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**Challenges and proposals
for a more effectively
implementation of economic
instruments for environmental
management in Latin America
and the Caribbean**

Challenges and proposals for a more effectively implementation of economic instruments for environmental management in Latin America and the Caribbean

This document was prepared by the Inter-Agency Technical Committee on the basis of the mandates of the Eleventh Meeting of the Forum of Ministers of the Environment of Latin America and the Caribbean (Lima, Peru, March 1998). The work was carried out by the Economic Commission for Latin America and the Caribbean (ECLAC) and the United Nations Development Programme (UNDP) as the lead agencies. The purpose of the document is to provide the Forum with support for discussing and approving courses of action in the sphere of the Regional Action Plan for the period 2000-2001.

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Presentation

This document is the result of a joint project between the United Nations Development Programme (UNDP) and the Economic Commission for Latin America and the Caribbean (ECLAC) following the decisions reached at the Eleventh Meeting of Ministers of the Environment of Latin America and the Caribbean held in Lima, Peru, on 12–13 March 1999.

At that meeting, the Ministers agreed that strengthening the institutional framework, policies and instruments for environmental management should be a priority for all concerned. Possible mechanisms include environmental education and training, citizen participation, the incorporation of environmental issues in public policy, the interrelation between business and the environment, financial mechanisms (in particular the scale of environmental investments in the region), innovative legal and economic instruments and the sharing of experiences in decentralizing environmental management. At the same time, the Ministers agreed that projects should be directed toward sharing experiences on common environmental problems faced by Latin American countries seeking to enhance the value added of their environmental resources through sound environmental management.

Within the framework of the Interagency Technical Committee established by the Ministers' Forum, UNDP organized a study on "Challenges and Proposals for a More Effective Implementation of Economic Instruments for Environmental Management in Latin America and the Caribbean", which was carried out by the UNDP Regional Environment and Development Project for Latin America and the Caribbean with technical support from ECLAC (Project RLA/98/015). The study reviewed the most recent works on the subject in order to analyse the main experiences in the region and set forth a group of recommendations. One source that was particularly influential was "Economic Instruments for Environmental Management in Latin America and the Caribbean" undertaken jointly by the United Nations Environment Programme (UNEP), ECLAC and the Mexican Ministry of the Environment, Natural Resources and Fisheries in 1997. The current document contains two annexes which present seven case studies of selected countries in Latin America and the Caribbean and a group of specific recommendations that emerged from the Experts Workshop held on 14–16 February 2000. (These annexes are in the process of being prepared for publication.)

The following is a description of the methodology used and the results obtained to date.

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Introduction

In Latin America and the Caribbean, the environmental regulatory institutions face the growing challenge of designing efficient instruments and mechanisms for environmental management at the local and national levels. Objectives for improving environmental quality must be achieved at the lowest economic cost possible. In the last decade it has become increasingly acceptable at the world level to approach environmental management through economic instruments based on market incentives which complement the countries' current systems of direct regulation.¹

Economic instruments constitute a separate category of instruments for environmental regulation. In theory, they can be used as a complement to or substitute for other types of instruments with the same goals, such as instruments of direct regulation through environmental standards or direct agreements between environmental authorities and industry to improve environmental performance, to reduce emissions, etc. In practice, the use of economic instruments in environmental management has not reduced the need for standards, controls, sanctions and other forms of direct governmental intervention. In the developed countries this type of instrument has been used to complement the traditional regulatory framework. They have introduced an important element of **flexibility**: (a) the regulated agents can minimise the individual cost of complying with standards, and (b) efforts to mitigate pollution have successfully been reoriented to encompass criteria based on efficiency, thus reducing the total cost of meeting the environmental quality goals set in each case.

The use of economic instruments for environmental management has had a slow but continuous evolution since the early 1970s, when the most industrialised countries began to develop their environmental policies. The first tendency that can be seen among the member countries of the Organisation for Economic Co-operation and Development (OECD) is that the variety of instruments used for environmental management has increased.² Whereas user charges on natural resources and also subsidies were common in the 1970s, other types of charges have become more common, including charges or fees for pollutants emitted, dumped or otherwise released. OECD, for example, has documented over 60 rates currently in use in various countries for the control of air, water, soil, solid waste and noise pollution. This type of instrument includes rates and taxes for the use of natural resources and charges on the volume of pollution released into the water or air. Other types of economic instruments have also appeared, such as deposit-reimbursement schemes, tradable permits for resource use or for a specified quantity of pollution emissions, performance bonds deposited during the execution of environmentally risky projects and labelling and public information schemes, among others.³

⁽¹⁾ Economic instruments are all those which have repercussions on the costs and benefits of alternative courses of action available to agents, affecting, for example, the profitability of alternative processes or technologies or the relative price of a product, and which thereby influence the decisions of producers and consumers (ECLAC/UNEP/SEMARNAP, 1998). For the purposes of the current paper, the term economic instruments with regard to environmental management also encompasses informal regulatory programmes involving the public dissemination of official information on environmental performance, certification, labelling and other sources of external pressure based on the transparency of information. All of these work through incentives based on one's reputation in the market, with economic consequences for the agents.

⁽²⁾ OECD comprises the most industrialized countries.

⁽³⁾ For a detailed description of the different types of economic instruments used in environmental management, see ECLAC/UNEP/SEMARNAP (1998) Huber, Ruitenbeek and Serôa da Motta (1998) and Panayotou (1998).

Another aspect of this evolution is the growing role of environmental taxes as an integral component of plans for fiscal reform in the more developed countries. OECD member countries, for example, are increasingly using taxes tied to environmental parameters in their pollution control strategies. In 1995, revenues from environmental taxes in OECD member countries represented 2.5% of GDP, or almost 7% of their total tax revenues (OECD, 1999, p. 5). The majority of these taxes were generated from a specific tax base related to transportation and energy; taxes on the disposal of solid and liquid waste are also common. In the area of natural resource management, OECD member countries frequently levy charges or taxes on water use as a mechanism for controlling the amount drawn; in a few cases schemes have been implemented establishing transferable quotas on water use. The instrument that has been used most frequently to control fishing resources involves transferable fishing quotas, although some countries also use rates and taxes as instruments for managing this sector. In the forestry sector, the use of charges and subsidies is very common in the management of logging resources in several countries. In the last two decades, the most industrialised countries have clearly moved toward an increasing application of this type of instrument as an integral component of their environmental management strategies.⁴

Given that these instruments offer the potential for greater flexibility and efficiency in regulatory strategy, it is reasonable to expect that their more extensive use would help lower the costs of achieving the objectives laid out by the countries of the region for improving environmental quality. Except for a few isolated attempts, however, Latin American and Caribbean countries to date have not undertaken a vigorous, systematic implementation of economic instruments for environmental management. Why haven't these instruments been more extensively implemented? What can be learned from the cases in which they have been effectively applied? And what can the environmental authorities in Latin America and the Caribbean do to incorporate these instruments more forcefully into their regulatory strategies? These questions form the basis for the present study.

