THE ENVIRONMENT AND INTERNATIONAL TRADE NEGOTIATIONS
DEVELOPING COUNTRY STAKES

EDITED BY DIANA TUSSIE

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Developing Country Stakes

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To Susan Strange
to whom I am deeply indebted
in memory of her spirit and pioneering mind
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Agriculture and the Environment in Developing Countries: The Challenge of Trade Liberalization

Graciela Gutman

Agricultural trade liberalization is particularly relevant to developing countries. First, in contrast to industry or services, agricultural protectionism is a sin of developed countries. Second, although all parties will benefit from increased efficiency in resource allocation, developing countries could be first in line to reap the producer benefits of increased production and exports, while urban consumers in Europe and other industrial countries would receive the bulk of consumer gains through lower local prices. Two parallel concerns have been raised against this optimistic view, particularly regarding developing countries—namely, the social and environmental costs of increased income inequality, unemployment, reduced welfare, natural resource depletion, bio-diversity losses, pollution, and environmental unsustainability.

However, relations between trade and the environment are complex. Expected growth from increased trade may produce different effects, with non-negligible consequences for the environment, including scale effects, changes in the specialization pattern, and access to more environmentally friendly technologies (Grossman and Krueger, 1991). These effects may be contradictory in developed and developing countries—and also within each of these sets—and, in some cases, impacts can be very significant. The direction and magnitude of changes will depend on several circumstances, including previous economic and social structures, different national ecosystems and natural resources endowments, the degree of reliance of different types of production regarding world trade (output as well as input), macroeconomic, sectoral and environmental economic policies, and the state and development of production techniques and technologies and their international diffusion.
Impacts might be intensified in developing countries, as the turnaround in their economic policies (deregulation of domestic markets, strengthening of the private sector, unilateral trade opening, structural adjustment programs) tends to encourage an outward-oriented path of growth still mainly dependent on exports of natural resource-intensive goods. Improved market opportunities in the short term might induce the expansion of “slash and burn” practices, regardless of natural resource preservation and environmental damage.

Assessing the costs and benefits of trade liberalization and economic growth is far from straightforward. For supporters of world reform, social or environmental costs are either negligible, temporary, or only to be solved through more economic adjustment and trade liberalization. In this view, overall economic benefits outweigh any possible social or environmental cost. Critics are less homogeneous. A few of them would reject trade reform altogether, on the grounds that social and environmental costs would outweigh the potential benefits of economic growth. Most critics do not go so far, but would argue that current social and environmental costs are high, and reliance on the market mechanism is not the appropriate answer. Therefore they would call for specifically tailored national policies, to ameliorate the lot both of the environment and of the poor.

AGRICULTURE AND THE ENVIRONMENT: SOME BASIC FEATURES

By virtue of the production process, agriculture always transforms the natural resource base. Negative impacts may refer to: (1) changes in natural ecosystems (i.e., bio-diversity losses); (2) changes in natural endowments (i.e., pollution, soil deterioration); or (3) medium- and long-term vulnerability of agricultural production and/or other activities directly or indirectly affected (loss of sustainability). Whether or not these changes are to be considered environmental damage will depend on social, economic and scientific criteria: environmental damage may be defined scientifically (pollution rates over natural values), socially (people’s choices and priorities) or economically (externalities). Even if these three approaches are associated, they are not interchangeable and relate to different policy prescriptions.

The main categories of possible environmental damage are twofold. First, on-site effects include effects on the health of farm workers of pesticides, fertilizers, heavy metals and feed supplements; erosion of soil resources;
and soil productivity losses from salinization, compaction and chemical pollution. Second, off-site effects include the following: contamination of coastal, surface and ground water by chemical fertilizers, pesticides and animal manure; downstream changes on water regimes and increased water-related hazards such as floods; conversion of forest, wetland and other natural features to agriculture; loss of wildlife and biological diversity; deterioration of eco-systems; contribution to global warming through emission of greenhouse gases (that is, the concentration of manure from intensively produced livestock); acid deposition from ammonia emissions from livestock and fertilizer; and effects on human health from, for example, consumption of contaminated food products or water.

The main environmental consequences of agricultural production are to be expected at the domestic level and affect local resources, principally in the form of soil deterioration and water pollution. Indirectly, however, agriculture may be responsible for damage to the global commons when expansion of production occurs on forest lands (see Sáez, Chapter 2 in this volume). Off-site effects may also be transboundary, such as in the consumption of contaminated imported goods, or regional, such as in water pollution in neighbouring countries. However, agriculture is not among the principal directly polluting factors relating to global warming (the greenhouse effect), although some agricultural regions of the world may be strongly affected in the future on account of potential changes in global climate conditions.

