some disagreement as to whether such reforms provide effective solutions or simply aggravate the situation (Barbier *et al.* 1994a, Barbier *et al.* 1994b, Vincent 1994).

The issue of stumpage prices is relatively clear, albeit politically intractable. The general tendency of forest authorities to offer timber concessions on public lands at very attractive prices has unambiguously stimulated harvesting. In many cases, these stumpage fees are based on the volume of timber harvested rather than standing volume, and take no account of waste or damage to remaining trees in the harvest process. Conventional harvesting practices thus tend to open a huge canopy area, waste considerable wood and damage many species in addition to those with commercial value (Uhl *et al.* 1992, Veríssimo *et al.* 1992). Moreover, because most concessions are for short periods, relative to the time required for forest regrowth, private firms have little incentive to avoid such collateral damage or to invest in management and reforestation. Abandoned logging trails offer easy access to land-hungry farmers, leading initially to the early establishment of slash-and-burn cultivation, followed eventually by permanent conversion.

Potential solutions include extending the period of concession rights or privatising forest lands. The latter option is often politically unpopular and can disrupt the access of forest communities to common property resources. Consequently, few countries have carried out privatisation on a massive scale. Another response is to increase stumpage prices. This has the advantage of increasing government revenue in the short-term, alleviating chronic fiscal problems. In practice, however, many developing countries have been reluctant to increase stumpage fees, arguing instead that the main problem is low prices for timber in international markets (Vincent 1994).

There is considerable controversy over the extent to which the international timber trade can be held responsible for deforestation. Recent econometric analysis suggests that the trade itself is not a major or direct cause of deforestation (Barbier *et al.* 1994b). Developing countries produce mainly general purpose hardwood timber for a highly competitive market, with some competition from temperate timbers where substitution is feasible. Moreover, tropical timber represents only a small part of the total supply of timber. Most developing countries therefore have little power to influence world prices and can only increase their domestic prices at the expense of market share. International prices will not reflect the increasing scarcity of timber in developing country. Indeed, the rate of increase in stumpage values is steadily diminishing. If future prices are expected to rise at a rate less than the cost of capital, it may even be more profitable for a country to accelerate the rate of harvest in the short-run and invest the proceeds in other industries or activities with higher rates of return (Vincent 1994).⁴

In many cases, adjustment programmes have stimulated the forestry sector as a source of foreign exchange and public revenues. Devaluation of the exchange rate, for example, has the immediate impact of increasing the profitability of forest product exports but does not solve the problem of low international prices. Many countries have attempted to increase revenues from the forest sector by stimulating domestic processing and export of value-added products. Restrictions on log exports, including taxes or trade bans, are frequently adopted as a means to this end. The experience of most Southeast Asian countries, however, suggests that such policies have led to only modest expansion of domestic processing capacity and employment. Moreover, export restrictions tend to depress domestic log prices, accentuating the under-valuation of stumpage, masking the true scarcity of timber resources and exacerbating over-exploitation (Barbier *et al.* 1994a, Vincent 1994).

⁴ This calculation ignores the value of non-timber forest benefits (e.g., watershed protection, biodiversity, carbon storage, etc.) which are not included in timber prices. For a detailed discussion of valuing non-timber forest products and services, see LEEC (1993).

Table 2. Sectoral Adjustment Policies: Forestry

Adjustment policies	Economic consequences	Environmental impacts
Incentives for (international) trade: devaluation, export tax reduction	Timber harvests increase, usually following a boom-and-bust pattern Forestry management may improve if appropriate concession policies are enacted	Direct impact: forest degradation due to timber harvesting Indirect impact: abandoned logging roads open forests to encroachment and conversion
Increasing stumpage prices, levied on standing volume rather than extracted logs	Increased efficiency of logging Increased public revenues	Positive impacts if harvest efficiency is improved Harvest may be reduced in the short-term
Longer concession periods and/or privatisation	Increased investment and improved forest management	Forest recovery Harvest may be reduced in the short-term

4.3 Industry and energy

Adjustment reforms typically favour export industries and tradable goods sectors. Since many developing countries have a comparative advantage in resource-intensive activities, critics have suggested that adjustment programmes stimulate over-exploitation of these resources, resulting in their rapid depletion and environmental degradation.

The mining sector is particularly sensitive to exchange rate changes and export incentives. During adjustment, governments are under pressure to increase the level of exports quickly, but there are relatively few opportunities to do so in the short term. Increased mineral extraction is one available option. Special incentives are often devised to spur output, even though the resulting decline in prices or increase in extraction costs may squeeze profits. In effect, short-term pressures to meet balance of payments targets may lead to short-sighted use of scarce mineral resources.

Structural adjustment reforms are also expected to attract foreign capital and investment in industry. Since environmental standards are often lower or less vigorously enforced in developing countries, critics have suggested that reforms may stimulate migration of pollution-intensive industries to countries ill-equipped to deal with them (see Leonard 1988 and Weil *et al.* 1990).

Little evidence is available to support this thesis. Using trade and investment figures from the US, Leonard (1988) concluded that the emergence of more stringent environmental regulations in that country did not accelerate the relocation of pollution-intensive industries to countries with lower regulatory requirements. In general, pollution abatement and control expenditure have had little impact on the competitiveness of developed country industries, due to their relatively small share in total costs. Other factors limiting the incentive to relocate may include: fear of legal liability in the event of an accident and consequent loss of reputation in the country of origin, technology transfer

costs, consumer demand for environmentally sensitive products, fear of the imposition of more stringent local environmental standards in the future and, in some cases, the high cost of refitting ageing equipment to meet higher standards (Low 1992).