Project methodology and approach

The research project was developed through the following steps.

- a) Researchers identified a representative group of countries that had experimented with the application of economic instruments for environmental management, and they defined the **terms of reference** for analysing national experiences. The terms of reference included extensive guidelines consisting of questions aimed at documenting and extracting the lessons offered by these experiences and deriving concrete proposals and recommendations relative to the application of economic instruments by the region's environmental authorities.⁵
- b) With the assistance of national environmental authorities, consultants were identified and contracted to develop the proposed analysis in the

⁽⁴⁾ See OECD (1999) for a detailed review of the instruments currently in use in OECD member countries.

⁽⁵⁾ Research was centered on the following questions: (1) What factors are present in the cases of successful application of economic instruments in the region? What strategies or circumstances determined their success? (2) What barriers do the countries of the region face against the effective implementation of economic instruments? (3) What implementation process or strategy can environmental authorities follow to overcome these barriers and to achieve an effective use of these instruments? (4) Which instruments are considered most feasible for application, given the institutional frameworks and capacities prevalent in the region?

- following countries: Brazil, the Caribbean sub-region (Barbados and Jamaica), Chile, Colombia, Guatemala, Mexico and Venezuela. These experts were selected for their ability to work in conjunction with the national authorities directly responsible for the design and implementation of environmental management instruments within national environmental agencies and organisations.
- c) On completing the analysis and national case studies, the national consultants met at ECLAC for a closing seminar to compare national results and produce summary proposals to take to the regional Forum of Ministers of the Environment to be held soon in Barbados. In particular, the seminar sought to generate proposals and strategies that the region's environmental institutions can use to move toward a more systematic use of economic instruments that complement and reinforce current environmental management efforts.

This report on the project results is organised in the following manner:

Introduction

Chapter 1. Applying economic instruments to environmental management.

This conceptual chapter outlines the theoretical framework for the application of economic instruments and highlights several points with regard to the challenge of successfully implementing them within the regulatory framework prevalent in our region.

Chapter 2. Lessons drawn from the collective experience of the countries of the region. This chapter (to be developed from the results of the closing seminar) seeks to synthesise the primary lessons derived from the national experts' analysis of the case studies.

Annex 1. National case studies. Each chapter contains the analysis carried out by the consultants and national authorities.

Annex 2. Proposals for the application of economic instruments by the region's environmental authorities. This final chapter (to be developed from the results of the closing seminar) emphasises proposals that environmental authorities can apply in order to complement their current regulatory strategies with the successful utilisation of economic instruments.

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I. Applying economic instruments to environmental management

1. Taxonomy of economic instruments for pollution control

The main economic instruments currently in use for environmental protection and management are charges, environmental taxes, fines for non-compliance with standards, deposit-reimbursement schemes, financial obligation when legal responsibility for environmental damage is determined (i.e., polluters pay), systems of tradable permits, environmental performance bonds and subsidies for activities related to environmental protection.

In addition to these economic instruments, some countries are increasingly using other environmental management instruments based on transparency of information and reputation-based incentives. These consist in the generation and public diffusion of official information on the environmental performance of firms and individual polluting agents. Although strictly speaking these are not economic instruments, they can be considered market-oriented instruments because the reputation-based incentives affect the cost-benefit structure that a company faces when considering different courses of action. Public information on environmental performance indirectly affects a company's economic calculations through impacts on its image vis-à-vis the market for clients, the surrounding community and the perception of risk in capital markets.

The following discussion provides a more detail account of the different types of instruments used within the context of environmental management.

1.1. Charges

Charges are an almost universal policy instrument that is applied in a range of different fields. Some authors distinguish between **charges** or charge systems and **taxes** or fiscal systems. Charges are defined as payment for the use of environmental resources, infrastructure and/or services, and they are analogous to a market price that is fixed by an official agency because the market cannot determine the price of these environmental goods or services. In contrast, taxes are not considered a payment for goods or services but rather are a mechanism of fiscal revenue. Three main types of charges are used in environmental management: emissions charges, user charges and impact charges (OECD, 1999). Each category can be further subdivided as follows.

Emissions charges

Emissions charges are levied based on either the flows of pollutants or waste produced in the course of certain activities and then released into different media (e.g., air, waterways or land) or the amount of solid waste that must be handled after the productive process. This category includes the following types of charges:

- Emissions charges for atmospheric pollution;
- Hazardous waste charges;
- Other waste disposal charges; and
- Charges on effluents discharged in waterways.

User charges

Examples of user charges include the following:

- Sewage and water use charges;
- Charges for the use of municipal waste collection and treatment services;
- Charges for the use of electricity and/or power in critical areas; and
- Charges for access to parks, beaches and protected areas.

Impact charges

Impact charges seek to internalise the external costs to the environment and/or scenery that are associated with certain types of private investment, such as construction, tourism, industrial development, etc. Examples include:

- Noise pollution charges for take-off and landing cycles (airplanes); and
- Charges per square meter of construction or development in critical areas

1.2. Environmental taxes

The 1990s saw the increasing use of taxes linked to environmental parameters. This environmental tax reform has proceeded along three complimentary lines: (a) the introduction of new taxes, generally applied on products with harmful environmental externalities (e.g., pesticides, fertilisers, automotive vehicles, hazardous waste, etc.); (b) the restructuring of certain existing taxes on relevant environmental sectors (e.g., transportation and power) to incorporate an environmental element, as occurred in the case of the so-called carbon tax that is applied to different types of fossil fuels; and (c) the modification or elimination of subsidies and tax exemptions on activities that are potentially damaging to the environment (e.g., agricultural subsidies, tax exemptions for the transportation sector, etc.). Some industrialised countries are in the process of studying the feasibility of even more ambitious "green" fiscal reforms. These would mainly entail displacing part of the fiscal charge that currently falls on capital and labour factors (for example, through the reduction or elimination of taxes on profits, capital goods, labour contributions, etc.) and compensating for the lost revenues through the introduction of new taxes on environmentally harmful activities, while being careful not to raise the total tax burden of the productive sector.

