

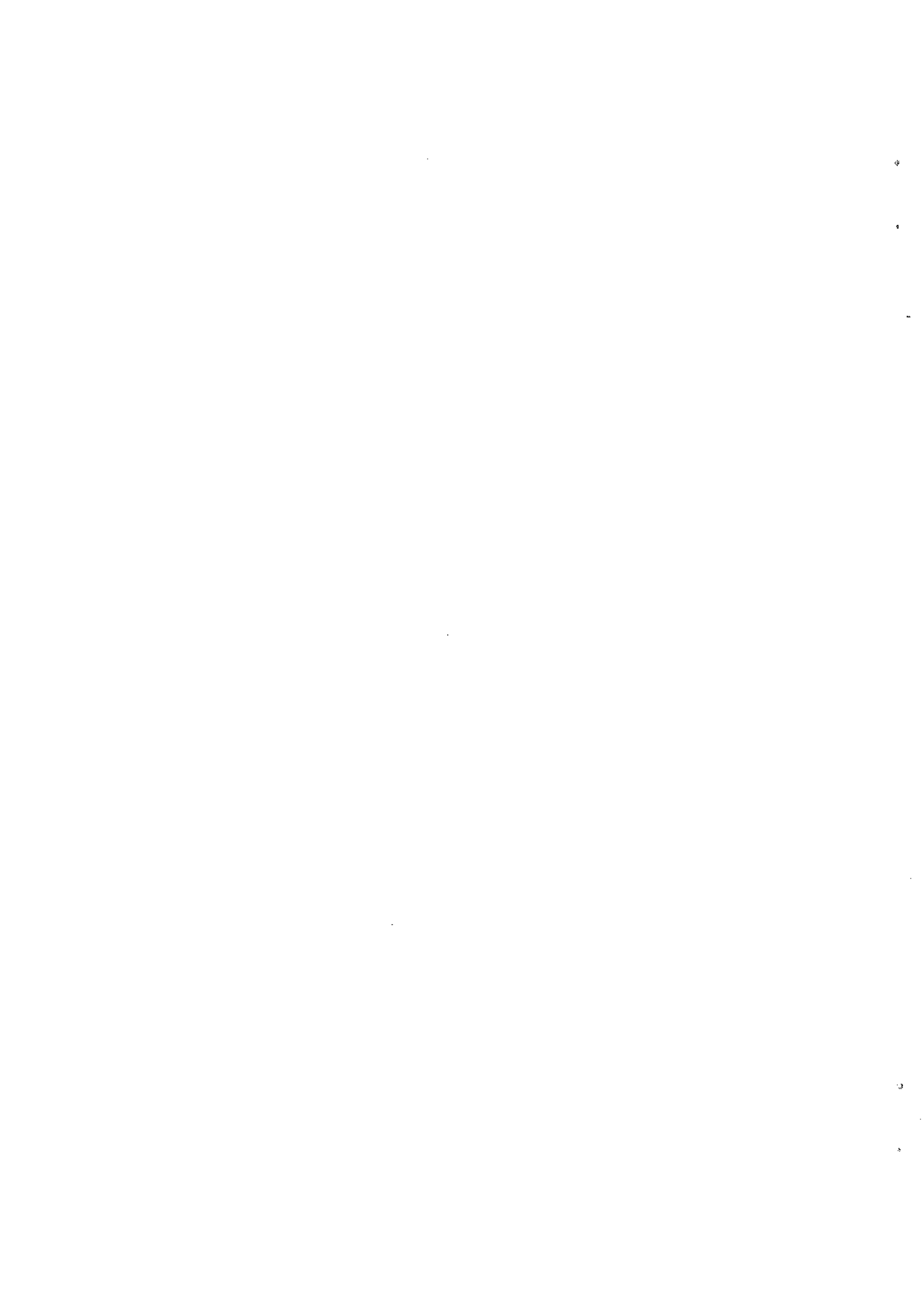
The "Non-Polluter gets paid"

Principle for Third World Commodity Exports

H.L.M. Kox

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THE "NON-POLLUTER GETS PAID" PRINCIPLE FOR THIRD WORLD COMMODITY EXPORTS

Henk L.M. Kox^{*)}

Contents

1. Introduction, 1
2. Production of export commodities and environment, 2
3. Cures and growth priorities, 5
4. The 'Non-Polluter Gets Paid' principle for integration of environmental externalities, 8
5. International Environment and Commodity Agreements, 13
6. Depletable resources and policy-induced externalities, 21
7. Conclusion, 23
8. Literature, 24
9. Summary, 27

^{*)} Faculty of Economics and Econometrics, Section Development Economics, Free University, De Boelelaan 1105, 1081 HV Amsterdam, Netherlands, tel.(0)20.548.46.30. The author thanks Hans Linnemann and Cor Wattel for useful comments on previous versions of this paper. Remaining mistakes are entirely for responsibility of the author.



1. INTRODUCTION

The report of the World Commission on Environment and Development, better known as the Brundtland report, has been a prominent eye-opener with regard to the dual relation between environment and development. It points out how economic growth and the quality of growth are influenced by the ecological issue. Besides, it shows how ecological devastation in many developing countries is amplified by poverty-led behaviour and by the need to secure foreign exchange. Production of primary export commodities is often linked with environmental damage. The current debt situation and adjustment policies force countries to increase their production of export commodities with simultaneously a further pressure on the biophysical environment. It is for this reason that the Commission expressed "the need for more effective instruments to integrate environment and development concerns into international trading patterns". (WCED 1987:84).

It becomes increasingly clear that environmental degradation does not respect national borders. From the present state of knowledge about a number of global environmental problems - a weakening 'green lung' capacity of tropical rain forests, perforation of the ozone layer and global warming, dwindling of species, and pollution of oceans with potential far-reaching implications for oxygen production by plankton - it emerges that international co-ordination and action is urgently needed. It is likely that the 1990s will see an intensification of attempts to integrate costs of environmental preservation and natural resource use in regular international price systems.

This paper is a contribution to that discussion. It argues that the creation of such an economic instrument is feasible for the most important export sector of developing countries, viz. exports of primary commodities to OECD countries. This economic device, labeled *International Commodity and Environment Agreement*, builds upon the remnants of 'traditional' commodity agreements but is, unlike the latter, not concerned with price stabilisation. It aims primarily at integration of environmental externalities in the commodity prices paid by OECD countries.

Before describing this instrument, some attention will be given to ecological damage associated with Third World production of export commodities, to attempts to value this damage, and to theoretical insights on integration of environmental externalities in price systems.

2. PRODUCTION OF EXPORT COMMODITIES AND ENVIRONMENT

The period of low prices since 1980 urged many countries to produce and export larger volumes of primary commodities in order to finance their import needs and debt. Prescriptions to increase commodity exports often formed part of the IMF readjustment package for countries with debt problems, thus contributing to further international supply imbalance and depression of export commodity prices. In a basic policy document on Sub-Saharan Africa the World Bank calls on these countries to increase their commodity exports in spite of depressed world markets.¹⁾ Export diversification programs are difficult to realize and can work only in the longer term. Many countries tried to shift towards downstream activities in the production chain (industrial processing of primary products) in order to improve their export earnings. Slow progress in this field can partly be explained by a limited propensity to invest in these activities by foreign companies, by technological problems, by the structure of international marketing and distribution of processed commodities, and in some case, by tariff escalation in OECD countries. In the foreseeable future commodity production remains a vital export sector for a vast majority of developing countries.²⁾

Some ecological effects of production of primary commodities have become a matter of international concern by now. This holds for the destructive effects of deforestation in the Amazon region and in South-East Asia. Most of this damage is caused for export of tropical hardwood logs, production of mineral resources with export destinations, and extensive cattle ranching, mostly producing for meat exports³⁾. According to the FAO agricultural extension for export-oriented agroindustry (e.g. groundnuts) can be accounted for 70 percent of Sub-Saharan deforestation. (Le Prestre 1989:170). Cattle ranching for export of meat or live animals is also a cause of overgrazing and soil erosion in many arid zones. (Myers & Tucker 1987). Overintense fishing of coastal waters and deep sea areas, often by international fishery companies, negatively affects the regeneration capacity of these eco-spheres. Sometimes it devastates the coral reefs and the sea bottom. (Swaminathan 1987).