The impact of agricultural production on natural resources and the environment depends essentially on the way natural endowments are combined with production techniques. The association of some of these impacts with a particular group of countries is not unambiguous. Nevertheless, it is accepted that problems with resource quality (due to pollution) are usually greater in industrialized countries, and that resource losses (due to land degradation) seem to be the most important environmental issue in developing countries.

The heterogeneity of development levels in this latter group of countries, and the fact that they are in many cases located in more fragile ecological regions, are some of the reasons explaining those differences. Evidence from Latin American countries supports the above arguments. Latin America is one of the wealthiest regions in the world in natural resource endowments, accounting for 23% of the world's potential arable land, 12% of its cultivated land and 46% of its tropical forests. With only 8% of the world's population, more than 200 million hectares of land are moderately or severely degraded as a result of human activity, which amounts to almost a third of total agricultural land (Garret, 1995).
Degradation appears to be more acute in the mountainous ecosystems of the Andean Zone and in Central America and Mexico, where it affects an estimated 40 to 60% of all potential arable land, but it is also present in subtropical and temperate zones (Trigo, 1995).

The specific manifestations of this damage depend on agro-ecological, environmental, and socio-economic conditions prevailing in each country. For instance, the degradation caused by highly irrigated tropical cash crops such as cotton, bananas, coffee, sugarcane, fresh fruits, and vegetables, typical of several Latin American countries (Brazil, Paraguay, Venezuela, Ecuador, Peru, Central America, Mexico, Chile and the Caribbean), arises principally from intensive use of chemical inputs, soil and water pollution and deforestation (Trigo, 1995). In Argentina, a recent report from the Natural Resources Office shows that more than 60 million hectares of arable land are moderately to severely eroded. This problem is widespread as a consequence of overgrazing, non-conservative agricultural practices, deforestation and cattle expansion in more fragile lands, but is particularly critical in the arid and semi-arid regions, which amount to 75% of total Argentine agricultural production.

TRADE LIBERALIZATION AND THE ENVIRONMENT: THE CURRENT DEBATE

The relationship between trade and the environment is complex and in many cases contradictory, since economic growth associated with trade expansion will be accompanied by changes in the composition of agricultural production, production techniques, and patterns of international specialization. Trade will alter the demand for intermediate inputs (pesticides and fertilizers) and primary or natural inputs (soil and water). World agricultural markets historically have been highly distorted by support and protectionist policies in industrial countries. OECD estimates of total support to agricultural producers as measured by the net total Producer Subsidy Equivalent (PSE) were $163 billion in 1993, which represents 42% of the value of OECD agricultural production at the farm gate. For the European Union, this percentage was 48%, and for the US, 23%. Price support policies accounted for 76% of all forms of support in OECD countries in 1993, 83% for the European Union and 51% for the US (OECD, 1994a).
A move to multilateral liberalization and agricultural policy reforms in the EU and the US will lead to a decrease in domestic prices in industrial countries and a rise in international prices, principally for temperate products, which have been the most affected by protectionist measures. The actual magnitude of the increase in international prices will also be affected by domestic policy responses in developing countries. In the long term, rises could be mitigated if these countries transfer to their domestic market the changes in international prices, expanding their production and exports (Anderson, 1992b; Pearce and Warford, 1993; Trigo, 1995).

While lower prices in industrial countries will tend to reduce agricultural production, the opposite situation is the case in developing countries. An international relocation of production from high-priced to low-priced countries can be expected. However, the net change in the aggregate level of world production can be positive or negative, depending on the current patterns of distortions to incentives in different countries, and the net impact of reducing those distortions on international prices (Anderson 1992b). At the same time, world production naturally will also be affected by technical progress. It is generally accepted that, by inducing less intensive production techniques, trade liberalization will have positive impacts on the environment in previously protected countries. Empirical research has shown that agricultural inputs such as chemical fertilizers and pesticide applications, associated with more intensive techniques of production, are positively and highly correlated with producer price incentives (Anderson, 1992b).

However, there is no agreement regarding the impact on the environment in countries previously not protected, particularly developing ones. Additional pressures on the environment, induced by more intensive techniques as a consequence of the new export push, are to be expected. At the same time, some environmental gains may arise following trade liberalization, particularly access to more environmental friendly technologies and a reduction in poverty pressures on land as a result of increased trade revenues. A trade versus environmental debate has been opened, with opposite policy prescriptions. By and large, trade supporters approach trade–environment issues from a narrowly defined economic standpoint. On the other hand, environmentalists will tend to underline social and scientific concerns. We may classify the different theoretical approaches into three main categories: the orthodox thesis, the critical approach, and a cluster of more pragmatic responses within a context of free trade.
The Orthodox Thesis

Supporters of free trade argue that environmental deterioration stems from the production and consumption of goods, and not from international trade itself. The expansion of trade is a source of increased wealth and diffusion of technology, including more friendly environmental techniques, and both processes enhance countries' ability to protect and to upgrade their environment. Kym Anderson, for example, thus questions the argument that trade in agricultural products is environmentally unfriendly, and from this standpoint argues that trade restrictions are not the appropriate policy instruments to address environmental degradation.