1.3. Tradable permit systems

Tradable permit systems have mostly been applied in the United States, where they have been used primarily to control atmospheric pollutants.⁶ Such systems establish an aggregate level of emissions allowed for each watershed or zone in order to control water or air quality. This total emissions quota is then distributed among the different sources of pollution in accordance with their volume of production or current volume of emissions. Because the total quota is set below the current level of emissions, the permits acquire a positive value, and the different polluting agents can trade them on the market. The different agents trade their permits with the objective of minimising their individual cost of reducing emissions at the same time that they comply with the goal imposed by the total quota. If the marginal cost of reducing pollution is lower than the market price of the permits, the polluting company or agent prefers to invest in reducing emissions while selling extra permits. If, on the other hand, the marginal cost of lowering pollution is greater than the price of the permits, the polluters will be forced to purchase additional permits on the market in order to continue operating at the same level of production.

Establishing a system of tradable emissions permits implies a significant administrative effort:

- Accurate definition of watersheds or zones for the purpose of controlling water or air quality. This requires an in-depth understanding of the pollution sources and flow patterns, given the local atmospheric and hydrologic conditions.
- Monitoring water or air quality in the designated area, and monitoring the relation between emissions and environmental quality.
- Capacity for random inspections or monitoring of individual sources of emissions to ensure that the emissions limit specified in the permit is respected.
- A system for approving and registering credits and transactions among permit owners.

These are serious requirements, which explain why no such systems have been implemented to date in developing countries. Examples are scarce even in the industrialised world; they are generally limited to a few cases in the United States involving the reduction of atmospheric pollutants such as sulphur dioxide released by fixed sources such as thermoelectric plants.

1.4. Deposit-reimbursement schemes

Deposit-reimbursement schemes have traditionally been used in relation to glass bottles for beverages. In recent decades they have also been used for products such as car batteries, pesticide containers, household goods, lubricants and other products that could represent ecotoxicological or public health risks if they were not disposed of properly.

(6) This type of system is also used to rationalize exploitation in designated fishing areas, whereby the fishermen receive tradable permits granting them the right to limited annual quotas. The aggregate total quota should not surpass the level of exploitation that the fishing grounds can sustain, which is determined by the schools' annual capacity for regeneration.

1.5. Fines for non-compliance with standards

Provisions for levying fines on the basis of infringement of environmental standards are common in both industrialised and developing countries. The application of fines rarely makes any real difference in the budget estimates of regulated companies, however. In order to generate an effective economic incentive, the amount of the fine should be significant or at least greater than the economic savings implied by postponing the investments necessary to comply with the standard.

OECD member countries employ different systems of fines for non-compliance with environmental standards. Some examples are shown in table 1, which outlines the different areas of application, methods for calculating the fine, applied rates and the number of times the fine is imposed. There are basically two methods for calculating the fine. One method consists in calculating the amount of environmental damage caused by the regulated agent's non-compliance with the standard. The second method is based on the magnitude by which the legal limit of pollution has been exceeded.

1.6. Environmental performance bonds

Systems based on environmental performance bonds seek to shift the responsibility for controlling, monitoring and enforcing compliance with standards onto the individual producers and consumers by charging them in advance for potential damages. If the productive activity or product is completed without causing damages, then the regulatory body returns the amount deposited as a performance bond.

Environmental performance bonds can guarantee the following, for example:

- that companies which extract resources and which are potential sources of pollution take appropriate measures to minimise the environmental damage caused by their activities;
- that producers undertake a cost-effective restoration and clean-up of any residual damages left by their economic activities; and
- that sufficient funds are available for cleaning up waste and otherwise restoring environments damaged by an agent that has not complied with regulations (Panayotou, 1999).

1.7. Financial compensation for environmental damages on the basis of legal responsibility

To induce socially responsible behaviour on the part of agents who are potential sources of pollution, this type of instrument establishes legal responsibility, and with it financial compensation, for the following:

- natural resource damages;
- environmental damages;
- property damages;
- damages to human health or loss of life;
- non-compliance with environmental laws or regulations; and
- evasion of environmental taxes, rates and fees.

1.8. Subsidies for activities related to environmental protection

This category includes direct subsidies, loans at special rates, tax incentives and other concessions that motivate economic agents to change their behaviour in the face of different initiatives or courses of action with positive environmental externalities. Direct financial subsidies and tax exemptions are frequently aimed at helping industry purchase environmental equipment, invest in superior environmental technology, undertake reforestation or environmental restoration activities provide human resources training and fund research and development in cleaner technologies.

Tax incentives, such as tax exemptions, fiscal credits and provisions for accelerated depreciation of assets linked to pollution control, assess a lower initial taxation rate on this type of investment. Tax incentives can be associated with the environmental performance of a company over time, or they can be oriented toward the relocation of industries as part of a plan for industrial decentralisation. Within this latter category, a whole range of tax incentives can be applied to promote the installation of certain types of industry. These include lowering tariffs on capital inputs, property taxes and taxes on company profits. Such incentives have often motivated the excessive growth of activities with significant environmental impacts. A typical case of bad use of subsidies involves the excessive use of fertilisers, which carries tremendous environmental consequences. The literature on economic instruments, particularly the OECD literature, generally expresses considerable reservations when discussing subsidies, although they are wielded enthusiastically in countries that are new to environmental regulation (ECLAC/UNEP/SEMARNAP, 1998, P. 26).

Fiscal incentives and instruments that offer financing facilities and technical assistance have important applications when they are directed to promoting environmental investment in sectors characterised by small and medium-sized enterprises (SMEs). SMEs respond better to these incentives than to the imposition of charges or taxes because of the general nature of the companies and their cost structure. In these sectors, promotional instruments are necessary for mobilising investment in cleaner production technology, environmental infrastructure and environmental recovery and conservation activities such as reforestation.