Nevertheless, evidence suggests that highly polluting industries have grown faster in developing countries than the average rate for all industries (Low and Yeats 1992, Lucas *et al.* 1992). At the same time, other studies indicate that countries which were more "open" to international trade became less pollution-intensive during the 1970s and 1980s than comparative "closed" economies (Birdsall and Wheeler 1992, Lucas *et al.* 1992).

Energy use is also expected to change during the adjustment process. Reduced subsidies and/or higher prices for energy may result in more efficient use, with a consequent reduction in air pollution.

On the other hand, rising fuel costs can reduce public access to transport, especially among the urban poor, exacerbating poverty and related secondary environmental problems.

Table 3. Sectoral Adjustment Policies: Industry and Energy

Adjustment policies	Economic consequences	Environmental impact
Trade liberalisation	Export sector and labour-intensive industries are favoured Foreign investment is anticipated Less efficient industries may close	Impacts depend on the nature of the export sector. Labour-intensive industries tend to pollute less per unit of output, but total pollution may still increase due to higher output. Mineral depletion is accelerated "Dirty" industries may be attracted Risk of unemployment and recession increasing urban and rural poverty, with negative environmental consequences
Increased energy prices	Increased energy conservation Total output may decline; poor are more affected	Reduced air pollution Risk of unemployment and recession increasing urban and rural poverty, with negative environmental consequences

4.4 Public sector reform

Environmental protection is a government responsibility in most countries. Cutbacks in public spending under adjustment can adversely affect the level and quality of services such as waste management and sanitation, regulation and enforcement of pollution standards, protection of protected areas, etc. Environmental quality may therefore decline even when the rest of the economy is recovering.

On the other hand, lack of funds may reduce public investment in projects with adverse environmental impacts, such as road and dam construction or settlement projects in frontier areas. Evidence from the Brazilian Amazon supports the notion that public spending on transport and other infrastructure is closely linked to the settlement of frontier regions and thus the rate of deforestation and land degradation (Binswanger 1989, Mahar 1988, Reis and Guzman 1992). Conversely, it may be argued that continued lack of public infrastructure and access to external inputs and markets obliges producers to maintain unproductive and environmentally destructive practices, such as slash-and-burn cultivation of annual food crops. This hypothesis is examined by Ozório de Almeida and Campari (1993) in yet another study of the link between agricultural expansion and deforestation in the Brazilian Amazon.

Privatisation is a central component of most adjustment programmes. The basic objective of privatisation is to reduce costs and increase efficiency by imposing market discipline wherever possible. Critics maintain, on the other hand, that the withdrawal of the state from provision of basic utilities, such as water and energy supply, does not lead automatically to private sector investment

and that in many cases poorer consumers lose out. Few attempts have been made to privatise environmental protection services.

Privatising state-owned land is another matter. As noted above, conferring private property rights on small farmers may stimulate investment and conservation. At the same time, privatisation may involve splitting up common lands or encourage more intensive land use, resulting in migration of poorer farmers to marginal areas.

Table 4. Sectoral Adjustment Policies: Public Sector

Adjustment policies	Economic consequences	Environmental impact
Reduction of public deficit through reduced government expenditure, increased taxation	Reduced inflation Recession	Ambiguous impact on resource depletion and degradation: economic activity is reduced, but poverty is increased Potential reduction in public environmental protection services
Privatisation Higher prices for public services	Infrastructure bottlenecks Public enterprises expected to be more efficient Impacts on the distribution of wealth and income	Increased pollution possible, offset by efficiency gains Poverty may increase with higher prices for public services

5 EXTERNAL DEBT, ADJUSTMENT AND THE ENVIRONMENT

5.1 Debt and the environment

An early focus of studies of the environmental consequences of adjustment reforms was the specific role of external debt in natural resource depletion and environmental degradation. As noted above, some authors have argued that developing countries were forced to increase environmentally harmful, export-related activities in order to service their external debts. This claim was most commonly made in reference to tropical deforestation. Attempts to test this hypothesis include elaborate econometric analyses of the proximate causes of deforestation (see Burgess 1992 for a review). The results of this research, however, are contradictory.

For example, Capistrano (1990) and Capistrano and Kiker (1990) test the significance of debt service payments as an explanatory variable for deforestation (measured in terms of industrial roundwood removal from broadleaved forests). Covering 45 developing countries between the years 1967 and 1985, the model also includes a range of other variables relating to the forestry sector, agriculture and the economy as a whole. The debt-service ratio was found to be a significant explanatory variable for the years 1972-75 only, and had a negative coefficient. This counter-intuitive result may reflect the readiness of international capital markets to offer credit during the early 1970s, which could have reduced pressures to sell off timber resources. A positive and significant relation was also found between devaluation and deforestation for the period 1976-85.

These results suggest that the level of exposure to foreign debt was not correlated with timber removals, contrary to claims from some quarters. On the other hand, devaluation of the exchange rate - an important element of many adjustment programmes - was found to be closely related to levels of deforestation. Thus while indebtedness itself may not lead directly to deforestation, the adjustment measures adopted as a consequence of high levels of debt may be significant.