Using a partial equilibrium model for testing global welfare effects of liberalizing agricultural trade, Anderson (1992a, 1992b) states that reducing agricultural price and trade distortions will involve a change in incentive structures that will increase incomes both in previously protected countries and in the rest of the world, generating large global economic gains and reducing global environmental damage. However, global welfare and environmental gains may not result in gains for all countries. It is likely that some countries – the poorer ones – will not be better off after trade liberalization. This is a question that cannot be answered a priori, and case studies are necessary to identify the likely environmental effects of trade liberalization. Environmentally negative impacts may result from the use of more intensive production techniques associated with the expansion of output, or the expansion of land areas at the expense of forests. However, these resources might otherwise have been employed in more polluting activities. Food importing countries, on the other hand, can lose from a trade liberalization that raises their border prices, although some of them may switch from importing to exporting or implement policies that keep their domestic price of food below international prices. Even if environmental degradation increases in poorer countries, welfare is likely to improve if the appropriate environmental policy instruments and the removal of distortions to farm prices are introduced as the international price rises. Anderson's conclusion is that trade liberalization in agricultural production need never be put off for environmental reasons.

The research carried out by the GATT concerning trade and the environment follows the above line. An expansion of trade following trade liberalization may produce negative environmental effects in certain countries – even to the point where they outweigh the conventional benefits from free markets – but only if the country does not implement the appropriate environmental policy that reflects its environmental values and priorities. As a consequence, unilateral trade restrictions are not the most efficient instrument dealing with an environmental problem (GATT, 1992).
The Critical Approach

In opposition to the thesis that free trade is beneficial to all countries involved, some authors propose a critical assessment, rejecting trade liberalization because of its social and environmental costs (see Daly, 1991). Ropke (1994), for example, argues that free trade benefits for developing countries have been dubious, stimulating growth with short- and long-run environmental problems. Most importantly, trade is the cause of the problem and not the solution: trade not only magnifies negative externalities, but also creates new ones, and doing so contributes to environmental degradation. This is the case for some developing countries, which have followed new specialization patterns based on the export of natural resource-intensive goods and have been caught in a kind of “specialization trap” (specialization based on products with low-demand elasticity and low-income elasticity). If this pattern is not broken then “free” trade becomes “forced” trade, and may produce irreversible environmental damage. Ropke makes a case for reducing trade under those circumstances.

This critical approach proposes some methodological aspects to be taken into account: greater emphasis upon the dynamics of trade, development and sustainability links; new theoretical approaches to take into account the pervasive character of externalities; special concern with the prevalent inequalities; and the importance of initial conditions. These “orthodox environmentalists” call for export restrictions in defence of the environment, arguing that if production and/or consumption of a good is pollutive then an expansion in global output of that good following trade liberalization would lead to greater environmental degradation.

More Pragmatic Approaches

Recognizing the importance of trade liberalization, a wide school of thought proposes a more pragmatic approach to trade and environmental links. In addition to the widespread criticisms made to the neo-classical paradigm – especially concerning the assumptions of perfect competition, the absence of externalities, the hypothesis of equally dynamic comparative advantages, and the utilization of partial equilibrium models that ignore other impacts and forms of inefficiency (see Ekins et al., 1994) – arguments are advanced to consider the possible impacts of trade liberalization on the environment, focusing on the particular situations of
developing countries, and on the consequences of the way international agricultural markets work (see ECLAC, 1993; FAO, 1994/1995; Pearce and Warford, 1993; Markandya, 1994b; Ekins et al., 1994; Trigo, 1995; UNCTAD, 1993).

Opening to trade in the absence of environmental controls, it is argued, does not necessarily result in an overall increase in welfare, and may lead to over-exploitation of environmental goods. It is possible for a single country to secure sustainable development—in the sense of preserving its natural resources—at the cost of procuring unsustainable development in another. The import and export of sustainability are partly an issue of international inequality. How far this “trade in sustainability” is a matter of concern will depend on several circumstances, including the balance between trade and the resource endowments of the each country, the extent to which trade revenues are applied to less polluting activities, and the extent to which international prices reflect the social costs of resource degradation (Pearce and Warford, 1993, Markandya, 1994a).