1.9. End-user mechanisms

Activities aimed at influencing the behaviour of the end user do not constitute instruments per se, but rather entail so-called informal regulation schemes which generate incentives for companies via transparency and the public dissemination of information on their environmental performance and products. These instruments operate through reputation-based incentives that affect the company's image vis-à-vis the consumer, the company's position with respect to competitors in the market and even the company's worth in capital markets (Dasgupta, Laplante and Mamingi, 1998).

A few countries have implemented programmes that require companies to submit information on their pollution emissions to technical governmental agencies, which then publish indexes on environmental performance based on this information.⁷

⁽⁷⁾ The Pollution Emissions and Transfer Registration (RETC) programme, which is currently being implemented in Mexico, is one of the first attempts to apply this type of instrument in the region. See INE (1997). Details are also available on the Internet at <http://www.ine.gob.mx/dggia/retc/retc.html>. In Indonesia, the PROPER programme provides a successful example that has been very well documented. The Indonesian environmental agency, BAPEDAL, classifies companies according to their environmental performance using data on compliance with standards for discharging waste water. The environmental performance classification of the companies is published by the press and other communications media,

Recent studies demonstrate that informal regulation through the public diffusion of information on environmental performance, together with other external sources of pressure and community action, emerges as a significant factor explaining the differences observed in the regulatory behaviour of plants ((Hettige and others, 1996). The use of various eco-labelling and official certification schemes to evaluate the environmental performance of specific companies and products also generates incentives of this type; their use was extended considerably at the international level in the last decade.

Table 1 shows a wide range of instruments currently used for environmental management. The economic instruments mentioned in this section are those listed in the second and third columns of the table. The fourth column outlines the new schemes for informal regulation via reputation-based incentives and the public dissemination of information.

Table 1. Taxonomy of policy instruments applicable to environmental management

Direct controls	Market-based instruments			Litigation
Regulations and sanctions	<ul style="list-style-type: none"> • Charges, taxes and rates • Incentives and financing 	Market creation	Demand side mechanisms Voluntary initiatives and use of "Multiple Incentives" on regulated agent	Legislation Liability for environmental damages
<p>Standards: The Government regulates (a) the type and quantity of pollution emissions and (b) resource use.</p> <p>Compliance is monitored, and sanctions are imposed for noncompliance (e.g., fines, closures and prison sentences).</p>	<p>Emissions or user charges: The Government assesses a charge payable by the polluting agents or individual resource users, based on the quantity of pollution or resource used and on the nature of the medium that receives the effluents. The charge is sufficiently high to create an incentive for reducing environmental impacts.</p>	<p>Tradeable permits: The Government establishes a system of tradable permits for pollution emissions or resource use; sells or distributes the permits; and monitors compliance with the system. The pollution sources and resource users can freely trade their allocated permits at market prices, which fluctuate freely.</p>	<p>Benchmarking environmental performance:</p> <p>The Government supports a labelling or environmental benchmarking programme requiring producers to reveal environmental information on products destined for end use.</p>	<p>Strict legislation on environmental liability:</p> <p>The law requires that polluters or resource users pay for damages that affect third parties.</p> <p>The affected parties receive compensation through litigation and the judicial system.</p> <p>In some cases, law might also include penal provisions for environmental crimes in addition to "polluter pays" principles via monetary compensation.</p>

which thus generates reputation-based incentives for improving performance. The classification employs a scale of five colours, from gold for leaders in pollution prevention who go beyond the legal standard, to black for those who cause serious environmental damages. The classification has proved to be a simple, effective format for making information on the environmental performance of companies available to the public, media and financial markets in Indonesia. PROPER was initiated in June 1995, when BAPEDAL classified the performance of the 182 largest plants. That first publication cited only the names of the five plants whose efforts exceeded the standard, thereby giving them public recognition. Of the total number of plants, 65% were in situations of non-compliance; these were contacted privately and given six months to improve their classification before information on their performance would be made public. With the second edition of the publication, just fifteen months after the programme was initiated, the incentives generated by the programme had reduced the number of plants in a situation of non-compliance from 65% to 47% of the total. For more information on PROPER, see Wheeler and Afsah (2000).

Direct controls	Market-based instruments			Litigation
	<p>Fiscal incentives and financing facilities: The Government seeks to promote investment in cleaner production and technology, reforestation and other activities with positive externalities. Financing facilities oriented to environmental investments in SMEs and other priority sectors.</p>		<p>Other programmes include the adoption of voluntary performance-based certification like ISO 1400 (e.g., zero pollution discharge, mitigation plans, adoption of pollution prevention technology, recycle-reuse policies) and official labelling schemes of “environmentally friendly” products which create incentives via market perception.</p>	
Specific Examples				
<ul style="list-style-type: none"> • Standards or maximum pollution levels. • Licensing of economic activities that generate pollution. • Restrictions on land use. • Regulation of the impact of roadway, waterline and port construction and of phone line installation. 	<ul style="list-style-type: none"> • Charges for exceeding pollution levels. • Environmental taxes. • Royalties and financial compensation for natural resource exploitation. • Performance bonds deposited as a guarantee of compliance with construction standards. • Taxes that influence the choice of transport. 	<ul style="list-style-type: none"> • Incorporating “environmental costs” in the prices for construction expropriation. • Clearly defined property rights on resources that could potentially be affected by urban development (e.g., forests, land, fishing grounds). • Deposit-reimbursement schemes for hazardous and solid waste. • Tradable permits for water rights and for air and water pollution emissions. 	<ul style="list-style-type: none"> • Legislation requiring producers to publish information on their generation of solid, liquid and toxic waste. • Public lists of polluting companies. • Eco-labelling of consumer products with regard to harmful materials (e.g., phosphates in detergents). • Education on recycling and reuse. 	<ul style="list-style-type: none"> • Compensation for damages. • Responsibility on the part of company management that acted negligently and on the part of environmental authorities. • Long-term performance bonds deposited as a guarantee against potential risks in infrastructure construction. • “Zero net impact” requirements for installation of roadways, pipelines or right of ways for public services (i.e., power, water, etc.)