The production of cash crops like soya, cocoa, coffee, cotton, tobacco, rubber, and sugar cane is often linked with abundant use of chemical fertilizers and pesticides, especially when production units are large. Often forests are destroyed by agricultural extension to grow these

1) "If Africa's economies are to grow, they must earn foreign exchange to pay for essential imports. Thus it is vital that they increase their share of world markets. The prospects for most primary commodities are poor, so higher export earnings must come from increased output, diversification into new commodities and an aggressive export drive into the rapidly growing Asian markets". (World Bank 1989b:13). In the light of recent historical experience these World Bank proposals seem questionable. (Kox 1990).

2) In 1988 primary commodities (including oil) accounted for more than half of total exports in 108 developing countries. In 88 countries the dependency percentage amounted even to more than 70 percent of total exports. (Unctad 1990a).

3) Export production is not always the only reason for deforestation. In some countries (e.g. Brazil) deforestation is also caused by a skewed division of land and by a government policy (e.g. Indonesia) favouring agricultural extension in remote forest regions by domestic settlers.

products. Intensive use of agrochemicals contributes heavily to pollution of the subsoil and surface waters. Moreover, it has cumulative long-term effects in the form of pesticide residuals in animal and human food chains, a diminishing biodiversity, soil erosion and falling ground water levels. The latter two consequences are in their turn important causes of desertification. (Redclift 1989; Barbier 1989; Mortimore 1989; Van Amstel et al. 1986; Pearce et al. 1990).

Export mining also contributes to soil erosion by demolition of vegetation and soil structure, especially in the case of open-cast mining (copper, tin, zinc, bauxite). Other metal mining activities create giant waste heaps or dispose toxic wastes and polluted run-off. (Blunden 1985).

Ecological effects of commodity production are felt mostly by the local population in producing countries, either directly or in the long run. Lagged effects such as soil erosion, or exhaustion of soil and water resources, manifest themselves through regular 'natural' catastrophes (land slides, floods, large forest fires, or drought). Similarly, they may appear in the form of a slow process of falling agricultural yields, causing rural impoverishment, departure for urban shanty towns, and depopulation of rural areas. Direct economic consequences of deforestation are not confined to the depletion of future timber sources. It also produces the disappearance non-timber means of existence for the local populations like medicinal and aromatic herbs, barks (e.g. quinquina), fibers, flowers, resins, fats, and other forest products.

Only a small part of harmful ecological side effects of commodity production trickles down along the international trade chain to the commodity-importing countries. This may have the form of residues of pesticides, herbicides or fungicides in agricultural commodities. These make themselves felt as health hazards for harbour, transport and manufacturing workers and, ultimately, also for consumers in importing countries.

Other, less direct effects of large-scale environmental degradation in developing countries, like those mentioned in the introduction, are only recently receiving international attention. These long-term, cumulative effects are transnational in character and can only be tackled by international co-operation.

Valuation of damage

If environmental externalities of export production are to be integrated in international commodity prices, exercises to quantify the costs of environmental degradation in the monetary dimension are indispensable. Several methods exist for measuring the costs of environmental damage. Each offers a different approach for tackling the quantification problems. Three central problems arise. Firstly, ecological effects have no natural unity of measure. This specially applies to influence on amenities. Secondly, environmental effects both have the character of externalities and of public goods: they represent no private property, are not sold in markets and their value cannot be assessed in a direct way. The third and perhaps most important issue is that ecological effects, due to their complexity, uncertainty, and to the far from complete knowledge about the complex ecosystems, can hardly be forecasted. (Turner, 1988). Non-linearity of ecological relations means that sudden vehement reactions

can occur due to small, gradual changes.¹⁾

Some methods base their estimates upon valuations derived from revealed or stated preferences of individual consumers. (Nash & Bowers 1988). Because of the public goods character of ecological effects such valuation efforts seem less appropriate. Moreover, using these methods assumes a large degree of discretionary consumer choice, which is scarcely available at the low absolute income levels prevailing in most developing nations. Preferences are influenced by income and knowledge levels, not only between individuals, but also between nations. Even if "The Polluter Pays", the admission to dump heavily polluted chemical waste in a poor African country, is probably more a function of income and knowledge than a function of 'autonomous' preferences. The willingness-to-be-compensated is therefore a dangerous standard for ecological valuation attempts in situations where large differences in income and knowledge about long-term effects prevail.

The method mostly applied for measuring environmental effects in developing countries is the *alternative costs* method. Basically, it tries to value unpriced production or resource consumption by using related economic variables that already do have a price at this moment, though sometimes in a different economic space. (Ahmad 1981; Hufschmidt & Hyman 1982). With regard to environmental costs of primary export production two variants of this method have been used.

The first variant basically counts the costs of environmental preservation that would have been incurred *if* the same production would have been undertaken in some other country with more advanced environmental regulations. Often the reference country is the United States. What is being measured, therefore, is primarily the amount of economized costs²⁾. By not demanding or by not being able to maintain the same ecological standards developing countries in fact subsidize industries and consumers in OECD countries. Walter & Loudon (1986) calculated that OECD countries for their 1980 imports from developing countries would have incurred direct pollution control costs of \$ 5.5 billion if they had been required to meet the environmental standards then prevailing in the United States. If the pollution control expenditures associated with the materials that went into the final product are also counted, the costs would have mounted to \$ 14.2 billion in 1980. In the same year Third World exports of non-oil commodities to developed market economies amounted to \$ 68 billion (Unctad 1990b), so that it is fair to speak of a considerable hidden subsidy. For two reasons the aforementioned amounts underestimate the 'real' costs of ecological damage. Firstly, because they do not count costs associated with resource depletion, and secondly because cost-price increasing environmental regulations in the reference country do not cover all ecological damage. Total ecological costs are, therefore, a multiple of the aforementioned amounts. Ironically, this very ecological 'comparative cost advantage' of Third World exporters is an argument for OECD producers to demand protectionist measures against these imports. (Ford & Runge 1990). In

1) For example, there have already been a number of unexpected ecological collapses in economically important fisheries. (WRI & HED 1986; NAS 1986).

2) Because of its basically microeconomic character the method is also used for locational decisions of transnational companies. (UNCTC 1985).

the Uruguay Round of GATT negotiations the use of environmental protectionism has been widely discussed.

A second application of the 'alternative costs' method tries to value ecological damage by counting the commercial costs which will be incurred when the destroyed environment has to be reshaped in its original condition. Estimates have been made of total costs of timber extraction and forest conversion in Indonesia during 1982. Cost elements include depreciation of the forest stock, costs of timber extraction itself (including logging damage and fires), and forgone costs of minor forest products. In Repetto, Wells et al. (1987) these costs have been estimated at a total of \$ 3.1 billion, or about four percent of Indonesian GDP that year. This estimate has been criticised as being too low.¹⁾ Several studies quantify the cost effects of soil erosion in developing countries. (Dasgupta & Maeler 1989). Production of export commodities is a major, but, of course, not the only cause of soil erosion.²⁾ The United Nations Environment Programme (UNEP) estimated the total global cost effects of desertification in arid zones at \$ 26 billion annually as a consequence of lost agricultural and livestock productivity. (Mortimore 1989). In Mali forgone farmer's incomes due to soil erosion are estimated at \$ 31 - 123 million annually, which is equal to 4-16 percent of agricultural GDP. (Bishop & Allen 1989). On-site costs of soil erosion in upland areas in Java are estimated to amount \$ 320 million annually, or three percent of agricultural GDP. Counting the costs caused by downstream sedimentation of eroded soils would add another \$ 25-90 million. (Magrath & Arens 1987).