Of course, using industrial logging as a gauge of deforestation can produce misleading results for countries where logging is not a significant cause of deforestation, or where timber derives mainly from plantation forests (Burgess 1992). A slightly different approach is adopted by Kahn and McDonald (1992 and 1994). In this case, high levels of debt are thought to provoke countries to behave in a myopic fashion, resulting in higher levels of deforestation than would occur otherwise (Kahn and MacDonal 1994). Economic variables are grouped into factors which contribute to GDP (labour, land), and alternative "unproductive" activities including government spending, debt service and investment. Population is incorporated through the definition of a minimum consumption standard.

The main conclusions of the analysis are that variables which contribute to GDP should reduce deforestation, while variables which compete for the use of GDP should increase deforestation. Debt is included in the latter group. The authors find a strong positive correlation between deforestation and public sector external debt, especially for the period 1981-85.

However, this approach can be criticised for its arbitrary definitions of productive and unproductive activities. For example, governmental spending on public health and education are considered unproductive activities, despite their evident contribution to growth in GDP. A more robust criticism concerns the authors' interpretation of the results. These indicate that debt and deforestation are correlated over the period 1981-85, but this does not mean that there is necessarily a causal relation between them. In effect, it is possible that deforestation and indebtedness were both affected by the same set of circumstances, including influences from public policy.

A clearer picture emerges from studies which focus on the specific impact of policy reforms undertaken in response to high levels of external debt, rather than the impact of debt itself. Hence in recent years research has shifted to analysis of the environmental consequences of adjustment programmes in developing countries, which are reviewed in the next section.

5.2 Adjustment and the environment

5.2.1 The World Bank Studies

In response to claims that adjustment programmes have been environmentally harmful, the World Bank sponsored two reviews of the environmental implications of its lending operations. The first review (Sebastian and Alicbusan 1989) focused on the economic and institutional components of selected structural adjustment loans (SALs) and sectoral adjustment loans (SECALs) in 43 countries, covering 83% of the World Bank's adjustment lending between the years 1979 and 1987. The loans were related to a wide range of domestic policy reforms, including:

- agricultural output prices (changes in producer prices and in export prices);
- agricultural input prices (reduction of subsidies for pesticides and herbicides, fertilizers, farm equipment and spare parts, and agricultural credit);
- energy policy (changes in production costs and in consumer prices, and introduction of energy-saving technologies);
- trade and industrial policy reforms;
- public expenditure programmes; and,
- institutional changes (energy conservation programmes, land tenure, land use and forestry regulation).

The method used by the authors was to identify those policy reforms believed to have direct or indirect effects on the environment, based on an examination of the original loan documents. These reforms were then analysed in terms of their potential environmental effects. No reference was made to whether these reforms had already been implemented, nor whether their intended objectives were met. Nevertheless, the main conclusion of the review was that:

"Far from being a major source of environmental degradation in developing countries, adjustment policies appear, on balance, to have a bias in favour of the environment" (Sebastian and Alicbusan 1989: 28).

In terms of sectoral achievements, the main findings of the review were as follows:

- (i) Agricultural programmes which increased output prices, created incentives for tree crops or stimulated agriculture in general were expected to have positive effects on soil conservation.
- (ii) Rising agricultural input prices were expected to reduce uneconomic use of fertilizer, pesticides, insecticides and herbicides. Higher prices for mechanical equipment may have decreased land clearing.
- (iii) Increasing energy prices were expected to reduce energy use and related pollution, although complementary measures were needed to mitigate environmental damage caused by increased use of fossil fuels and development of hydroelectric power.
- (iv) Industrial trade reforms were expected to provide long-term environmental benefits.

- (v) No definitive conclusion was reached with respect to reductions in government expenditure. Both positive (reduced subsidies leading to more efficient use of resources) and negative (reduced spending on environmental protection and resource management) consequences were anticipated.
- (vi) Institutional reforms including land use planning and tenure reforms, forestry and livestock regulations, were generally expected to have positive environmental effects.

The authors also noted that an increasing number of loan operations over the study period included explicit environmental objectives in their terms of agreement.

This review was updated by Warford *et al.* (1993) for the period 1988-92. The approach and conclusions were basically identical:

"adjustment is a necessary, if not sufficient, condition for sound environmental management. Certainly stability, 'getting prices right', and public sector reform have virtually unambiguous - and beneficial - impacts on environment. Trading reform, in enhancing efficiency and employing the principle of comparative advantage, will also tend so" (Warford *et al.* 1993: 16).

Nevertheless, both studies are weakened by their exclusive focus on the intended objectives of adjustment rather than actual observations, casting doubt on the conclusions reached. In order to obtain more concrete findings, the World Bank has recently embarked on a series of country case studies of the environmental consequences of "economy-wide" policy reforms (see Table 5).

Table 5. World Bank case studies of macroeconomic policy and the environment

Country	Environmental focus
China	Unsustainable agriculture
Costa Rica	Deforestation and land degradation
Ghana	Land use and soil degradation
Indonesia	Industrial pollution
Mexico	Air pollution
Morocco	Water resource depletion
Philippines	Deforestation
Poland	Industrial pollution
Sri Lanka	Environmental aspects of energy use
Tunisia	Degradation of agricultural land due to over-grazing
Zimbabwe	Wildlife management

Preliminary results from the case studies are described in a recent summary paper (World Bank 1994). The studies are varied in their methodology and sectoral coverage but all are guided by the basic assumption that economic policy reforms are almost never the fundamental cause of environmental problems. Nevertheless, the authors acknowledge that macroeconomic reforms may interact strongly with, and thus alleviate or exacerbate, previously existing market imperfections and policy failures related to natural resource and environmental management.