Direct controls	Market-based instruments		Litigation
<ul style="list-style-type: none"> • Environmental directives for urban transit systems. • Fines for discharging in ports or dumping on land. • Restrictions on materials for municipal solid waste collection services. • Water use quotas. 	<ul style="list-style-type: none"> • Taxes to motivate recycling and reuse of materials (e.g., tires and batteries). • Charges on effluents to reduce requirements for downstream water treatment. • Solid waste collection rates. • Water use charges. • Fiscal incentives for investment in clean technologies. • Earmarked funds for financing environmental investments. 		

Source: Adapted from Huber, R., J. Ruitenbeek and R. Serôa da Motta, "Market Based Instruments for Environmental Policy Making in Latin America and the Caribbean", World Bank Discussion Paper, No. 381, Washington, D.C., World Bank, 1998.

II. Applying economic instruments as an integral part of regulatory strategy

There is a growing consensus among analysts and experts that the application of economic instruments can complement the direct regulatory strategies that characterise the legal framework of most of the countries in the region. In particular, the flexibility inherent in such instruments allows agents to minimise the cost of complying with regulations, which in turn minimises the total cost to society of achieving goals for environmental quality.

Given the nature of this mechanism, using economic instruments more extensively would help the countries of the region lower the cost of achieving their specified objectives of improving environmental quality. With the exception of a few isolated cases, however, the Latin American and Caribbean countries to date have not undertaken a vigorous, systematic implementation of economic instruments for environmental management. Why haven't these instruments been implemented more extensively, and what can be done too achieve that?

2.1. Challenges in the implementation of economic instruments for environmental management

Over the last decade, a growing body of literature has emerged, documenting the challenges that both industrialised and developing countries face in the implementation of economic instruments for environmental management. The following discussion highlights the observations that are most relevant for Latin America and the Caribbean.

Budgetary deficiencies faced by environmental authorities

The experiences of industrialised countries demonstrate that in the application of economic instruments involving charges, rates and taxes, the revenue objective has predominated over the objective of creating incentives to improve environmental quality (ECLAC/UNEP/SEMARNAP, 1998; Panayotou, 1998). Collecting funds has been the primary role of economic instruments in developing countries, as well.⁸ Other potential objectives, such as reducing environmental impacts, improving environmental performance or increasing regulatory efficiency, have not received the same emphasis (Huber, Ruitenbeek and Serôa da Motta, 1998).

All signs indicate that revenue collection will continue to be the central objective of environmental regulatory institutions in most developing countries. One could argue that the ability to generate their own funds is in fact a prerequisite for environmental

⁽⁸⁾ The predominance of the revenue objective may have been augmented by the uncertainty inherent in attempting to affect quantities (of pollution emissions or resource use) by acting on price variables (through charges or taxes on inputs, emissions, effluents, etc.). Achieving environmental quality objectives through the application of charges, rates and/or taxes presupposes that at the moment in which the fees are set, the regulating body has the capacity to anticipate the degree of response (elasticity) by the polluting agents and resource users. In many cases, the necessary information for anticipating the degree of response by the regulated agents simply does not exist, and so the charges must be applied gradually in a process of trial and error until the desired objective is achieved. Furthermore, in order to attain political approval, the applied charges must often be set below the level at which targeted agents would be motivated to change their behavior significantly enough to improve the parameters of environmental quality. Experience indicates that in general the regulatory institutions find it more feasible to design an environmental charge, rate or tax that carries a specific revenue objective, than to address the technical demands of designing a system of charges that achieves a specific improvement in environmental quality.

regulatory institutions if they are to develop the strength and technical capacity to realise the full potential of these instruments for achieving significant improvements in environmental quality. Revenue collection alone does not guarantee a successful environmental management, however. The funds received should be channelled toward local authorities to strengthen their institutional capacity for environmental management and to contribute to the infrastructure investments required in each case.

Applying economic instruments to generate fiscal income earmarked for specific environmental objectives is becoming increasingly important in several countries. The most successful programmes are those in which (a) the charges, rates and/or taxes are linked to existing collection systems and (b) the resulting income is channelled toward decentralised authorities for the purpose of carrying out environmental programmes and institution building (Huber, Ruitenbeek and Serôa da Motta, 1998, p. 2). Earmarking funds received from environmental charges, rates and taxes has also contributed to the political acceptance of applying these instruments. In particular, tax payers are more willing to pay charges or taxes, for example, when they are specifically targeted to the provision of an environmental service or programme that the tax payers support, when the applied charges are justified to cover the cost of a clean-up programme or when the funds are used to reinforce the local sanitation infrastructure. For these reasons, governments are increasingly earmarking resources derived from environmental charges, despite the fact that targeting resources is normally avoided in public finance.

Increasing the use of earmarked environmental revenues in the region presents important challenges with regard to the collaboration between environmental and fiscal authorities. In general Latin American countries have little experience with this type of collaboration. Achieving a more substantial collaboration will probably depend on the initiative and technical sophistication of the environmental authorities and the extent to which the fiscal authorities can be motivated to politically support the application of targeted collections for specific environmental ends in the coming years. Given the need for environmental institution building and technical development in the region, the generation of earmarked revenues is considered one of the areas with the greatest potential for increasing the application of economic instruments in the countries of the region.

The Inter-American Development Bank (IDB) echoes this need in the closing recommendations found in its study on the legal and institutional framework of environmental management of the Southern Cone countries.

"Stringent financing constraints at all levels of environmental management were encountered in this analysis. One of the options to mitigate these constraints is to link fund-raising or environmental protection to the income-generating capacity of the sector itself. To do so, specific legislation must be enacted to change the prevailing mechanism of allocating all fiscal receipts to the national budget without distinction of origin and the possibility of earmarking them for specific expenditures."

IDB goes on to recommend the following specific actions:

"Review all sources of funding for environmental management. Promote a participatory discussion with government agencies on current sources of funds for environmental management and possible improvements. Enact legislation earmarking receipts from environmental fees, fines, and other charges to environmental agencies."

Source: IDB, "Environmental Management in the Southern Cone. Final Report", Recommendation, No. 14, Washington, D.C., Inter-American Development Bank, December 1996.