Both variants of the alternative costs method can be criticized in some respects. In case of the first method one could remark that a perfect counterfactual case does not exist, so that additional adjustments have to be made. In case of the second method it is obvious that ecological damage will never be solely caused by production of primary export commodities. Moreover, cost-benefit methods usually treat irreversible environmental effects of projects no differently from more reversible effects, and the practice of using cost-benefit methods has therefore been criticised for strongly favouring projects with short-term benefits and long-term costs (as is often the case for environmental effects). (Goodland & Ledec 1987).

Even though some criticism is possible, the estimates made it plausible that ecological costs of commodity production are substantial and that the magnitude of the hidden environmental subsidy transferred to OECD countries, is far from trivial. This would justify an integration of environmental externalities in international commodity prices to be based not only on ecological and/or solidarity grounds, but also on economic grounds.

1) It does not count costs of a decreased protection function of the forest (watershed protection, maintenance of a micro climate, biodiversity) and lower potential tourism income. (Barbier 1990).

2) Large population pressure on the available in a region with limited ecological carrying capacity causes similar effects. Desintegration of social structures that ensured maintenance of common grounds, also contributed to overgrazing and erosion.

3. CURES AND GROWTH PRIORITIES

Abatement of ecological devastation in commodity producing countries both has a stock and a flow aspect. The stock aspects centers around the arrears in ecological 'reparations'. The flow aspect concentrates on the modalities of a different growth model that incorporates ecological preservation at an ongoing basis, while depletion of non-renewable resources is minimised.

Reparation of ecological damage caused by past production of primary export commodities in past years, will require ample funds for environmental reconstruction and protection. At a national level such funds come more and more into existence in OECD countries. At an international scale large financial efforts are necessary, but available funds are still limited. For years, the spending power of the UNEP Environment Fund amounted to only \$ 30 million. Intergovernmental negotiations in London (June 1990) produced commitments for the ozone layer conservation fund to a total of \$ 120 million. Given the extent of overdue reconstruction requirements such fund proportions are still less than modest.¹⁾ The distribution of fund contributions is a politically very sensible issue. With respect to transnational pollution processes few people will deny that industrialised countries of the OECD will have to bear the largest part of the financial burden. Given their historical share in pollution processes and their current share in consumption of natural resources this is hardly deniable.²⁾ However, when it comes to concrete commitments, large industrialised countries fail to face their responsibility (e.g. the USA in the case of CO₂ emissions). When measured by the number of international conferences on environmental issues during the last couple of years, awareness of the need for action against global environmental degradation is manifestly increasing. Minor 'reparation funds' and conscience-raising intergovernmental conferences, of which we have witnessed quite a couple during last years, cannot but only form a first phase of a much more comprehensive restructuring of international economic relations with regard to environmental issues. The World Bank³⁾ and UNEP finance a range of specific projects and programmes oriented at environmental preservation and reconstruction, but the total amount of funds is still limited. These organisations, in co-operation with NGO's and local governments, can function more powerful as channels for allocation of reparation funds to develop-

1) Ettinger et al. (1990:21-24) estimate the required total annual investment costs for dealing with the greenhouse problem at \$ 330 billion (of which \$ 100 billion to be spent in developing countries) while an additional Climate Fund of \$ 25 billion would be necessary to alleviate developing countries' current financial burden which would stem from such investments. The minimal dimension of an emergency facility of the Climate Fund is estimated to amount to \$ 1 billion. Wicke & Hucke (1989:292-304) estimate total annual costs for an 'Ecological Marshall Plan' at \$ 190 billion in 1993, increasing to \$ 651 billion in 2013.

2) In the case of world consumption of commercial energy 70 per cent of which is annually consumed by only one fifth of the world's population (WCED 1987).

3) After much criticism of its support for ecologically harmful programs as the Polonoroeste program (in the Brazilian Amazone region) and the Indonesian transmigration program the World Bank reoriented its lending policy in 1987 (Le Prestre 1989). Since then it explicitly announced a 'greening' of its projects. (Finance & Development, Febr.1990).

ing regions, if their financial means and their mandate are strengthened.

The second discussion element is how future growth patterns should look like, in order to minimise ongoing environmental damage and natural resource depletion in commodity producing nations. There is relatively broad agreement in literature (Turner 1988; UNCTAD 1990c; ECE 1990) that four categories of adjustments are required to obtain sustainable patterns of development:

1. development and introduction of production techniques and policy instruments that reduce pollution output;
2. development and introduction of techniques oriented at recycling of waste products and non-renewable resources;
3. minimising total use of non-renewable resources by shifting towards renewable resources (provided that the regenerative capacity of renewable resources is maintained), with the proper rate of exploitation of non-renewable resources being related to the availability of alternative investment opportunities;¹⁾
4. reduction of pollutive and natural resource-intensive consumption patterns.

Worldwide implementation of such adjustments (especially 3 and 4) is unlikely due to a wide divergence of interests. Developing countries do not have the same priority ranking as industrialised countries have. Their most important social-economic policy target is to raise the level of per capita income and economic growth. For them pressures to curb consumption (4) -other than for foreign exchange constraints and growth constraints- form a non-item, unless this would be coupled to global redistribution of purchasing power. A similar disagreement arises around adjustment category nr. 3. For their economic growth they need investments in (often imported) equipment, technology and intermediates, which make export earnings vital. In so far as reduction of natural resource use implies a reduction of export opportunities for their commodities, this will at least be received with mixed feelings, unless forgone export earnings are fully compensated in another way. Similar disagreement will arise with regard to adjustment category nr. 1. Because of fierce competition in overcrowded international commodity markets a constant pressure on commodity prices exists, translating itself in pressure on production costs. To the extent that alternative, environment-friendly production techniques and related policies conflicts with the need to lower production costs, their introduction will severely be hampered. Unless, again, they would be compensated for additional costs.

1) Biophysical economists (e.g. Georgescu-Roegen, Costanza, Daly, Cleveland) consider this category of adjustments as a too optimistic and partial solution for resource depletion and increasing entropy levels. (Cleveland 1987; Daly 1989).

4. THE 'NON-POLLUTER GETS PAID' PRINCIPLE AND INTEGRATION OF ENVIRONMENTAL EXTERNALITIES

From these observations it can be derived that to arrive internationally at a different, sustainable growth model adoption of the following guidelines is required for Third World commodity exporters:

- * developing countries need further growth of income and consumption per capita;
- * to the extent that retrenchment of natural resource use leads to reduction of Third World commodity exports, the latter countries should be monetary compensated for lost earnings and for the costs of diversifying their export basis;
- * incremental production costs associated with introduction of ecologically more optimal production techniques or additional measures for environment protection.¹⁾

Implementing these guidelines, which represent the "Non-Polluter Gets Paid" (NPGP) principle, should be tied to a transitional period. Given the wide dispersion of income levels among countries, the period could be fairly long for some primary commodity-dependent countries. Moreover, implementation of the NPGP principle should be shaped in such a form that it doesn't destroy the incentive for the country (and its producers) to change their export base in an ecologically more optimal way.

Market failure

Basically, the principle has two components: an adjustment component, and a financing and redistribution component. When OECD countries (and possibly some OPEC countries and NIC's) would consider it purely as a financing instrument, their contribution would be considered as a voluntary addition to their development aid. The supplement could have the form of balance of payment support, project aid and/or technical assistance. Future proportions of the contribution would be exposed to the same budgetary arbitrariness as other national development aid budgets, even if funds are channeled via multilateral organizations. They would remain a gift rather than representing a contractual obligation to pay the full price in a trade transaction. Commodity markets would continue to function in such a way that prices do not reflect the full social cost of production, and that OECD consumers gratuitously reap a part of producing countries' welfare. Technological and organisational innovation would continue to receive wrong price incentives. Environmentally undesirable consumption patterns persist because prices do not reflect real costs.²⁾ The economic signal system emits misleading hints.