An example of this approach is provided by the Indonesian case study (World Bank 1994). Pollution was found to have increased dramatically almost everywhere following adjustment, as a consequence of accelerated industrial growth. Moreover, the paper anticipates that by the year 2020, "dirty" processing industries will still account for more than 80% of Indonesian industrial output (outside of Java). However, adjustment is not seen as the primary cause of such problems, but rather as a potential solution:

"Thus, Indonesian industry in the aftermath of liberalisation has a much-improved sectoral and locational profile from an environmental perspective" (World Bank 1994: 68).

A similar example is provided by the Mexican case study. Pollution intensity is found to have increased throughout the 1980s (the adjustment programme in Mexico began in 1982). However, the authors assert that the roots of this problem are to be found in an earlier period:

"This increase is almost completely explained by the growth of public sector investments from 1978 to 1982 in petrochemical and fertilizer industries" (World Bank 1994: 69).

Finally, the Ghana case study relates increasing pressure on land resources, encroachment onto forest lands and accelerated soil degradation to the expansion of agriculture, especially export crops

(World Bank 1994). Lower taxes on agricultural exports are considered to have encouraged production, resulting in increased forest conversion. Reduction of the government wage bill is considered to have stimulated a shift of labour into agriculture, putting further pressure on land resources. Nevertheless, none of these problems are considered to have been caused by adjustment itself. Instead the blame for environmental degradation is placed on the traditional land tenure system, which is regarded as encouraging over-exploitation of land and as an obstacle to sustainable land management.

Accordingly, since the primary cause of environmental damage always lies elsewhere, the final conclusion reached by the authors was that:

"adjustment programmes, especially the market liberalising elements, are usually good for the environment" (World Bank 1994: viii).

5.2.2 The WRI Study

The World Resources Institute (WRI) conducted a study of the implications of alternative macroeconomic policies on the use of natural resources in the Philippines (Cruz and Repetto 1992). The study focuses on two periods: the 1960s and 1970s, considered to be the origins of the debt crisis, and the 1980s, when stabilisation and structural adjustment programmes were implemented. The study aimed to identify the effects of macroeconomic policies along three axes:

intertemporal	transfer of resources between present and future generations
intersectoral	reallocation of resources between economic sectors
interpersonal	altering the distribution of income and wealth among individuals and households

Adjustment reforms undertaken in the second period were further assessed and compared to alternative reforms using a computable general equilibrium (CGE) model. Incorporating land as a production factor, the model was used to assess changes in land use associated with alternative adjustment policies. Thus the model was able to highlight the effects of macroeconomic policy changes in resource-intensive sectors such as logging, fishing, mining, upland agriculture and energy supply.

The authors conclude that during the 1960s and 1970s, the development pattern of the Filipino economy was based largely on the liquidation of natural resource assets in order to finance current consumption and the acquisition of relatively unproductive industrial capital. Agriculture and primary industry were discouraged by high tariff and exchange rate policies, which kept the prices of manufactured consumer goods high and of intermediate industrial inputs relatively low. Fiscal incentives also played an important role in stimulating energy-intensive and pollution-prone industries (pulp and paper, ferrous and non-ferrous metals, chemicals and petroleum products). In response to these distortions in relative prices, industry became more materials-intensive, resulting in increasing pollution from industrial emissions and consumer waste.

Another characteristic of industrial activity during the 1960-70s period was its relative capital-intensity. Industrial employment thus failed to keep pace with a growing labour force, while poverty was further aggravated by regressive taxation. Institutional rigidities, including concentration of private agricultural holdings and of rights to exploit public lands, meant that landless workers' only alternative was to exploit marginal resources in the public domain (upland forests, mangroves and

fisheries). The consequence was over-exploitation of the fragile soils of the uplands and of artisanal fisheries.

Economic growth all but ceased in the early 1980s, with the balance-of-payments crisis. Both stabilisation and structural adjustment programmes were adopted, but the drastic economic contraction resulting from the former (with the support of the IMF) sidetracked efforts to restore growth. The consequent massive economic recession, associated with the collapse of world commodity prices, resulted in reduced output of timber, minerals and most other resource-based products. Hence in this case the debt crisis led to reduced pressure on natural resources rather than increased extraction, at least in the short-term.

Nevertheless, the authors conclude that the environment hardly benefitted from such contraction. Massive unemployment and declining income, with a fall of more than 20% in real wages between 1983 and 1985, forced an increasing number of poor households to resort to a desperate and unsustainable reliance on common property resources:

"As vastly increased numbers of workers migrated to the open access resources of the uplands and coastal areas, deforestation, soil erosion, the destruction of coastal habitats, and the depletion of fisheries increased" (Cruz and Repetto 1992: 6).

Use of a macroeconomic simulation model allowed the authors to analyse a number of alternative policy scenarios. First of all, they show that the balance of payments, income levels and energy conservation would all have improved if structural adjustment measures had not been sidetracked by the initial emphasis on stabilisation. Consequently, environmental pressures linked to increased poverty could have been avoided. However, even in this case some over-exploitation of natural resources would occur in mining, logging and upland agriculture. The reason is that structural adjustment programmes were designed with limited regard for the environmental requirements of sustainable development. An alternative scenario, linking adjustment to improved environmental and resource management, would have produced much better results:

"The overall economic and environmental benefits of this (actual) adjustment program are uncertain, but certainly are inferior to those of an alternative structural adjustment package that includes institutional and policy reforms to achieve adequate control over industrial pollution and over the use of natural resources" (Cruz and Repetto 1992: 6-7).