Similarly, in the executive summary of a World Bank study on market instruments for environmental management in eleven Latin American countries, earmarking revenues is identified as one of the three most important areas that merit future attention.

"While the revenue collection task of MBIs [market-based instruments] has been highlighted, there still is a strong need to channel revenues to local authorities to assist in building institutional capacity."

Source: Huber, R., J. Ruitenbeek and R. Serôa da Motta, "Market Based Instruments for Environmental Policy Making in Latin America and the Caribbean", World Bank Discussion Paper, No. 381, Washington, D.C., World Bank, 1998.

2.2. Compatibility of economic instruments for environmental management with the sectoral policy framework

Far from operating in a vacuum, the design and application of economic instruments for environmental management occur within a context of other macroeconomic or sectoral policy decisions which often have a much greater effect on agents' behaviour with regard to the environment than does the incentive structure that the environmental regulator is able to manipulate. The latter must occasionally seek to promote "corrective actions for the negative effects of other economic instruments employed by different governmental bodies besides the environmental regulator. Part of the environmental regulator's job should be designing instruments to counteract market failures which lead other decision makers to implement decisions that are harmful for the environment or even correcting market failures induced by these decision makers."⁹

These observations suggest that the effectiveness of instruments applied to environmental management ultimately depends on their coherent articulation with the rest of the public policy framework in which they operate. This fact necessitates coordination and collaboration between the environmental authority and the authorities of other productive areas (e.g., agriculture, mining, industry, etc.), although in fact this is often absent. Some experts hold that in order to achieve this objective, countries must establish a legal framework which systematically defines the modalities for applying economic instruments in environmental management and the form in which the different governmental bodies should work toward their implementation. Beyond a formal treatment through legislation, this discussion brings to light the challenge environmental authorities face in improving their capacity for dialogue and articulation with other economic authorities throughout the process of implementing this type of instrument in environmental management.

2.3. Challenges presented by the prevailing juridical-institutional conditions

Various authors indicate that important challenges and room for improvement can be found within the juridical-institutional conditions under which environmental management is developed in the region. Among the juridical-institutional characteristics that condition environmental management are the following:

- A wide dispersion of environmental management responsibilities among various national, regional and local bodies;

⁽⁹⁾ A typical sectoral example involves the agricultural development policies that establish implicit subsidies on the use of chemical fertilizers, with disastrous health and environmental impacts on the soil, water and even the atmosphere. Environmental regulators are then forced to search for solutions to a problem created by another economic instrument which did not take these externalities into account in its design (Giner de los Ríos, 1997).

- Conflicts and contention with regard to areas of competence, which arise among the various environmental management agencies as a result of the dispersion of responsibilities and the lack of clarity in the definition of agency boundaries;
- Conflicts of interest within agencies which must carry out the dual function of promoting natural resource exploitation while also administering and controlling natural resource use;
- Limited autonomy for the environmental authorities because they are appointed by other agents of the State which are charged with promoting sectoral development (e.g., Ministry of Agriculture);
- Lack of a national environmental agency with the authority to coordinate the environmental management efforts of the various local, regional and national bodies and with the ability to serve as an effective liaison among the different State and private actors working toward sectoral development; and
- Shortage of adequate channels for civic participation through which interest groups could assert their demands in the face of State environmental management policies and play an active role in planning and financing compliance (Rodríguez and Uribe, 1995; Sejenovich and Abraham, 1995).

2.4. Extensive administrative requirements of applying economic instruments for environmental management

Experience suggests that the effective implementation of economic instruments requires an extensive administrative effort. In practice, many countries find that the application of economic instruments for environmental management implies administrative costs similar to those incurred in the administration of command-and-control regulations.¹⁰ Monitoring and other control activities which are necessary to ensure compliance with command-and-control regulations are also necessary when applying economic instruments. The administrative requirements involved in monitoring companies, designing a legal framework, conducting public inquiries and operating control and collection mechanisms are not markedly different for economic instruments than for strict command-and-control regulations. The application of economic instruments may even entail additional administrative efforts to address the institutional changes and design requirements which arise in the course of applying these instruments. For these reasons, the literature is unanimous in advising that economic instruments cannot be viewed as a substitute for weak environmental institutions or for command-and-control regulations in environmental management (Huber, Ruitenbeek and Serôa da Motta, 1998).

The administrative aspects of implementing economic instruments require strong environmental institutions. Factors such as an insufficient budget, inexperience and weak political support seriously limit the possibility of successfully implementing any environmental management effort, whether through economic instruments or direct regulation.

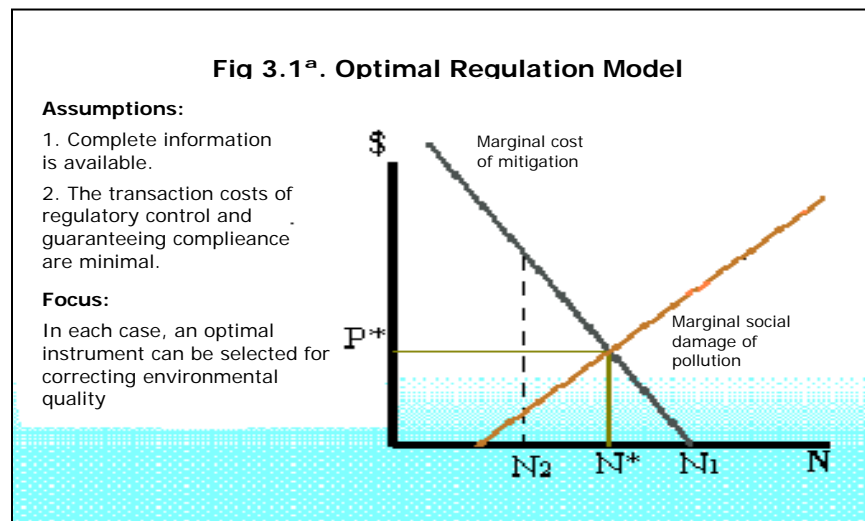
⁽¹⁰⁾ Although the administrative costs of applying direct regulations and economic instruments are similar for the regulatory agency, the private costs of complying with environmental standards are lower in the case of economic instruments because of their flexibility.