1) In the case of reducing chlorofluorocarbons (CFCs) emissions, harmful for the ozone layer, this principle has already been accepted in intergovernmental negotiations.

2) Galtung's (1990) proposes to shorten pollution chains for consumers, so that these chains become more visible and tangible. He illustrates this by a provoking, but clarifying proposal to make it obligatory that exhaust pipes of cars end inside the car instead of outside. The motivation to buy only clean cars would be greatly enhanced !

Integration of environmental externalities

Adjustments necessary for sustainable development can be brought about by regulating output or inputs, supplemented by creating monitoring and policing institutions. It would introduce many aspects of a command economy with all its rigidities, efficiency losses, and disincentives for technological innovation. If, however, the capitalist market economy is to remain the dominant allocation system, as seems to be the political spirit of the age, then policies for sustainable development must be concerned about internalising environmental externalities. Adjustments will have to be brought about by price incentives from markets, either at the cost side or at the revenue side. Commodities produced by ecologically more sound techniques must either fetch a price premium or a cost advantage. Economic theory offers two main approaches for internalizing environmental externalities. Both are based on the "Polluter Pays" principle.

The first method is associated with Pigou's (1920) proposal to impose 'corrective' taxes by government so that private agents incorporate in their decisions the effect of their actions on others. Application of this remedy is not very promising with regard to Third World commodity exports. A pivotal condition - the existence of robustly operating government and tax system - is not satisfied, because there is a multiplicity of governments and tax systems. A second problem is that some form of transfer to the *damaged* parties will be needed in order to prevent an undesired lowering of total output by individual action of the producing agents. (Pezzey 1988:204-205). Furthermore, who are to be regarded as damaged parties, given the fact that it is the structure of international commodity trade that prevents Third World producers from demanding a price that reflects the full social cost. In the short term industries and consumers in importing nations are beneficiaries of transferred welfare from producing countries, so that the latter (i.e. the '*polluters*') are to be compensated.¹⁾ Pigovian taxes will not end the environmental externality, when producers take the tax costs for their own account. Whether this happens or not depends on market form and costs of alternative techniques. This hints at a final problem, the question at what level corrective taxes should be fixed so that the undesired externality will be halted. Brown Weiss (1988) pleaded for instituting international tolls on the use of common resources like seas, oceans, and air. The proportions of this toll are somewhat arbitrary, and the connection between pollution creation and the costs of environmental protection is only indirectly established. In Brown Weiss's proposal the revenues are to be used for financing clean energies and monitoring agencies.

A second cluster of approaches towards internalisation of externalities is mostly associated with an article of Coase (1960). His proposition, labeled by others as Coase's theorem, is that bargaining among agents over allowable levels of externalities achieves efficiency without detailed intervention of a central government. To attain that situation a government should

1) Paraphrasing Keynes ("In the long run we all are dead") national boundaries become irrelevant in the long term, because both country categories loose from environmental destruction.

take two steps. It has in some way or another to privatise the rights to use its amenities¹⁾, thereby ending its public good character. Also, it has to guarantee that negotiation about exploitation of these rights is costless, so that it does not involve transaction costs for any party.

The Coasian approach may be useful in some ways to alleviate the 'tragedy of the commons'. For our aim it does not seem appropriate, however, since it presupposes a national government that takes care for legal entitlements and liability rules for individual producers. (Berge 1990). In the world market there is no such supranational authority and generally accepted legal order. Neither property rights for (use of) the environment nor the claimant status of damaged parties are internationally acknowledged. Even if would, the second step (eliminating transaction costs for individual negotiations) could turn out to be very expensive. Widely diverging bargaining power positions in international commodity market would have to be smoothed.²⁾ Finally, Coase's approach has been criticized because of it presupposes that bargaining parties take a long-term view and are not chasing short-term gains (Cooter 1989).

For our purpose the main flaw of both traditional approaches is their national orientation and the basic presupposition of central (government) authority that is able to function as a unity. Internationally this precondition does not apply. In the sphere of regulations on specific topics the function of an integrative central authority could be reached by intergovernmental agreements and covenants. As long as the United Nations do not have a supranational status, international treaties and covenants are the only possible way. Some progress has been made among industrialised OECD countries and European Community members, e.g. national fishing quota, national quota for chlorofluorocarbon (CFC) emissions. In OECD countries a large number of environmental policy instruments associated with the "Polluter Pays" principle are being developed. (Opschoor & Vos 1989). Internationally, such instruments are non-existent so far. A main stumbling block for international treaties that apply the "Polluter Pays" principle is probably the distribution of income among nations. Problems occur when they are to be extended to countries in very different states of development and different priorities with respect to environment and protection of natural resources. (Opschoor 1990). In this situation it seems more promising to endeavour to conclude international treaties incorporating the "Non-Polluter Gets Paid" principle.

With regard to primary commodities international treaties regulating this trade do not have to start from scratch. A tradition of toughly negotiated international commodity agreements

1) This could be done by pollution taxes, by auction of pollution permits, and by distributing licenses that specify a maximal pollution emission per company. (Siebert 1987:91-98; Pezzey 1988).

2) The 'Coase theorem' states that the allocative result of negotiations will be independent from the initial distribution of property rights. It has been criticised because the negotiation result is not independent from income distribution between parties. It is evident that between trading agents in a given commodity chain wide differences in negotiation power can coexist, e.g. between large transnational trading companies, local governments or marketing boards, and small farmers. Correction of these differences by a government can be expected to be expensive. Moreover, there is no intrinsic reason to limit the set of parties that are damaged by externalities, to only production units. A similar status could be claimed e.g. for forest inhabitants whose existence and territory is distressed by timber production.

exists. An important characteristic of those agreements is that they established links between production, consumption, and trade conditions of specific primary commodities. The rest of this paper will be devoted to possibilities for internalising of environmental externalities in international commodity prices by similar international agreements.

Environmental premium

Though powerful ecology movements hardly exist in most Third World countries, their governments are more and more aware of the need to minimize damage to the environmental resource base that supports their commodity exports. Given the need to continue the flow of export earnings, better environmental care will have to come primarily from the use of ecologically more optimal production techniques that have already been developed elsewhere. In agricultural and forestry technology increasing attention has been given to the development of non-chemical forms of pest management (integrated pest management), 'green' fertilizers to replace (most) chemical fertilizers, harvest rotation, use of low-input varieties, mulching, integration of agriculture and forestry (agro-forestry), and systematic reforestation. In hilly areas economic self-interest and ecology can be combined by helping farmers shift from grain to tree crops by providing them with advice, equipment, and marketing assistance. (Ghatak 1988; Pearce et al. 1990). Sometimes it will be necessary to supplement commodity production with additional production to neutralise harmful effects, like sewerage systems, water cleaning and other forms of waste clearance, anti-erosion dikes and other sedimentation techniques. Irrigation techniques can often be optimised so that better use made of available water resources. (Barbier 1990).

In mining, especially in developed countries with stiffer ecological norms, exploitation techniques have been developed and applied that do less harm to the environment: construction of waste water reservoirs; air and water cleaning; refilling of open-pit mines; various forms of erosion abatement, like storage and reconstruction of removed top soils; systematic reforestation.

Existence and feasibility of alternative techniques can only be established on a commodity-by-commodity basis, often with necessary region-specific modifications. This being done, it is possible to establish how alternative production techniques influence initial investment and operating costs, relative to current techniques.¹⁾ More probable than not, such alternatives will demonstrate to be more expensive, because additional cost elements are included while not being matched by a proportional increase in productivity. A price premium for commodities produced in this way is required to cover extra costs, specifically for the recurrent element of extra costs. For brevity's sake this price premium will be labeled *environmental premium*. A practical form of internalisation of externalities would be to get this premium included in the commodity's world market price.