5.2.3 The WWF Study

The World Wide Fund for Nature (WWF) sponsored three case studies of the links between structural adjustment and the environment, in Côte d'Ivoire, Mexico and Thailand (Reed 1992). Each study adopted a slightly different approach, but in every case adjustment reforms had both positive and negative impacts on the use of natural resources. The fundamental condition centres once again on the environmental consequences of economic growth.

On the one hand, stabilisation programmes tend to have deflationary impacts, at least in the short term (with Thailand a notable exception). Since natural resource depletion and pollution tend to follow economic activity, lower growth implies less environmental damage. On the other hand, poverty increases with recession. As discussed above, increasing poverty generally has a negative impact on the environment, due to greater pressure on marginal lands and common property resources, and/or accelerated migration to peri-urban areas with inadequate infrastructure, where environmental health deteriorates quickly.

(i) Côte d'Ivoire⁵

Côte d'Ivoire was considered an economic success story from independence until about the mid-1970s. The country enjoyed high rates of economic growth (averaging 7% per annum over the period 1960-75), mainly thanks to exports of coffee, cocoa and timber, as well as industrial growth.

Another stimulus was the monetary stability afforded by participation in the Communauté Financière Africaine (CFA), which maintained a constant exchange rate with the french franc between 1948 and 1994. Heavy taxes on export crops were used to finance the development of import-substitution industry, much of it publicly owned. Industry also depended heavily on protectionist trade policies. At the same time, urban wages (mainly in the public sector) grew to relatively high levels, resulting in a creeping over-valuation of the real exchange rate.

The first oil price shock in 1974 was absorbed with little apparent effect, due to a simultaneous boom in the world price of the main export commodities, coffee and cocoa. Windfall revenues from the boom were used to finance a major expansion of public investment, which increased by 250 per cent in real terms from 1975 to 1980. High levels of investment were maintained in the face of a subsequent decline in export prices and the second oil shock of 1979-81. As a member of the CFA, Côte d'Ivoire was not able to devalue in order to restore the competitiveness of its export sectors. Growing trade deficits were financed instead by increasing foreign debt, while domestic activity was maintained by central bank credits until the fiscal gap and current account deficits reached unsustainable levels. By 1981, Côte d'Ivoire was forced to appeal to the international financial institutions for emergency credits, which were approved subject to the implementation of a short-term stabilisation and medium-term structural adjustment programme.

Stabilisation and adjustment

The immediate objective of the stabilisation programme was to reduce the current account deficit through a reduction in domestic absorption. In practice, this was achieved mainly by cutting public expenditures, since the devaluation option was not available. Trade reforms were limited to harmonisation of import duties, conversion of non-tariff barriers to tariffs, and an attempt to simulate an exchange rate devaluation using a combination of higher import tariffs and an export subsidy. Sectoral policy reforms consisted of price liberalisation, reduction of producer and consumer subsidies and restructuring of public sector enterprises, including severe cutbacks in agricultural extension services.

⁵ The Côte d'Ivoire case study (Reed 1992, chapter 3) was written by the London Environmental Economics Centre (LEEC), based on a study by the Centre Ivoirien de Recherches Economiques et Sociales (CIRES).

The results of these reforms were far from their original intentions. Continued recession in the country's key export markets further depressed the world prices of the main export commodities, counteracting any potential stimulus achieved under the adjustment programme.⁶ Decreasing profits inhibited agricultural modernisation, with low usage of fertilizers and other modern inputs, while traditional, extensive farming practises prevailed.

Industrial reforms were also considered unsatisfactory, as the sector remained heavily protected and focused on domestic rather than export markets. Meanwhile, cutbacks in public expenditure were not matched by increased private investment, while foreign direct investment was stagnant. Urban unemployment increased dramatically, depressing wages and income in the informal sector, while real wages in the formal sector stayed high due to institutional resistance. As a result, there was no improvement in the terms of trade faced by rural producers, who simply saw reduced demand for their products.

Environmental impacts

Restrictive fiscal and monetary policies had the anticipated effect of easing pressure on natural resources, because of the consequent fall in overall demand. Also, by simulating an exchange rate devaluation, the policies may have increased the profitability of timber exports, thereby creating a stimulus for timber extraction but also a potential incentive for investment in forest management (subject to appropriate concession policies). Finally, reduced public investment in rural transport infrastructure may have slowed the pace of timber extraction and agricultural expansion, by increasing the cost to private firms and farmers of gaining access to virgin forest lands (p.62). Note that many of these potential negative impacts were offset by the relative ineffectiveness of trade reforms in stimulating agricultural exports:

"Recent adjustment reforms probably had far less impact on agriculture than did the decline in world commodity prices, particularly for the main export crops, coffee and cocoa" (p.64)

The recession caused by stabilisation also had the effect of exacerbating poverty and worsening living conditions, especially in urban areas. Poor environmental health conditions were aggravated by the postponement of water and sanitation projects and other anti-pollution measures. Finally, the lack of a well-defined land tenure regime meant that improved terms of trade for agriculture may have simply stimulated further land clearing and degradation, while reduced government extension services hindered efforts to promote agricultural intensification and soil conservation.