The main conclusion is that, if there are no market imperfections or distortions, and in the presence of full social cost pricing in each country then trade restrictions are not the adequate response to environmental degradation, and free trade may be considered a necessary condition for economic efficiency at national level. Up to here, authors in this current of thought are not in opposition to the orthodox thesis. Yet, when the above conditions are not fulfilled, these authors accept trade restrictions in developing countries, for transitional periods. They may be used as interim measures to protect the environment and natural resources, if first-best policy instruments to reduce environmental damages (domestic policies that directly tackle the environmental problem) are not available or politically feasible. Moreover, even if policy instruments other than trade restrictions are employed to internalize environmental costs, it is also recognized that environmental regulations do not correspond to a full internalization of environmental costs, and additional measures may become necessary. Thus, a case-by-case approach is proposed for assessing environmental impacts of trade liberalization, in terms of both individual countries and specific agricultural products. The need for regional and global institutional frameworks to provide adequate and democratic environmental signals is also stressed (Hveem, Chapter 8 in this volume).

The debate is far from being closed, and opposite arguments and evidence continue to appear in the fore of discussion. Nonetheless, there is a widespread acceptance that trade restrictions—even if they may be necessary in developing countries for transitional periods—are not the first-best instruments to address environmental challenges.
SOME RECENT EXPERIENCES IN DEVELOPING COUNTRIES

The adoption of export-oriented growth strategies tended to increase the importance of agriculture in the export structures of many developing countries. In Latin America as a whole, agriculture and agriculture-based industries accounted for more than 40% of total exports in 1995, excluding oil and minerals (ECLAC, 1996). Figures vary between individual Latin American countries, which have followed different specialization paths since the 1980s. Some of them, like Mexico, Brazil or Costa Rica, have changed their traditional international specialization patterns in the last decade, diversifying their export structures with an increase in the relative share of industrial exports (Gutman and Miotti, 1996). Nevertheless, even in these countries agricultural exports continue to play a strategic role, with the restructuring of traditional activities and the development of new, modern, dynamic, export-oriented ones. This tendency is likely to continue in the years ahead.

However, empirical evidence associating environmental damages with export-oriented agricultural production in the strict sense is scarce. In addition, it is difficult to isolate the contribution that trade makes to the exploitation of natural resources, because other circumstances (such as pressures from poverty) may contribute to environmental degradation. Environmental impacts differ between countries and specific agricultural crops: trade may have contradictory effects, and damage tends to be cumulative in the long run.

Although most of the case studies presented in recent literature stress the negative impact of trade liberalization in developing countries, overall effects are mixed. In some cases, trade reforms and structural adjustment programs have stimulated the expansion and diversification of tradable crops and shifts to non-traditional commodities, with positive environmental impacts. This is the case, for instance, with Cameroon, where trade policy reforms had provided new incentives for farmers to increase production of cocoa and coffee, crops that are less erosive than previous subsistence crops. The case studies reviewed by Reed (1996) show that cash crop production is able to respond successfully to new price incentives from international markets by diversifying crops, intensifying production and introducing technological improvements. In some cases, these changes have been accompanied by environmental improvements. Small farmers, on the contrary, concerned primarily with their own food security, will intensify their production of food crops in response to deteriorating economic conditions, a production based in
many cases on unsustainable practices, which will lead to greater environmental damage. The overall environmental impact is closely associated with the relative size and social and economic conditions of small, subsistence producers. Lankoski’s review of the linkages between agricultural policies, trade liberalization and the environment presents additional evidence that suggests that in some cases, environmental effects from trade liberalization might be neutral (Lankoski, 1997): studies on the impact of NAFTA on environmental quality in Mexican agriculture indicate that the expected increase in chemicals used in fruit and vegetable production may be offset by a decline in grain production. In Chile, the probable environmental effects of a complete agricultural liberalization in OECD counties are expected to be very small, in the form of neutral effects on soil erosion and an increase in fertilizer use for almost all crops.

Below, some illustrative examples of negative environmental impacts associated with export expansion are summarized. The first two are related in one way or another to the distorted trade patterns derived from the early Common Agricultural Policy (CAP) of the European Economic Community (EEC).

The “Cassava Connection”

The “cassava connection” is an interesting case of trade and environmental linkages that involves Thailand and Indonesia. It illustrates how a distorted trading structure combined with short-term policy objectives can lead to an environmentally questionable outcome (Barbier, 1991). Cassava is a root crop widely grown for human consumption in the tropics and a rich source of feed for livestock. It is an “easy” crop: it requires little labour and attention, is relatively disease-free, can be grown on relatively poor soils, and is drought-tolerant (Siamwalla, 1991; Pearce and Warford, 1993). In the past, little cassava was traded internationally. Export expansion began in the 1960s associated with the CAP, whereby as a result of the concessions granted during the Dillon and Kennedy rounds of the GATT, protein crops and root crops were granted very low tariffs while cereal imports remained highly protected. Thai exports dominated the markets, but always competed with Indonesia for a share of total import quotas for cassava, mainly used as feed for intensive pig farming in the Netherlands (Barbier, 1991; Pearce and Warford, 1993).