1) A range of alternatives may have to be considered. A study of a large number of Canadian mining sites for non-ferrous metals over the period 1951-1974 evaluated the economic effects of water pollution control for 'standard' and 'best-possible' techniques. pollution control measures necessary under the prevailing governmental regulations amounted to 3-10 per cent of total mine investment and 2-5 per cent of operating costs. However, if the best possible water treatment schemes (given known technology) would be employed, the figures would rise to 13 per cent of total investment and 8 per cent of operating costs. (Blunden 1985:53).

When it comes to application of an environmental premium, the question arises whether it should be a generic or a differentiated mark-up on the 'free market' commodity price. A differentiated level could reflect different rates of cost increase in various producing countries, but it would at the same time introduce redistributive elements. In order to keep interference with market prices as limited as possible a differentiated level is less desirable. Besides, it would require additional administration and bureaucracy. A generic level of the environmental premium, with the same nominal proportions for all countries, is preferable, therefore. It has to be recognised that, for two reasons, a generic premium level works out differently for various producing countries. Firstly, there will be differences in ecological side effects of production in various countries. In some countries a generic premium will not completely compensate all incremental costs abatement of pollution and other undesired side effects of commodity production. At the same time, a generic price increase will in some countries overcompensate such cost increments, thus contributing to a higher average profit margin for these exporters. This differential effect reflects comparative ecological advantages.¹⁾ These cannot be expected to correlate in a systematic way with production scale. Yet in a second way does a generic environmental premium on the world market price work out differently for various exporting countries. This is a consequence of economies of scale in pollution abatement. To the extent that alternative technologies are characterised by indivisibilities and cause discrete additions to fixed investment requirements, large scale producers enjoy the advantage of sinking fixed unit costs. This is illustrated by Figures 1 and 2 on basis of a random numerical example. In Figure 1 (next page) the magnitude of the environmental premium is fixed in such a way that the relation between average unit costs (AC1, AC2) and world market price (P1,P2) is left unaltered for the marginal producers, i.e. those exporting 15,000 units per year. The black bars (old situation) and crosshatched bars (new situation) indicate unit profit margins, and show economies of scale in pollution abatement. In Figure 2 the level is determined by the principle that the profit margin for the 'average' producers (say those producing 25,000 units annually) should be left unaltered. The unit price in the second case is slightly lower thus causing some marginal producers to drop out. Depending on the relative weight of fixed costs in pollution abatement, and depending on the supply conditions, this very effect may bring policy-makers to choose for the first option.

1) Differential effects on profit margin tends to stimulate production in countries with a comparative ecological advantage, and thus invokes a change in international supply conditions of the commodity. On the other hand, the eventual form of the IECA should be such that it does not form an incentive for exporters with a relative disadvantage to dismiss cost-increasing pollution abatement and other environment preservation measures.

Figure 1

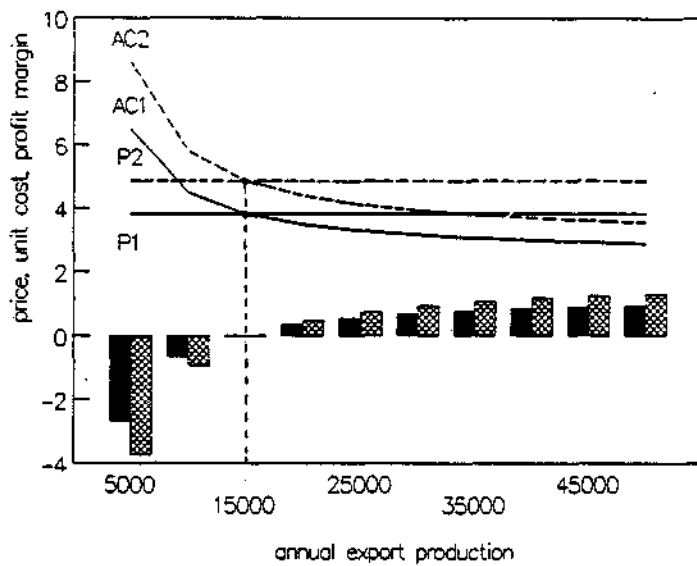
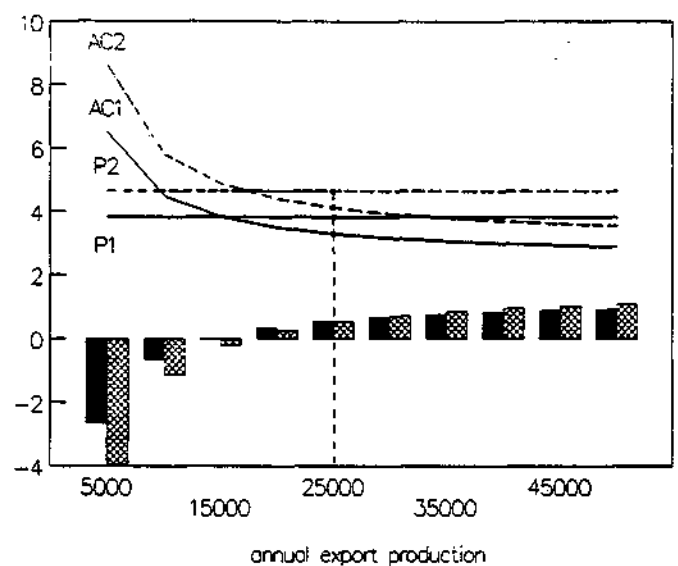


Figure 2



5. INTERNATIONAL ENVIRONMENT AND COMMODITY AGREEMENTS

In a situation where many debt-ridden Third World countries compete each other with the same commodities and try to increase their export volumes, it will be hard to realize the environmental premium. International trading houses, manufacturing firms, and other importers in developed countries skillfully play the 'Divide et Impera'-game, thus contributing to the same effect. The free market solution seems to offer meagre prospects. International arrangements and market regulation form a prerequisite for internalisation of the environmental premium.

International commodity agreements belong to the scarce institutional forms for regulation of international markets. For some commodities (wheat, tin) international arrangements were already in function before World War II, though most of them stem from the 1970s. Usually two types of these intergovernmental agreements are discerned: those with, and those without economic mechanisms (like manipulatable bufferstocks and quota systems). The former are called *formal* agreements and aim at stabilising the world market price of the commodity. Moreover, and this they have in common with *informal* agreements, they specify guidelines

for exchange of (statistical) information on production, trade flows and consumption of the commodity, and for promotion of new commodity applications.

At the 1976 Nairobi Unctad conference some agreement was reached on an Integrated Programme on Commodities (IPC) that should (1) improve the position of Third World commodity producers and, at the same time, (2) stabilise commodity prices. It would contain an \$ 11 billion common fund to finance buffer stocks to support - by an equal number of formal commodity agreements - the prices of some 19 primary commodities. (Later on this was reduced to ten 'core' commodities). The atmosphere in which the original agreement was reached, was certainly influenced by the successful actions of OPEC and high prices for many other commodities. OECD countries were most interested in the second objective. From a theoretic angle the potential dissonance between both objectives was pointed out in an early phase.¹⁾ As time went on disagreement increased on the relative weight of both objectives. When, with a time lag of ten years, the common fund' became ratified by the required minimum number of countries and received the required minimal amount of pledges for funds, its proportions had been reduced drastically (to about \$ 0.5 billion). Formal agreements were concluded for sugar, coffee, natural rubber, cocoa and tin. Most of them have been discontinued since then. Disagreement between producing countries and/or non-participation of important consumer countries led to disintegration of the cocoa and coffee agreements. In 1991 the only remaining effective formal agreement is the International Natural Rubber Agreement.