The reduction in public subsidies for modern imported inputs (fertilizers and pesticides) was another reason for depressed agricultural profitability. More intensive technologies became less feasible, stimulating the traditional system of extensive agriculture through land clearing. In any case, the supply response to price stimulus is generally limited in the short term since most cash crops are perennial. Another restriction to output expansion are the labour and capital constraints facing most smallholder farmers. Therefore, the effects of adjustment policies are more likely to favour a shift to annual food crops than the expansion of cash crops onto the remaining forest land. This change is expected to have negative environmental impacts since annual crops are more destructive of soil fertility and thus require larger amounts of land under traditional shifting cultivation.

Adjustment reforms in the forestry sector focused on increasing the very low concession fees and

⁶ A criticism which is not presented in the study is that the World Bank's adjustment programs encouraged several indebted countries to invest in the same set of commodities, eg. cocoa and coffee, but failed to consider the depressive effect of a widespread increase in supply on global prices.

stumpage taxes, and instituting an auction system for export licenses. Both measures have potential positive environmental impacts insofar as they signal the increasing scarcity of timber to private firms and stimulate investment in forest management. However, while significant in percentage terms, the increase in fees was from a very low base (at prevailing rates up to 1990, all concession and stumpage fees together amounted to less than 0.25% of average FOB values), such that the increased fees were expected to have little impact on the behaviour of private industry.

With respect to industry, pollution is considered to be relatively modest and largely restricted to the capital of Abidjan. The authors note, however, that efforts to promote exports of processed agricultural and forest products may stimulate demand for raw material inputs, which could aggravate deforestation.

The overall effect of adjustment on the environment was thus mixed. Economic recession resulting from the stabilisation programme reduced the rate of depletion of natural resources, particularly the pace of deforestation linked to timber extraction and conversion of forest land to agriculture. However, increased poverty in both rural and urban areas, combined with a lack of budgetary resources for environmental protection and improvement, were considered to have had negative environmental impacts. The study assesses the probable impacts of each set of reform policies, although lack of data limit the force of the findings.⁷ The study concludes by underlining the complexity of the links between adjustment policies and the environment. Institutional factors that led to market and policy failures (mainly the quest for land) appear to have had a more significant impact on natural resource use than macroeconomic instruments.

(ii) Mexico⁸

As a major petroleum exporter, Mexico was favourably affected by the oil price rises of the mid-1970s. These windfall gains were used to support an expansionist economic policy, led by increased public expenditure. However, the resulting over-valuation of the exchange rate, increased imports and poor results from public investment undermined the competitiveness of non-oil exports, leading to ever increasing dependence on the petroleum sector (a classic case of the so-called "Dutch disease"). When international oil prices later declined, no immediate change was made in macroeconomic policy. Total public expenditure, the fiscal shortfall and the current account deficit continued to grow. The situation gradually deteriorated until 1982, when the government devalued the exchange rate by 57% and declared a six-month suspension of payments to foreign creditors.

Stabilisation and adjustment

The macroeconomic measures adopted in the following years were characterised by reduced public expenditures, narrowing the fiscal deficit, privatisation of public sector enterprises, increases in real interest rates and declining real wages. On the external side, devaluation of the exchange rate was succeeded by liberalisation of foreign investment and trade, and entry into the GATT in 1986. A massive shift of resources to the export sector occurred, including the "maquiladora" programme of industrial expansion on the US-Mexico border. By 1987 internal consensus had been reached on a package of orthodox measures, including tighter credit and reduced public expenditure, along with less orthodox policies including a floating exchange rate and administered prices for certain goods

⁷ A more precise picture is expected to emerge from a follow-up study being carried out by CIRES and IIED, with support from the Dutch Ministry of Foreign Affairs and the World Bank. The new study focuses on the implications of adjustment policies (particularly the recent devaluation of the CFA franc) on crop choice, production technology and land use change.

⁸ The Mexican study (Reed 1992, chapter 4) was prepared by LEEC based on a study directed by the Instituto Tecnológico Autónomo de México (ITAM).

and services.

The programme achieved a significant reduction in inflation, at the expense of severe recession and a massive fall in real wages, mainly in the urban public sector. By the late 1980s a recovery was under way. Thus the authors consider the adjustment programme to have been successful, pointing out the increasing confidence of the international financial community in the performance of the Mexican economy, which facilitated the restructuring of Mexico's foreign debt on a long-term basis and the establishment of a free-trade agreement with the USA and Canada.

Environmental impacts

Prior to adjustment Mexico used petroleum products very inefficiently due to subsidies on domestic fuel prices, which in turn were a major cause of the public deficit. Air pollution caused by oil-related emissions was the main urban environmental problem. Petroleum extraction was also linked to opening up ecologically fragile regions which had hitherto been inaccessible, as well as damage to marine and coastal environments caused by petroleum spills, residues and associated waste.

During the adjustment period, cutbacks in public expenditure had a significant impact on low priority spending areas, including environmental conservation. Oil exploitation increased, in the quest for foreign currency. There is little evidence, however, that exploitation of other mineral resources or of timber increased at the same time. The rate of depletion of these other resources appears to be closely linked to domestic demand, and was therefore lower during recessionary periods.

Sectoral policies had a more significant impact on environmental quality and the use of natural resources. More realistic pricing of petroleum products resulted in reduced consumption and thus also lower emissions of pollutants. Moreover, energy price reforms encouraged industry to substitute labour-intensive for energy-intensive technologies, thereby reducing unemployment and boosting incomes. The prices of certain other public utilities, such as water supply, also increased and there is a recent trend towards privatising some of these services. Both measures are expected to promote more efficient use of natural resources.