In order to increase its share, Indonesia stimulated production and export of cassava. As a result of rises in domestic prices, monocropping of cassava expanded on the fragile upland soils of Java and on converted
forest lands in the Outer Islands, leading to upper watershed degradation and deforestation (Barbier, 1991). In Thailand, small farmers rapidly expanded production of cassava on previously public forest lands, along with exports. Between 1968 and 1980, cassava production doubled every four years. The end of the cassava boom came in the 1980s: in 1982 Thailand agreed to limit its exports of cassava to the EC at about 5 million tonnes per annum, when previous exports stood at about 8 million tonnes.

The most visible environmental impact of the 1968–80 boom was a steep decline in forest areas: in the northeast of Thailand forest areas were depleted by half from close to 30% of the area in a period of less than fifteen years (Siamwalla, 1991). Some authors consider the cassava export expansion to be a significant cause of deforestation, soil erosion and reduction in soil nutrients. But the reality is more complex: cassava does not cause more depletion of the soil than other crops, although it does remove nutrients from the soil when there is no artificial fertilization, as was the case in Thailand. Other authors argue that deforestation would have occurred anyway, with or without cassava production, because of the pressures on land caused by poverty-induced unsustainable production (Pearce and Warford, 1993). In short, during the export boom years, land degradation and the reduction of forest areas took place in both countries. How increased trade contributed to this process needs to be re-examined. Nevertheless, the “cassava connection” case illustrates the actual and potential damage to the environment stemming from the failure to coordinate short-term trade objectives with environmental policies.

“Agriculturalization” of the Argentine Pampas

The Argentine pampas is one of the world’s most productive areas for temperate commodity products, where a high proportion of production is oriented to world markets. The “agriculturalization” of this region – a term used to describe the cereal and oilseed expansion at the expense of livestock production – that began in the 1970s provides an interesting example of the harmful effects on sustainability of international market-driven specialization. As in the case of cassava, grain expansion is linked directly to the demand for livestock feed from intensive forms of production in the EC.

Here poverty does not provide a counterfactual element, because the land tenure system is highly concentrated. Argentina became one of the three main exporters (together with Brazil and the US) of soybeans and industrial by-products to EC markets during the 1980s (Gutman and Feldman, 1990).
Grain production grew significantly in those years, especially soybeans for export, leading to a profound transformation of the traditional crop–cattle rotation production system. The rotation scheme was replaced by a permanent crop production accompanied by a process of technological innovation with greater use of fertilizers and agrochemical inputs, which increased the productivity and profitability of these crops (Trigo et al., 1991; Observatko, 1988, 1991). Short-term and rental contracts widespread in this area did not encourage land reservation or the implementation of conservation techniques (Gallo Mendoza, 1996; Morello and Marchetti, 1995; Trigo et al., 1991).

The new “permanent agriculture” has led to a drastic fall in the levels of organic material, nitrogen and assimilable phosphorus present in the soil. In some areas of the pampas, losses of organic material are as high as 47% compared with virgin or unaltered soils. Losses of nitrogen and phosphorus are 48% and 76% percent higher respectively (Trigo et al., 1991, Trigo and Kaimowitz, 1994). In one of the most productive areas of the pampas, the so-called “Corn Centre”, recent research shows that soil erosion associated with new continual crop practices were 65% higher than those observed in rotation systems (Morello and Marchetti, 1995; Solbrig, 1997). The effects of intensive use of herbicides and plagiocides in soybean production on the quality of water have not yet been evaluated, but significant changes in the environmental conditions are predictable, owing to the growing dependence on these inputs (Morello and Marchetti, 1995).

Agricultural intensification took on an additional impulse in the 1990s. The stabilization plan in Argentina, and the elimination of tariffs on imported inputs, led to a dramatic rise in the consumption of fertilizers and agro-chemicals, mostly imported. Total agro-chemical sales increased by 87% between 1991 and 1995 (the most striking rises were to be found in herbicides associated with soybean expansion), and fertilizer consumption quadrupled between 1990 and 1995 according to official estimates. At the same time, trade liberalization and economic deregulation have attracted new short-term financial investments in agriculture, leading to the consolidation of large tracts of farmland as required by economies of scale, and a greater use of intensive technologies, with greater risks of resource degradation, as the time horizons of such investments make resource conservation unattractive (Trigo, 1995).