The collapse of the International Tin Agreement in October 1985 revealed painfully that it is impossible to maintain a stable reference price at a high level against secular market trends. The financial burden of increasing bufferstock proportions increases beyond the level that not only consumption countries but also producing countries are prepared to carry. The last agreements for cocoa and rubber both included a mechanism for periodic adjustment of the reference price to 'free' market prices. Falling commodity prices²⁾ and subsequent balance of payment problems of many producing countries during the 1980s placed the need for stabilisation of export earnings again on the international agenda. Rather than returning to the original commodity agreements, there is increasing support for the vision that stabilisation of *export earnings* is better served by international compensation arrangements. Examples exist in the form of the IMF Compensatory and Contingency Financing Facility and the Stabex arrangement of the Lomé Treaty. Both offer financial compensation for loss of export earnings due to commodity prices fluctuations.

In spite of their decreasing international popularity it must be recognised that international

1) Only under special conditions will measures for price stabilisation simultaneously increase or stabilize incomes of producers in developing countries. "Our main conclusion is that price stabilisation schemes have limited efficacy in stabilizing the real spendable income of producing countries and that most of the other benefits associated with the stabilization schemes are transfer benefits which, in many cases, seem to benefit the consuming countries at the expense of the producing countries." (Newbery & Stiglitz 1981:39-40).

2) In 1989 the average real price of non-fuel commodities from developing countries was only 78 percent of its 1980 level. (IMF 1990:27).

commodity agreements belong to the very scarce international institutions capable of establishing direct links between consumption, trade and production. This capacity makes them potentially useful instruments for integration of environmental issues.

Up to now only one commodity agreement, namely the International Tropical Timber Agreement, explicitly includes environmental aspects. In the timber agreement member countries are encouraged "to support and develop industrial tropical timber reforestation and forest management activities". Another of its seven objectives is "to encourage the development of national policies aimed at sustainable utilisation and conservation of tropical forests and their genetic sources, and at maintaining the ecological balance in the regions concerned". (UNCTAD 1983:2). For the realisation of these objectives R&D projects in the field of reforestation are promoted, while one of its three subcommittees concerns itself with reforestation and forest management. The Agreement encourages member countries only on a voluntary basis to promote environmental protection and reforestation. It includes no provisions for directly linking costs of forest reconstruction and timber prices. The need for such instruments is becoming evident, since deforestation continues worldwide with little regard to operational forest management and sustainable timber production. (Poore 1989).

Integration of environmental protection elements in such agreements can be extended beyond the terms included in the timber agreement. Intergovernmental negotiations could be used to find agreement on integration in commodity prices of an environmental premium to cover costs of alternative production techniques or environmental reconstruction expenses in producing countries. To distinguish this new type of agreements from earlier experiences we propose to label them *International Environment and Commodity Agreements* (IECAs). A number of preliminary steps are necessary before International Environment and Commodity Agreements (IECAs) can become active. They can be ordered in two phases, a research phase and a negotiation phase.

Preliminary steps

During the research phase rather detailed technical and economic studies are required relating to ecology, production and functioning of markets for a specific commodity. Five sub-themes can be specified:

- a. Inventarisation and quantification of ecological effects of its export production. Effects will be formulated in terms of several relevant indicators and measures (continuous or discrete) that are relevant for this commodity. (e.g. Nijkamp 1989; Nash & Bowers 1988).
- b. Assessment of relevant alternative production techniques and additional measures that would limit the most important negative environmental effects, with an indication (on purely technical criteria) of a time path for implementation.
- c. Appraisal of economic effects of alternative production techniques and additional measures, with regard to production costs and production volumes. This has to include a tentative assessment of effects on import requirements, employment and production regions. For the best alternative techniques the incremental cost price relative to costs under current techniques has to be established, thus indicating the magnitude of the

gross price markup that will be necessary. Incremental cost effects in some important export countries must be estimated.

- d. Investigation of probable substitution effects that may occur in consuming countries and industries as a consequences of the estimated gross price markup.
- e. Assessment of the optimal form in which the environmental premium is to be institutionalised, i.e. import levy or export tax (elaborated in a later section), and formulation of proposals for procedures, checks, monitoring agencies, and fund management.

For the four first sub-themes it may be necessary to differentiate between the main producing countries. The study on fourth sub-theme should specifically pay attention to the reaction of all relevant economic agents. From the point of view of consumers the price markup, in whichever form it is levied, functions as a turnover tax on the international price of the commodity. Because of the small part of commodity prices in the costs of most final products, substitution effects on the consumer side tend to be small. Most substitution effects may be expected from manufacturing agents and large importers. How price elasticity affects their demand for the commodity has to be estimated by considering cross elasticities for viable substitutes.

On basis of reports on ecological effects (a), technical-economic studies (b,c) and expected market reactions (d) proposals have to be put forward with regard to implementation priorities of alternative techniques and the associated level of the environmental premium. In the fifth sub-study attention it should be considered if and how the Common Fund for Commodities and Unctad's IPC programme could facilitate introduction of an International Environment and Commodity Agreement.

Negotiation issues

The negotiation phase builds upon the results and proposals of the first phase. Most probably, the studies will contain a number of variants rather than clear-cut, unambiguous conclusions on the issues involved. Across various diverging interests - between producing and consuming nations, between producing countries with different production conditions, between ecological action groups, governments, and established interests in commodity chains (like transnational companies) - agreement has to be reached on a number of issues. The most important of them are:

* *Decision criterion for determining the magnitude of the environmental premium* . If a generic premium level is preferred, it has to be decided which reference countries will be used for determining the increase in average units costs due to alternative techniques, and the required price mark-up. Should the premium level be such that marginal producers are kept in the market or should 'average' producers be taken as benchmark.

* *Levels of unacceptable ecological damage*. Which types and levels (for all relevant criteria) of negative environmental externalities should be abated ? Discussion can be expected on policy-induced versus 'average technology'-induced ecological damage (elaborated on in a following section).

* *Magnitude of the environmental premium.* Having established the reference countries, the ecological effects that have to be neutralised, the incremental costs (given known technologies), it is possible to fix the level of the environmental premium. Some other considerations may enter the discussion, however.

For producing nations a trade-off exists between ecological damage and the potential loss of export earnings which is likely given a certain price elasticity of commodity demand. Their attitude depends among other things on the availability export diversification alternatives.

For consuming nations a trade-off exists between current cheap commodity supply versus tolerating further ecological damage in producing countries that bolsters future threats to the global ecosystem. It is to be expected that on some issues their tolerance levels will be lower, namely in cases where immediate health damage may be caused in consuming nations, e.g. due to pesticide residues in agricultural commodities.

* *Indicator of reference price.* If the level of the environmental premium is fixed on basis of average price-cost margins in the situation before introduction of alternative techniques, then it has to be decided which price indicator will serve as reference price. One could use an existing, internationally used price indicator at certain agreed point in time or a weighted international price trend that is calculated in an agreed way. Also the frequency of adjustment to new reference price levels has to be decided upon.

* Finally, governments must achieve an agreement on a number of questions relating to the *institutional form* in which the price markup will be introduced (import surcharge, export tax or other forms). Associated with this conclusion are decisions on *monitoring system, government representation, and sanction procedures* to guarantee that the price premium will be paid and that resulting extra earnings will be allocated to expenses for environmental reconstruction and conservation as agreed upon in the agreement. Finally, some dynamic procedures¹⁾ must be endorsed.

The negotiation process draws heavily on a well-understood long-term self interest of nations. The most important divergences of opinion will probably spring from short-term interests and regional or country-group egoism. An essential negotiation element will be how to cope with *free riders*. If countries systematically share the benefits of an International Environment and Commodity Agreement (IECA) without carrying part of its burden, this forms a time bomb under the agreement. Free-ridership can occur both between countries and within countries. Handling this problem will be a important determinant in the choice of the eventual institutional form of the IECA.

1) The magnitude of the price markup is determined by several variables of a dynamic nature: technical innovation (feasible alternative production methods), changes in the international reference price, and price developments of commodity substitutes. As part of a monitoring system a subcommittee of the International Environment and Commodity Agreements may be charged with a permanent review of ecological, technological, and economic conditions in the commodity branch. The subcommittee could periodically present proposals on necessary adjustments of the price markup.