III. Proposals for the implementation of economic instruments

Strictly applying the theoretical model for the internalisation of environmental externalities is not very feasible in practice, given the constraints discussed above with regard to information, transaction costs and juridical-institutional conditions. Environmental authorities must therefore design mixed regulatory strategies which are feasible within the context of their national situation, taking advantage of complementarities and synergies that arise among the mechanisms for direct regulation, economic instruments and informal regulation via the diffusion of information to various actors. Combining these different elements in a coherent regulatory strategy represents a real challenge in creativity and innovation, but the results can be more effective and practicable than pursuing isolated efforts to implement economic instruments. The following discussion summarises the recent literature on mixed regulatory strategies that draw on multiple incentives and actors to achieve the objectives of environmental management.

3.1. Regulatory models with multiple actors and multiple incentives

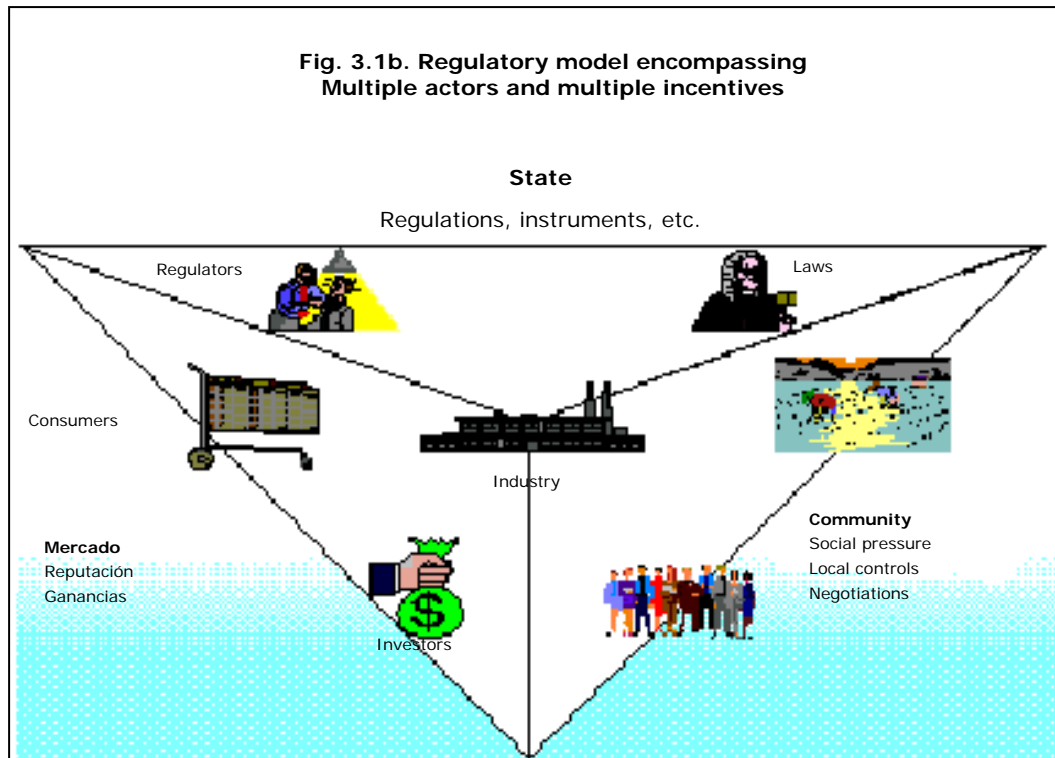
In the classic “optimal regulation” paradigm, the State plays a central role. Two principal actors—the regulatory agent and the Law—establish regulations for economic behaviour and ensure compliance on the part of private agents who are the object of the regulation. The regulatory problem in this idealised scenario is very concrete. First, the regulator determines the “optimal level of pollution” (N^*), using complete information on the marginal costs of mitigation and the marginal damages caused to society (see figure 3.1a). Next the regulator introduces direct regulations or market instruments to achieve the determined optimal level N^* . Once the regulations are in place, the regulator is capable of making companies comply with the terms of the mandate, with minimal transaction costs. In this theoretical scenario, the regulator, by definition, is the only agent with the power to make decisions and the only party responsible for the environmental management outcome (Afsah, Laplante and Wheeler, 1996).



Source: Afsah, S., B. Laplante and D. Wheeler, “Controlling Industrial Pollution: A New Paradigm”, World Bank Policy Research Working Paper, No. 1672, Washington, D.C., World Bank, 1996.

Experience clearly shows that the basic assumptions, on which the optimal regulation paradigm rests— namely, complete information and zero transaction costs—do not hold in practice. Environmental agents often face informational constraints with regard to monitoring environmental quality and emissions, which make it difficult to evaluate compliance and data on the marginal costs of mitigation are almost never available. The existing information on environmental quality and on water and air emissions tend not to be computerised and to be maintained by separate entities which rarely communicate with one another. These circumstances have serious implications for the implementation not only of command-and-control regulations but also of economic instruments, and they call into question the assumption that the regulator is the only source of pressure capable of acting on polluting companies to improve their environmental performance (Afsah, Laplante and Wheeler, 1996).

Afsah, Laplante and Wheeler (1996) offer an alternative to this traditional view of the regulatory relation. They propose a model of interactions among four agents: companies, the State, the community and the market (see figure 3.1b). This regulatory model emphasises a *process* of multiple incentives that act on the polluting source or agent through multiple instruments, including not only economic instruments but also direct regulation and informational mechanisms. The collection of multiple incentives stimulates a process of regulatory pressure, negotiation and consensus building among the agents involved in the regulatory scheme. In practice, efforts to reduce pollution and improve the environmental performance of companies evolve through precisely this type of process.



Source: Afsah, S., B. Laplante and D. Wheeler, "Controlling Industrial Pollution: A New Paradigm", World Bank Policy Research Working Paper, No. 1672, Washington, D.C., World Bank, 1996.

The multiple incentives model more closely captures the complexity of regulatory relations and points to the complex role of the regulatory agency in successfully attaining the objectives of reducing pollution and improving environmental quality. This role can no longer be limited to designing, monitoring and enforcing regulations and optimal instruments which in practice face serious constraints to their implementation. Rather, the role of the regulatory agency should be broadened to that of an orchestrating agent who generates multiple incentives using public pressure and the market as leverage via non-traditional programmes. Traditional regulatory strategies can thus be reinforced and complemented with a public information approach, for example, through the public diffusion of indexes on corporate environmental performance, voluntary compliance programmes and other programmes that incorporate civic participation and reputation-based incentives in environmental control.