Intensification techniques and new forms of short-term investment pose severe threats to natural resource conservation and the environment in the pampas in the near future. Even if the current intensity of fertilizer and
agro-chemical use in Argentina is dramatically below those prevailing in industrial countries, the above evidence shows that intensification is taking place at high rates. The pursuit of short-term profitability may be in direct conflict with the diversification required to ensure sustainability (Trigo and Kaimowitz, 1994). In instances such as this (which is by no means an isolated example), in which export expansion takes place without supporting policies to ensure sustainable practices, the working of the market is detrimental to sustainability. Although more research is warranted, the lessons of this case give ample food for thought to the need for designing support policies to trade expansion.

**Development of New High-Value Agricultural Products for Export: The Case of Shrimps in Ecuador and Honduras**

Shrimp mariculture in Ecuador, the principal producer in Latin America, was developed in the 1970s, and production expanded rapidly from 45,000 tonnes in 1975 to 65,000 tonnes in 1988, supported by national exchange rate, tax and credit policies (Torres Zorrilla, 1994). Production was destined mainly for external markets, principally Japan, the US and some European countries. Shrimp became the second most important export product, after petroleum (Gutman and Miotti, 1996). Expansion has resulted in the degradation of numerous coastal mangroves. As a result of the diseases stemming from a degraded environment, the natural reserves from which shrimp larvae are obtained are being depleted. Natural reproduction of shrimps as well as larvae for pool farming have been reduced: in 1985, around 40% of the pools were not used for this reason (ECLAC, 1993; Torres Zorrilla, 1994). To face this problem, producers have recently moved from extensive to semi-extensive cultivation. However, the more intensive cultivation methods threaten to generate further environmental problems, such as salinity of coastal soil, reduction in the subterranean water layer and greater vulnerability to epidemics (ECLAC, 1993).

The environmental implications of shrimp farming are complex, and involve diverse elements of the environment. The wetlands, including mangrove ecosystems, play a decisive role in sustainable development strategies. Mangroves perform certain ecological functions (control of erosion), generate products (fish and wildlife) and have important attributes as providers of abundant bio-diversity. The consequences of the loss of these functions in the Ecuadorian coastal system are difficult to
Nonetheless, shrimp expansion has resulted in the accelerated degradation of the mangrove ecosystem, while economic benefits deriving from exports seem volatile and short-term. The migration of workers induced by the shrimp bonanza has caused conflicts over land use and tenure systems, and the alteration of traditional patterns of fishing and agriculture (Torres Zorrilla, 1994).

A similar process took place in Honduras, here external sales of shrimp increased sharply in the 1990s. As in Ecuador, the transformation of mangrove ecosystems into pools for shrimp farming was encouraged by policy incentives to achieve diversification and growth of exports. Shrimp farming in Honduras is presently the most threatening factor in the destruction of the coastal resources (ECLAC, 1993).

INTERNALIZING EXTERNALITIES: POLICY INSTRUMENTS AND MULTILATERAL TRADE RULES

The question thus is how to prevent additional environmental damage in developing countries as a result of trade liberalization. There is a widespread agreement among economists that the best way to deal with environmental problems in these countries is, in the first place, to modify or replace government policies that have had indirect negative impacts on the conservation of natural resources and the environment (policy failures), and, in the second place, to implement appropriate and targeted environmental policies.

Specific policy instruments that directly target the source of environmental damage are, on the one hand, those associated with the “polluter pays principle” (PPP), and, on the other, environmental subsidy schemes. These policy instruments have opposite effects on final producer prices and on trade and international competitiveness. In the first case, final producer prices will reflect at least part of the costs of environmental deterioration; in the second, polluters will be subsidized for pollution control measures, so internalization will not be reflected in final prices.

The Polluter Pays Principle

The current economic approach to environmental damage stresses the importance of internalizing externalities. Although this approach enjoys widespread acceptance among economists, it is important to bear in mind
three points. First, environmental deterioration and externalities are not interchangeable concepts. As discussed above, the former is a physical measure based on scientific criteria; the latter is an economic concept. Second, from an economic approach, internalizing externalities does not necessarily eliminate environmental damage. The aim is only to reduce these to the "optimum pollution level", and only to the extent that increased prices would reduce the pressure upon natural resources (through reduced demand and hence reduced production). Third, even were part of the increase in prices resulting from internalizing externalities to be set aside to repair environmental damage, repair would depend on whether or not the damage was in fact reparable. This is not always the case with bio-diversity losses or widespread pollution processes.