Import levy and other implementation alternatives

The environmental price mark-up can be levied in several forms, each having its own advantages and disadvantages. Because it is a premium on top of a 'given' world market price, and because regards a form of international redistribution, it seems obvious to charge this levy when commodities pass a border. This may be the border of the exporting country or that of the (ultimate) importing country. In the first case it has the form of an export tax, in the latter case it is an import toll.

The *export tax variant* has two less attractive implications. One implication is that commodity-importing Third World countries will also face a higher import bill. If the international community agrees on the principle that most of the financial burden of the environmental reconstruction and conservation will have to be borne by the OECD countries, additional measures have to be taken. The most direct way to elaborate this principle could be a compensatory fund.¹⁾ Secondly, guarantees have to be created against free riding by exporting countries. Free riding behaviour can occur by either not levying the export tax (to secure extra market share) or by using the revenues for other purposes. Since these funds are fungible, it is tempting to simply add them to general profits of the exporting companies, or to general public revenues. To prevent such forms of free riding the IECA Secretariat (or an auditing committee of it) should have the right to inspect:

(a) *exporting companies*, to check whether the price markup is actually charged by the exporter and whether these revenues were reserved and used for the right purposes. Moreover, the origin of exported commodities has to be verified, in order to prevent misuse by reexport or blending of commodities from countries where no export tax is levied.

(b) financial transactions of producing countries' *national government* related to the export tax. The auditing task would be facilitated by creation of a special account or administrative body for transfer of funds from the price markup.

(c) *production locations*, to verify whether ecologically more sound production techniques and processes are being implemented.

The inspection committee or IECA secretariat would report any irregularity and would formulate proposals for corrective steps to the government of the exporting country. Some arbitration and sanction rules will be required. If a government and the IECA don't reach agreement a problem arises.²⁾

A preliminary conclusion may be that implementation in the form of export taxes is marred by additional measures and international bureaucracy. Auditing procedures may easily interfere with national sovereignty feelings of producing countries. None of these problems arise

1) The fund could be fed by direct contributions of OECD members and more developed NICs, or by transfer of part of export tax revenue from the exporting countries. Contributions could be proportional to either their exports or imports of the commodity. Management, proportions, and drawing right are to be settled separately.

2) Juridical enforcement of IECA-rules is only possible by a litigation in a court in the country with which a dispute exists. Internationally, only arbitrage (e.g. for the International Court of Justice in The Hague) can be hoped for. (Cf. Stein & Grenville-Wood 1985). However, juridical enforcement seems not the most appropriate way to regulate an escalated major conflict, as actual economic functioning of the IECA in many cases will be enfeebled before a settlement is reached.

with the *import levy variant*.

Charging the environmental premium at the border of importing countries makes it possible to charge only OECD countries, and perhaps some NICs and OPEC countries. The import surcharge should be commodity-specific and will have to be paid by importers in commodity-importing developed countries. They pay a fixed amount per quantity imported to the fiscal authorities of their national government¹⁾. By levying on a generic basis on all imported quantities, the need to check for origins (due to re-export) is eliminated. It also thwarts the incentive for free-ridership on the side of exporting countries. Governments of importing countries periodically transfer the revenues from the surcharge to a special environment fund, administered by the IECA board. Exporting countries and a statistical department of the IECA secretariat together assess annual total export volume and its country destinations. On basis of this, with a correction for re-exports, the gross payable amount for each importing country is easily assessed. Free riding by importing countries will be difficult. Governments of producing countries can make drawings from environment fund, with maximal drawing rights proportional to their export volume. Definitive remittance of allotted funds is dependent upon the content and soundness of the proposals put forward by governments. The financing proposals formulated by governments (perhaps on behalf of exporting companies in their country) concern specific projects for additional investments in ecology-friendly production methods, subsidy programmes for use of alternative production methods or inputs²⁾, and local environmental preservation projects in commodity-producing areas. The IECA could offer technical, organisational and economical assistance to governments to help them formulating feasible proposals for funding. Evaluation of project proposals by the IECA could be based on: expected ecological effect, technical and organisational feasibility, effectiveness of earlier fund disbursements to the country.³⁾

In current economic practice initiatives for creation of import levies for environmental purposes have seen their debut. It regards the European tropical timber trade, which is feeling . European timber trade organizations, feeling a growing public pressure to limit import of tropical hardwoods. Timber traders are themselves becoming increasingly aware of the fact that future tropical timber sources become insecure, as countries like the Philippines have already abandoned timber exports. (Blackwell 1991). Now organisations of timber importers in several European countries (e.g. United Kingdom, Netherlands) are becoming aligned with

1) Customs clearance in the port of entry should be the determining criterion. It avoids troubles with differences between physical and non-physical (futures) trade.

2) In case of commodities where production is dominated by small scale producers, governments need programmes that offer subsidies for implementation for specific production methods and inputs. In the implementation of such programmes land extension services or local authorities can play a role. To the extent that production methods and or input use during production can be diagnosed in the product itself (e.g. chemical residues) commercial channels in the country (purchasing companies, exporters) can play a useful role in distributing the premium to producers that apply the beneficial production techniques. The ecological properties of the product, possibly in the form of a hall-mark, become a regular quality attribute along with other quality characteristics.

3) Evaluation procedures should be as short as possible, with limited bureaucracy. Use of contracted experts by the IECA secretariat could serve this objective.

some environment conservation groups in lobbying their governments for a surcharge *on the import prices* of tropical hardwood. This surcharge (extra import levy) will be used to fund - through the International Tropical Timber Organization - the development of sustainable tropical timber resources. If such a system comes into existence exporting countries can make drawings from this fund for reforestation projects.

Compared to the one based on export taxes the import levy variant has as relative disadvantage that the connection between commodity export production and implementation of environment-preserving techniques becomes less directly. Internalisation of environmental externalities in world commodity prices is accomplished in an indirect way. This relative disadvantage is, however, more than compensated by being relatively easy applicable and by limiting possibilities for free riding.

Success of International Environment and Commodity Agreements (IECAs) will partly depend on some product and market characteristics. The commodity must have a certain degree of homogeneity regarding quality and variety. The main producing and consuming nations must participate in the agreement, so that market transactions outside the sphere of the IECA can be limited in magnitude and number. Stable supply conditions must prevail, so as to avoid sharp discrepancies between (a) the interests of traditional producers and newcomers, and (b) sharply diverging production costs in the different producing countries. The demand side of the international market should have some stability. Dominating market positions of large trading houses or commodity speculators that benefit from the continuation of highly volatile prices are an unfavourable factor. Strong volatility of prices creates extra problems for assessing levels and total amounts of environmental price levies. In cases where supply and demand side of the commodity market are dominated by one or a small number of transnational corporations regulating a large part of international transactions on an intracompany or semi-intracompany base (i.e. by vertical integration or long-term supply contracts) some extra audit measures by the IECA board will be required. This situation would not necessarily constraint success, provided that a comparison is possible with an accepted international arm's length price, and provided that involved governments have adequate statistical or customs services for monitoring their international trade, so that the freedom to manipulate intracompany prices is limited.

6. DEPLETABLE RESOURCES AND POLICY-INDUCED EXTERNALITIES

The IECA model which has been described so far, only takes into account *current* costs for environmental protection and reconstruction. It does not offer a solution for depletion of non-renewable resources, though this issue is important in the cases of tropical timber¹⁾ and mining products. Non-renewables have intentionally been left out of consideration for both theoretical and practical reasons. Assessment of the optimal depletion path implies a number of highly disputable valuation questions. One concerns intergenerational equity: how should time preference of current consumers be valued against the demands of all future generations? How should the latter be discounted? In which way will future generations deal with the skewed historic-geographical distribution of the consumption of depletable natural resources? What are the current value implications of future technical innovations in recycling, material-saving and the use of non-scarce natural substitutes? Even without these issues accomplishment of IECAs will put a strain on international willingness to compromise, and on the long-term vision of national governments in producing and importing countries. In order to avoid a paralysing international dispute on these matters, it seems preferable to make a start with a price markup that allows current suboptimal techniques to be discarded or minimised in the production of primary commodities in developing countries. If experience with IECAs is satisfying, an atmosphere may be created in which it is possible to reach international agreement on price markups or other instruments that explicitly deal with economic valuation of non-renewable resources.