Adjustment policies also affected the pattern of agricultural production and the study speculates on the potential impacts of these changes on the pace of land degradation and deforestation. Improvements in the terms of trade for agriculture will have increased demand for land, thereby creating a potential threat of more rapid deforestation. At the same time, increased agricultural incomes may have encouraged investment by farmers in soil conservation and land improvement. Finally, devaluation of the exchange rate may have promoted perennial crops over subsistence crops, again with potential environmental benefits. Potential poverty impacts were not considered.

Industrial pollution may have decreased with higher prices for energy, but the study also suggests that the maquiladora programme has brought about environmental deterioration in the newly industrialised areas. Once again, however, a lack of data impedes precise analysis of the impacts of liberalisation and privatisation.

(iii) Thailand⁹

In macroeconomic terms, Thailand is described as having had a successful experience of adjustment. Indeed, Thailand has achieved impressive economic growth, averaging 7% per annum over the period from 1960 to 1980, and more than 12% in recent years. However, worsening income

⁹ Thailand is another case presented in Reed (1992, chapter 5). LEEC was again responsible for the final version, based on an original study conducted by the Thailand Development Research Institute (TDRI).

distribution, persistent poverty and increasing environmental problems are presented as undesirable by-products which adjustment policies were unable to address.

The main conclusion of the study is that structural adjustment appears to have resulted in more efficient use of resources and environmental degradation per unit of output. However, accelerated growth of industrial output more than offset the gains in efficiency, resulting in an overall increase in pollution and resource depletion.

The study is relatively detailed in its sectoral treatment and policy analysis was aided by the use of a CGE model. Policy reforms considered in simulations based on the model include:

- reduction of export taxes on rice and rubber
- increases in domestic energy prices
- promotion of exports based on labour-intensive manufacture
- promotion of tourism
- reduction of public sector expenditure.

Agriculture, forestry, water and fisheries

The main environmental problems associated with agriculture are deforestation, soil erosion and encroachment on protected areas, all linked to catastrophic flooding and landslides, as well as excessive use of agro-chemicals. Adjustment policies were linked to these problems through resulting changes in agricultural output and land use, and may indirectly have worsened migration and rural poverty.

Export-promotion was achieved through the reduction of export taxes, chiefly benefitting producers of rubber and rice. The environmental impacts of this tax reduction were unclear. On the one hand, reducing export taxes stimulates a switch from maize, sugar cane and cassava cultivation to rice and rubber, which are less damaging to soils. On the other hand, land clearance is stimulated, since rubber plantations typically replace natural forests.¹⁰ Although the rubber tree is more protective of the soil than other crops, rubber plantations on higher slopes and marginal lands nonetheless contribute to soil erosion. In fact, catastrophic landslides and floods in southern Thailand in November 1988 occurred mainly in areas downstream from young rubber plantations. Finally, although the expansion of rice production is not associated with additional forest clearing it does result in more intense use of agro-chemicals, hence agricultural run-off and pollution.

Taxation of fertilizer inputs and an implicit subsidy on irrigation water are also discussed. The overall result of taxing rather than subsidising nitrogen-based fertilizers had a negative environmental impact, for two reasons. Firstly, with an open access forest frontier, taxation of fertilizers raises the costs of intensifying production on existing agricultural lands, making expansion into virgin forest lands more attractive. Secondly, the use of non-nitrogen-based compound fertilizers was stimulated, despite their being less suitable for Thai soils.

The consequences of the water subsidy were more ambiguous:

"On the positive side, the implicit irrigation subsidy offsets part of the price distortion and disincentive to agriculture in general, and rice in particular, owing to export taxes. On the negative side, it results in inefficient and inequitable use of water and to varying degrees may be held responsible for water logging, salinisation, and

¹⁰ The authors estimate that for every hectare added to total cultivated area, 1.4 ha of forest is cleared.

flooding" (p.109).

Land titling was included in the adjustment programme as a spur to agricultural investment and productivity improvements. However, the reliance of the scheme on temporary, non-transferable land certificates was considered an insufficient disincentive to continued land clearing. Note, however, that migration of landless farmers to forested and marginal areas was successful in alleviating rural poverty and discouraging migration to urban areas:

"Sacrificing the forest land to alleviate rural poverty and reduce urban-rural income differentials is effectively the trade-off Thailand has made in the process." (p.123).

Adjustment policies were also claimed to have accelerated depletion of marine fisheries, through efforts to improve export performance. Harvests were stimulated by input subsidies and output price supports.

Industry and energy

The environmental consequences of industrial growth were also rather ambiguous. Earlier protectionism had fostered serious inefficiencies. Trade liberalisation and harmonisation of industrial taxes were considered essential to improving the overall use of productive inputs. Another positive aspect to the reforms was the stimulus given to labour-intensive industries, which helped to absorb surplus labour from rural areas. At first glance, this appeared to have had positive environmental consequences:

"Trade protection through the promotion of industry has been critical to the use of natural resources by influencing their industrial input, affecting the rate of migration and size of the residual rural population that exerts pressure on the natural resource base, affecting the relative profitability of agriculture, and directly determining industrial pollution levels." (p.111)

On the other hand, new industrial investments were generally characterised by poor environmental compliance. Weak enforcement of emissions standards and waste disposal regulations resulted in increased industrial pollution and discouraged the adoption of cost-effective resource recovery and recycling programmes. Note that many of the industries benefitting from export incentives were resource-based, such as agro-processing, furniture making, mineral processing and fertilizer production. Industrial growth also resulted in increasing demand for energy.