The PPP, widely adopted among OECD countries, is both a principle of cost allocation (who pays for pollution prevention and control) and of cost internalization (which costs and how much of each the polluter must pay). It is considered a non-subsidization principle, and in this sense is compatible with multilateral trade rules even if it has not been formally incorporated (Tobey and Smets, 1996; Barde, 1994). Policy instruments associated with the PPP include regulations – the command and control (CAC) approach – and market instruments. The CAC approach consists in the passing and enforcement of laws, technical regulations and standards with which polluters must comply. Economic instruments other than subsidies (for example, emission, user and product charges or taxes; marketable permits; and deposit-refund systems) provide market signals in the form of modifications to relative prices and/or financial transfers, and are usually referred to as Pigovian taxes. Although mostly advocated in relation to pollution control, similar mechanisms can be for natural resources management (Barde, 1994; de Castro, 1994).

Cost internalization in agriculture faces the complexities of managing "non-point" sources of pollution: in effect, with the exception of livestock feed, it is very difficult to directly link polluters and polluting practices with emissions, because pollution is normally diffuse, emissions occur over a dispersed area, and the impact may not be perceivable in the short term (Tobey and Smets, 1996). Differences in endowments of key environmental factors such as soil, rain and climate mean that a given practice that may be unsustainable in some regions may have a different effect in others. Furthermore, pollution is linked with the managerial practices and input choices of each producer, which are very difficult to control and supervise. For these reasons, levels of direct and indirect agricultural pollution abatement costs in industrial countries are very low being estimated as less than 1% of total production costs (Tobey and Smets, 1996; Beghin et al., 1994).
Therefore, the CAC approach remains the most applied environmental policy, although there is evidence to suggest that the use of economic instruments is becoming more widespread (OECD 1994a; Tobey and Smets, 1996). Examples of CAC measures in industrial countries include: penalties for the conversion of wetland on farmland; restrictions on fertilizer and pesticide use and application practices; required plans for land disturbance; enforceable codes of agricultural practice; operating permits or restrictions on activities that may cause soil erosion; pollution emission standards; production standards for pesticides, fertilizers and farm machinery; information programs; and adoption by farmers of integrated pest management practices (Tobey and Smets, 1996).

Subsidies

Precisely because internalization poses such formidable challenges, subsidies are used increasingly to address agricultural point and non-point pollution in industrial countries. Subsidy schemes may include subsidies for environmental investments (e.g. facilities to dispose of livestock wastes), payments to farmers for the use of more environmentally friendly techniques, financial incentives to reduce farming activities on environmentally sensitive land, incentives to set land aside for environmental reasons, and training of farmers in environmentally sound techniques. Evidence remains limited and incomplete, but suggests that the magnitude of agricultural subsidies for environmental protection in industrial countries is not large, ranging from 1% of agricultural GDP in Europe to 4% in the United States. Nevertheless, there are growing concerns that, at least during the period of agricultural policy reform, old production-oriented subsidies will emerge in new clothing as production-enhancing support in the form of “green payments”, and would attain magnitudes so high as to continue the distortion of markets, even if these subsidies are not supposed to affect production and commercial flows.

Therefore, the provision of environmental subsidies raises the question of compatibility with multilateral trade rules. Exceptions to the non-subsidization rules were stated at different opportunities by the OECD. Environmental exceptions are contemplated in WTO commitments. Besides paragraphs (b) and (g) of Article XX, which relate to measures necessary to protect human, animal, or plant life or health and to those concerned with the conservation of exhaustible natural resources (see Tussie and Vásquez, Chapter 6 in this volume), the Final Act of the
Uruguay Round provides a more strict and comprehensive framework for dealing with agro-environmental subsidies. Whereas specific subsidies for the exploitation of natural resources are not included in the exemptions to actionable subsidies accepted in the Agreement on Subsidies and Countervailing Measures (see Sáez, Chapter 2 in this volume), environmental subsidies are accepted in the Agreement on Agriculture. Subsidies in this context (the so called “Green Boxes”) must have no, or at least minimal, trade-distorting effects: support should be provided through a government programme, should not consist in price support to producers, and should be limited to the extra cost or loss of income involved in complying with the government programme (including conditions related to production methods or inputs).

The above review of the PPP and subsidies as alternative instruments shows that at the core of the problem is a question of opposite impacts on competitiveness (Vossenaar, 1993; Pearson, 1993; Beghin et al., 1994). Countries that opt for a subsidy scheme will enjoy a competitive advantage relative to countries that are more oriented to a “polluter pays” approach. This is probably the most important reason for the increasing use of environmental subsidies in industrial countries.