Apart from the non-renewables issue, discussion on IECAs will be complicated by similar existence of negative ecological externalities caused by market failure (public goods, absence of negative prices for pollution products) and those caused by wrong policy. International Environment and Commodity Agreements are set primarily for the first type of externalities and do not offer a solution for the second type. This is not to say, however, that the second type of externalities is not important in relation to the production of primary export commodities. In many developing countries degradation of environmental quality is encouraged by and even subsidised by local governments, some times in co-operation with foreign donors and companies. (Le Prestre 1989:170; Pearce et al. 1990; Gillis & Repetto 1987).

The role of governments can differ very much between one commodity and another. Two poles can be discerned, between which a large number of mixed cases exists. On the one hand we find commodities of which production is based on concessions given out by governments. This is often found in mining and forestry. Government policies that regard deforestation or mining development primarily as economic extension projects, and accordingly subsidise them, without much regard of ecological aspects, cause negative environmental externalities

1) It is not so certain that tropical timber can be regarded as a renewable resource, like for instance is true in case of most coniferous timber varieties. This uncertainty stems from the long growth cycle (40-150 years) for many popular tropical hardwood varieties, the vulnerable ecology of tropical rain forests, and widespread lack of success - except in case of teak - of attempts to regenerate the logged varieties. (Gillis et al 1987:522).

of a policy-induced nature. Large infrastructural projects by governments often explicitly aim at opening up natural landscapes and rain forests for concession areas. For instance in Gabon and Brazil this has contributed to ecological degradation of rain forests. Allotment of short-term concession encourages short-term behaviour, submaintainance of the concession base, and neglect of lagged ecological consequences. In the case of concession-based commodity production governments have powerful and rather direct tools for compelling allottees to observe certain ecological conditions for exploitation. In Malaysia, for instance, the government requires introduced a hall-mark for export timber, ensuring that concessionaires produced it by sustainable forestry methods. Ecological degradation of concession areas could be reduced by stricter control of concessionaires and prohibitive financial penalties in case of harmful exploitation.

At the other extreme we find commodities predominantly produced by small, decentrally operating small producers, like is often the case with coffee and cocoa. Governmental grip on this type of commodity production is much more indirect, yet not absent. Via extension services, marketing boards, pricing policy, subsidies for fertilisers, pesticides and high yielding varieties, and rural credit policy government already influences production conditions. This set of instruments - incentives and disincentives - can also be used to foster ecological preservation. Existing commodity purchasing channels (exporters and local merchants) can get a useful complementary role once if they can be persuaded to include ecological quality standards in their overall quality monitoring.¹⁾ Increasing the availability of rural credit at affordable rates and terms could relieve ecological strain and allow proper investments in conservation, particularly for marginal farmers, that now often overexploit their soils and environment due to lack of (income) alternatives. Extension services could play an important role in dissemination of ecologically more appropriate techniques (e.g. integrated pest management, ploughing techniques) and more appropriate varieties. There is a role for governments in developing local agronomic research on more appropriate production techniques.

An important consequence of growing international attention for environmental problems is probably that unwanted and unanticipated ecological effects of government policies in developing countries will be reduced in the future. The World Bank 'ecologised' its policy since 1987 and now supports transfer of sustainable production technologies to Third World governments. Given this change in awareness it can be expected that, internationally, the accent will shift more and more to environmental externalities that are caused by market failure, rather than wrong government policies.

1) This could be facilitated when a government would subsidise distribution of simple and cheap technical devices for testing of biocide residuals in products. For their support it is crucial that ecologically high quality products fetch a price premium.

7. CONCLUSION

Damage to ecosystem in developing countries is often related to production of primary export commodities. Education and conscience-raising programs may increase awareness of side effects of production activities. But it will not necessarily stop negative environmental externalities associated with export production. Government policies for raising export income may even increase such effects, because environmental concern tends not to be put in the first place of their priority rankings. Economic growth and poverty abatement objectives are generally considered far more important, although ecological concern is manifestly increasing in most developing countries. Economic growth requires investments and imports, for which foreign exchange earnings by primary commodities exports are vital in many developing countries. Given this need for a continuing flow of export earnings, introduction of more ecology-friendly production techniques will only be possible if producers would be compensated for the extra costs of such techniques. This would require the adoption of the "Non-Polluter Gets Paid" (NPGP) principle in international commodity trade between commodity-exporting developing countries and industrialised countries. Growing awareness of transnational threats to the global ecosystem increases the latter countries' willingness-to-pay for environmental preservation in vital areas like conservation of the world's stock of rain forests. Therefore, a climate is coming into existence in which adoption of the NPGP principle is becoming feasible. In international negotiations on ozone layer depletion and global warming effect this principle is on the brink of being adopted.

Apart from a generic application of the principle, e.g. in the form of a Climate Fund or a separate fund to help less developed countries ban CFC-gasses, it can also be used to integrate environmental externalities in prices of primary export commodities. Commodity prices do not reflect real costs of environmental destruction, which is to a large extent due to market failure. In this paper it is argued that the NPGP principle could very well materialise in the creation of International Environment and Commodity Agreements (IECAs). Such agreements would incorporate procedures and institutions for putting an environmental premium on top of existing commodity prices. This ecological mark-up would primarily be used to finance alternatives techniques and measures that allow environmental conservation and reconstruction in commodity producing areas. The most appropriate form for levying the environmental premium is probably that of an import surcharge in importing countries, but introduction of an IECA will require additional research for each specific commodity. Successful application of the NPGP principle in International Environment and Commodity Agreements will function as an example for wider approach to integrate environmental externalities in world market prices.

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9. SUMMARY

Damage to ecosystem in developing countries is often related to production of primary export commodities. Awareness of negative side effects of commodity production is not a sufficient condition to reduce such practices. In developing nations environmental concern generally is not put in the first place of governments' priority rankings. Economic growth and poverty abatement objectives are considered far more important, even though ecological concern is manifestly increasing. Economic growth requires investments and imports, for which foreign exchange earnings by primary commodities exports are vital in many developing countries. Given this need for a continuing flow of export earnings, introduction of more ecology-friendly production techniques will only be possible if producers would be compensated for the extra costs of such techniques. This would require the adoption of the "Non-Polluter Gets Paid" (NPGP) principle in international commodity trade between commodity-exporting developing countries and industrialised countries. Growing awareness of transnational threats to the global ecosystem increases the latter countries' willingness-to-pay for environmental preservation in vital areas like conservation of the world's stock of rain forests. Therefore, a climate is coming into existence in which adoption of the NPGP principle is becoming feasible. Though several forms for application of the principle can be thought of, the paper pays special attention to an institutional form that integrates environmental externalities in prices of primary export commodities. Commodity prices received by developing countries, seldom reflect real costs of environmental destruction. By creation of International Environment and Commodity Agreements (IECAs) this situation could be changed. IECAs would incorporate procedures and institutions for putting an environmental premium on top of existing commodity prices. This ecological mark-up would primarily be used to finance alternatives techniques and measures that allow environmental conservation and reconstruction in commodity producing areas. After describing some variants and limitations, the paper shows optimism about future chances for International Environment and Commodity Agreements. This application of the "Non-Polluter Gets Paid" principle could form a starting point for further integration of environmental externalities in international trade between industrialised countries and developing countries.

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