The encouragement of labour-intensive industry was expected to have positive environmental impacts, since capital-intensive technologies often tend to be more polluting. A simulation of increasing labour-intensive manufactured exports was carried out using the model, but environmental impacts were mixed. On balance, heavy industries are more polluting if all types of pollutants are considered. But certain labour-intensive industries, such as slaughter houses, tanneries and breweries, are major sources of water pollution, and others, such as electrical machinery and textiles, are major sources of hazardous waste. Hence the final balance of industrial pollution is not positive:

"Industry has changed structurally in recent years. In 1979, nonhazardous waste-generating industry represented 71% of industrial GDP, but by 1989, the figure was 42%. At the same time, hazardous waste-generating industries doubled, from 29 to 58%" (p.113).

Increased prices for petroleum products were also expected to have a positive impact on the environment. However, the government maintained a cross-subsidisation scheme favouring gas, fuel oil and diesel over gasoline products. This distortion restricted the efficiency gains from rising energy prices. A simulated increase in domestic oil and gas prices showed an overall positive environmental effect, due to a shift to less energy-intensive activities.

Services and the public sector

Although the service sector is not usually linked to environmental problems, the expansion of tourism can result in significant degradation of certain vulnerable ecosystems. This result was confirmed by simulating an increase in tourism, which revealed an increase in transport-related emissions and energy consumption. Expanding tourist-related activities (eg, hotels and restaurants) in coastal areas, and the additional waste resulting from their development, has had significant environmental implications in terms of marine pollution, destruction of mangrove forests, coastal erosion and degradation.

Problems of waste and emissions are concentrated in Bangkok, Chiang Mai and coastal tourist resorts, where public infrastructure and environmental protection are often inadequate. Although public investment in both areas was reduced under the adjustment programme, the overall environmental impact of these cutbacks is not clear. Simulation exercises using the model indicate that the deflationary impacts of a reduction in aggregate demand will depress economic activity in urban and industrial areas and thus also pollution. A reduction of domestic demand, however, will tend to favour the expansion of agricultural exports, resulting in more rapid depletion of natural resources, forest encroachment and increased agricultural pollution. Ultimately the environmental impact of reduced public spending depends on the nature of the expenditure itself. Cutbacks in environmental protection (eg, sewerage systems and waste treatment) and pollution abatement will certainly aggravate environmental conditions.

The Thailand case study concludes with a discussion of public policy failures and market imperfections which hinder sustainable development. It is argued that even if all policy failures were removed, underlying market failures would continue to provoke inefficient use of natural resources and the environment. The resolution of these market failures would have reinforced economic growth, contradicting the widespread claim that environmental protection is a brake on economic growth. Nevertheless, economic stagnation would have been far less favourable for the environment.¹¹

The authors further argue that adverse environmental impacts could have been anticipated, and appropriate policies incorporated in the adjustment reforms, in order to avoid or mitigate them. In particular, they suggest that environmental protection activities should have been undertaken as a second stage in the adjustment programme and that such corrective policies could have been implemented without compromising economic stability and growth.

¹¹ An extension of this study is currently being undertaken by TDRI and IIED. The main objective is to assess the potential economic impacts of environmental policy changes related to land and water use, pollution and congestion.

6 CONCLUSION

The diversity of opinion and evidence presented in this review suggests that the environmental implications of macroeconomic adjustment reforms are still unclear. In fact, there may be no simple answer to the question of whether adjustment programmes are generally good or bad for the environment, for the simple reason that adjustment programmes and the circumstances in which they are implemented vary so widely from country to country.

Nevertheless, there are strong parallels between the discussion presented in this paper and the earlier debate on the social costs of adjustment. This can be seen, for example, in the many studies which suggest that economic recession resulting from short-term stabilisation policies has both positive and negative impacts on the environment. The overall reduction of domestic demand can provide a respite from resource depletion and environmental degradation, insofar as resource use relates directly to the level of economic activity. However, economic recession also tends to exacerbate poverty, increasing pressure on open access resources in rural areas and feeding the human exodus to shanty towns and slums in urban areas, where people are often more vulnerable to pollution and poor sanitation. Moreover, cutbacks in government spending do not spare environmental and other welfare-related expenditures. Thus, while stabilisation may offer short-term relief from some resource management problems, it can also create or aggravate other environmental problems through its effects on poverty.

Structural adjustment policies also have rather mixed effects on the environment and natural resources. Trade liberalisation and public sector reforms can lead to more efficient use of natural resources. However, if such reforms are effective in restoring economic growth, they can easily stimulate more rapid environmental degradation. Targeted corrective measures are therefore essential as a means of avoiding or mitigating potential adverse environmental impacts. In the same way that the debate on the social impacts of adjustment has resulted in a growing awareness of the importance of poverty alleviation, the current debate highlights another area for improvement in the implementation of reform policies.

Finally, a key issue in any argument about the success or failure of adjustment programmes, or indeed about the sustainability of economic growth more generally, is the selection of appropriate indicators. Conventional measures of economic performance, such as growth in average per capita GDP, are often used by the lending agencies to justify their policy recommendations. However, it is now widely recognised that such indicators fail to provide an adequate measure of changes in economic welfare. In particular, they fail to account for environmental degradation, depletion of natural resources, income disparities and other social factors which may be adversely affected under adjustment programmes. Hence the importance of multi-factor analysis using a range of economic, social and environmental indicators. This presents a considerable challenge for future research in this area.

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