CONCLUSIONS AND POLICY OPTIONS

The relationship between international trade and the environment in the case of agriculture is complex, and in many cases contradictory. Trade-generated growth has three main effects: a scale effect, which imposes additional pressures on the environment; a composition effect, involving changes in international specialization towards more or less natural-resource-intensive activities; and a technical effect in increased access to more environmentally friendly technologies (Grossman and Krueger, 1991). Assessing the possible outcome of these effects on agriculture in any particular developing country is a question of empirical research and a case-by-case analysis. More empirical analysis is needed so as to arrive at a better and more comprehensive understanding of the trade and environmental linkages as well as the effects of different policy instruments. The review presented in this chapter has shown that the market in and of itself will not provide positive incentives to environmental preservation, as seems to be the case in industry (Motta Veiga, Chapter 4 in this volume). The incentives provided by trade may be perverse, and the role of income growth may not be sufficient to induce
sustainable production. Better monitoring of the impact of trade liberalization on the environment is required, since active international and national policies could be called for in order to correct undesired and unexpected negative environmental impacts.

From a general perspective, there is a trade-off between the increase in environmental degradation and the economic benefits deriving from the expansion in trade. For many developing countries, this trade-off expresses the strategic dilemma between the short-term need for export earnings and increased degradation of natural resources. Trade liberalization tends to encourage exports of goods that are intensive in natural resources, with growing and sometimes unsustainable pressures on the environment. Poorer countries, with strong budgetary constraints, will give more priority to growth than to environmental conservation. In the absence of multilateral or regional cooperation schemes and technological progress for the protection of the environment, it is likely that economic growth associated with free trade will aggravate environmental damage in these countries, which in turn will compromise growth in the long run.

The challenges faced by developing countries concerning the preservation of their natural resource bases and the environment are more than significant. In the first place, correcting policy failures and the under-pricing of environment and natural resources appears to be a requisite for applying appropriate environmental policies (Barde, 1994; de Castro 1994; Barbier, 1991; Torres Zorrilla, 1994; Trigo and Kaimowitz, 1994). Such a reform includes macroeconomic policies (changes in exchange and interest rates or in tariff policies that indirectly induce the over-exploitation of natural resources), as well as sectoral policies (input and output price controls, taxes and subsidies) and project-related policies. Yet this task is not without difficulties. Impacts of government policies on the environment are complex and sometimes difficult to discern, and not all changes in macroeconomic and sectoral policies may work to the advantage of the environment. In some cases, for instance, agricultural subsidies might be contributing to resource degradation (inducing overuse of agro-chemical inputs); in others, subsidies might be necessary to increase production and encourage sound environmental practices. When market failures are present, the policy trade-off between promoting agricultural growth and environmental degradation must be also taken into account. Once again, a case-by-case analysis is required.

Second, applying environmental policies in developing countries is not straightforward. The common presumption is that these policies may not be in place, enforced, or appropriately designed. Internalization of environmental externalities is practically non-existent, because of time and
monitoring costs, and scarce institutional capacities and administrative skills. Direct estimates of abatement costs are very rare in developing countries. Additionally, internalization of environmental externalities may affect international competitiveness. For instance, cost estimates of suggested environmental regulation for Malaysian palm oil presented in Beghin et al. (1994) show that while they are small for processing industries (5% of production value), they are very high for commodity producers (up to 40% of production value). Command and control regulations are also often limited in these countries by poor functioning of judicial, administrative, monitoring and enforcement procedures. Furthermore, financial resources are not always available for these policies.

Third, subsidy schemes for environmental purposes, as developed in industrial countries, are difficult to envisage in developing countries, because there is fierce competition for the use of scarce government financial resources for other, more urgent domestic problems. Finally, there is the issue of export restrictions. Even if they might be necessary for transitional periods while first-best policies are put in place, they are not the most appropriate instruments to address the environmental problems in the market-oriented context now prevailing in developing countries. Moreover, export controls are in fact very difficult to envisage, given the globalization of the world economy and the ongoing trends towards trade liberalization.

In spite of these significant challenges and difficulties, national and international support policies must be foreseen and encouraged, as market forces alone will not guarantee resource conservation. The most appropriate response seems to lie in the coordination of environmental policies with agricultural and trade policies. This action must be accompanied with the necessary institutional and legal reforms, and the strengthening of local managerial capacities, in order to manage natural resources rationally and to improve – or at least not to impair – environmental quality in the face of trade growth. When possible, subsidies coupled with regulatory frameworks must be proposed. Subsidies hitched to natural resource preservation, and the creation of investment funds to reclaim natural resources, financed by a tax on resource-depleting activities, are other possible policy instruments (Ford Runge, 1996; Trigo and Kaimowitz, 1994).

Strengthened international cooperation and technical assistance is needed for institutional and financial capacity-building to internalise environmental externalities. In the future, the promotion of scientific and technological development, more formal and informal education, the diffusion of modern and more friendly environmental techniques, and a greater national and international environmental awareness, will be essential tools for achieving sustainable development.