Principles for the use of information in the new regulatory models

- Emphasise the publication/transparency of information, or at least ensure that it reaches all relevant decision-making agents and stakeholders involved: To increase the effectiveness of control efforts and compliance with standards, a regulatory agency should allocate resources for generating, publishing and effectively disseminating information. This requires trustworthy data and integrated information, so regulators are able to establish priorities that reflect the relative costs and benefits of different options. The availability of precise, current public information that correctly evaluates the environmental performance of companies is equally important; by directing such information toward markets and the community, regulators can generate external incentives for improving performance.
- **Orchestrate, don't dictate:** The regulatory agency is just one of the actors involved in the scenario. The agency can indirectly influence polluting companies through other agents; such activities can be as important as direct control efforts. Environmental education programmes in affected communities, the publication of indexes on the environmental performance of manufacturing plants and technical training for environmental personnel in contaminating industries are a few examples of possible sources of leverage.
- **Encourage participation:** The regulatory agency can facilitate the incorporation of voluntary efforts by providing trustworthy information on emissions and local environmental quality, technical alternatives for mitigation and the transfer of experience from other areas.
- **Learn from pilot experiences:** Given the complexity of the process of implementing environmental policies and the attendant uncertainties, it is difficult to know in advance which instruments will work best. Instead of committing to large-scale programmes, regulatory agencies should follow a structured learning process, starting with the implementation of pilot programmes and then gradually building their information systems in order to monitor developments in the implementation process. The agencies can design bigger programmes as they gain experience.

Use flexible instruments: Developing countries are generally dynamic, and they sometimes experience rapid changes in environmental quality. Environmental institutions should be able to adapt quickly to these changing conditions. The mandate of the regulatory agencies should therefore include the capacity to adjust environmental regulation in response to processes of environmental degradation.

Source: Adapted from Wheeler, D., "Information in pollution management: the new model", *Brazil: Managing Pollution Problems. The Brown Environmental Agenda*, World Bank Report, No. 16635-BR, Washington, D.C., World Bank, June 27, 1997.

The following discussion outlines two generic implementation processes that environmental regulatory institutions could follow to introduce economic instruments as an element of their regulatory strategies.

3.2. Model of the implementation process given an “average” level of institutional capacity

The process described below is presented as a possible model for implementing an economic instrument such as environmental charges, rates or taxes¹¹ to be orchestrated by the representative regulatory agencies of the Latin American countries which are the most advanced with regard to environmental institutions.

Proposed steps:

- a) Clearly establish both the objective of the instrument and the field of action for its application, in terms of the environmental problem which the agency aims to control. This implies defining the group of agents to be regulated in terms of their size, number, contribution to the problem, location and process of production or exploitation. If the instrument is aimed at controlling the actual pollutants, the products or natural resources involved must also be defined, in addition to the processes.
- b) Clearly establish the goal that the agency should seek to achieve through the incentives generated by the instrument, whether it be in terms of a specific amount of revenues (in the case of charges or taxes) or a quantifiable improvement in environmental quality (reduction of pollution, etc.). Defining the goal may imply a process of negotiation and consensus building among the various actors involved.
- c) Earmark the collected funds. For example, the funds could be applied to specific environmental programmes run by local authorities, or they could increase or substitute other fiscal revenues. This implies a process of negotiation and consensus building with the fiscal authorities.
- d) Establish a gradual transition period culminating in full application. This could entail investing in technical training for the relevant parties, political consensus building and adjusting the design of the instrument during pilot tests in restricted areas or on a limited number of agents. All these efforts should be oriented toward facilitating implementation and making the application of the designed instrument feasible within the limitations of each case.
- e) Formulate specific guidelines for the instrument, sanctioned by law, decree or resolution on the part of a competent authority. These should include the instrument's environmental justification; its field of action; pertinent parameters; periods for implementation, re-evaluation of objectives and adjustment; area of application; taxation, control and sanctioning mechanisms; and other relevant administrative procedures. The regulatory project draft should be submitted for discussion to a work group comprising representatives of the different interests involved.
- f) Establish institutional responsibilities and then proceed to implementation, assigning important roles to regional and municipal governments. Private-sector businesses and civic organisations should also be incorporated in the process through voluntary agreements and

(11) This type of instrument is known in the literature as a Pigouvian tax.

information programmes that complement and reinforce the objectives being pursued through formal regulation.

- g) If revenue collections are successfully earmarked for environmental programmes, seek to use these funds in innovative ways by establishing regional or local environmental funds to underwrite municipal environmental infrastructure, finance clean production projects and strengthen the technical and institutional capacity of the environmental management authorities.

3.3. Model of the implementation process given a “weak” level of institutional capacity

The process described below is presented as a possible model for implementing an economic instrument to be orchestrated by the representative regulatory agencies of the Latin American countries whose environmental institutions are less experienced.

Proposed steps:

- a) Identify a limited number of the most important sources of pollution which the agency can effectively regulate with existing resources.
- b) Mobilise political and community support for initiating action.
- c) Gather information to help establish a relation between the pollution reduction measures to be applied to the identified sources and the achievement of the environmental quality goals that the regulatory body has set for designated watersheds and atmospheric pollution areas. Invest in the progressive development of integrated information systems for environmental management.
- d) Use cost-effectiveness analysis to establish priorities among the alternative measures to be applied. Study different methods of introducing charges, and choose one that features a simple means of collection and at the same time affects the actual externality or polluting process as directly as possible.
- e) Experiment with a combination of cost-effective measures of direct regulation together with the application of modest, easily managed charges. Ideally, at least a portion of the collected fees should be earmarked to strengthen the technical capacity of the authorities responsible for environmental management.
- f) Gradually move toward an optimal combination of policies as environmental goals are achieved, better information is generated and the institutional capacity for applying instruments with greater administrative requirements is developed.
- g) Explore opportunities for complementing earlier efforts by initiating informal regulation through voluntary programmes in coordination with the private sector, public dissemination of information on environmental performance, etc.

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