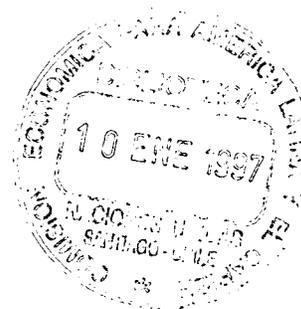


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**APPLYING ECONOMIC INSTRUMENTS FOR ENVIRONMENTAL MANAGEMENT  
IN THE CONTEXT OF INSTITUTIONAL FRAGILITY:  
THE CASE OF LATIN AMERICA AND CARIBBEAN\***

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## Introduction

The use of economic instruments -market-based instruments (MBIs)- is at the top of the agenda of the environmental management sector (EMS) in Latin America and Caribbean. Several studies have already attempted to describe and analyze them *vis a vis* the current OECD experiences.<sup>1</sup> That approach will be somewhat avoided in this paper since our main focus will try to capture intra-regional features instead.

As can be seen in the following table, countries in the region are already implementing a very wide scope of MBIs.

### *Market oriented instruments are seeing wider application in LAC*

	Barbados	Brazil	Chile	Colombia	Ecuador	Jamaica	Mexico	Peru	Trinidad & Tobago	Venezuela
Credit Subsidies	♣	♣		♣	♣		♣			
Tax/Tariff Relief	♣	♣	♣	♣	♣	♣				♣
Deposit-refund Schemes	♣	♣	♣	♣	♣	♣	♣	♣	♣	♣
Waste Fees&Levies	♣	♣	♣	♣	♣	♣	♣		♣	♣
Forestry Taxes		♣		♣						♣
Pollution Charges		♣		♣		⊕	♣			
Earmarked Renewable Resources Taxes		♣		♣	♣					
Earmarked Conventional Tax Levy		♣		♣			♣			
Tradable Permits			♣				⊕			
Eco-labelling		♣	♣		♣		♣			
Liability Instruments				♣					♣	

♣ in place

⊕ under discussion

<sup>1</sup>See for example, Erocal (1991), Eskeland and Jimenez (1992), Panayotou (1993), UNEP (1994) and OECD (1994). The taxonomy used here will be, however, following the one adopted in these texts.

The current trend towards MBIs in the region is basically due to (i) the limited performance of the “comand and control” approach (C&C) and (ii) the need to generate earmarked revenue to the EMS.

The principles and instruments of environmental management emerged from the 1974 Stockholm Conference were promptly introduced in the region since the seventies. Currently, capturing the political upgrade of ecological issues, consolidated in the Rio UNCED Conference, the region EMS has gained ministerial status and a wider legal and institutional basis. Economic incentives are now openly accepted within the EMS and very welcome in the current liberalisation of regional economies.

However, public awareness of MBIs is very low regarding their potential benefits and very high towards their possible resulting economic and social costs. Benefits arising from efficiency in natural resource allocation and revenue generation are misperceived whereas competitiveness losses and equity issues are overexposed.

Although these perceptions are also commonly found in OECD countries, they tend to be serious barriers in the region due to its low degree of institutional development. Public sector’s new role in the continent has not been either implemented or, sometimes, redefined to deal with freer market and trade and macroeconomic stabilisation.

The historical institutional fragility is now under higher pressure from lower budget allocation and increasing and different demand for regulation. MBI experiences in this context have been characterised as initiatives beyond institutional capacity which has resulted in weak governmental integration and public participation. The consequent lack of careful analysis and discussion of potential economic and social impacts arising from these MBI proposals have not allowed consensus building which could avoid legal and institutional barriers.

It has been a long process of learning and those problems are today being accounted within the country’s EMS.

Because of that, the main objective of this study was to facilitate the sharing of these country’s experiences. So far, most of MBI experience sharing has been between OECD and developing countries. The objective of this study is, therefore, to create an opportunity to bring about lessons on MBI uses among countries with more comparable institutional capacity. Some of those findings will be presented in this paper as a reduced version of the study’s main report.

The study was sponsored by the Division of Latin America and Caribbean (LA3EU) in the World Bank and its full and revised version will be soon published by the World Bank by the title: **“Market Based Instruments for Environmental Policymaking in LAC Countries”**.

The main lessons learnt from the country’s surveys pointed out what can and cannot be translated into other country reality. To achieve that, the study has adopted an original approach. A panel of ten countries -Mexico, Jamaica, Barbados, Trinidad&Tobago, Venezuela, Colombia, Ecuador, Peru, Chile and Brazil- was formed and local experts were assigned to elaborate a country report (cited in the Bibliography) to address legal, institutional and political barriers and the importance of macroeconomic and sectoral policies affecting MBI application for environmental management, particularly in the urban setting context.

The results were far beyond the expectations. Not only very interesting MBI cases were reported but a clear view of the current status of MBI enforcement problems was revealed.

Most of the MBI cases reported are genuine attempts to conform MBI to each country economic and cultural characteristics. However, weak public participation inherited from

yesterday's authoritarian regimes, general public sector crisis and social inequalities are very difficult barriers to be quickly overcome and to be framed in sound and enforceable policies. It is a task to be carried out with great deal of effort and long maturation.

MBI use can be an important, if not the main, resort to introduce efficiency and enforcement in the current C&C instruments. To do so, the EMS has, above all, to match MBI scope with its current institutional capacity. Gradualism and flexibility are promising catchwords.

Information building and sharing are key issues to promote intra and intergovernmental integration and public participation which helps to remove legal and political barriers and merge institutional strengths. Leadership and expertise of EMS have to be exercised without insulation.

Market reliance policies in the region are the most favouring factor to MBI initiatives. Therefore, it has to be emphasised and captured in the MBI design.

Those are the main messages arising from this cross-country survey review carried out. They are not new ones, but we hope that this analysis may broaden up the conventional wisdom on MBI use in the region.

The next Section describes the legislative and institutional settings of the environmental management sector of the panel's countries. Section 2 analyses the current experience with MBIs in these countries. Additional MBI design issues arising from this analysis are covered in Section 3. Finally, the concluding remarks of the last Section, rather than definitive prescriptions, suggest that conventional wisdom may need to change to incorporate a more coherent view of the use of economic instruments in LAC within a context of *institutional fragility*.

## SECTION 1

### Institutional Frameworks in LAC

This Section describes the legislative and institutional setting in the study countries that will form, as here denominated, the environmental management sector. Major lessons are drawn within a context of promoting 'institutional sustainability'. A key theme of this Section is that various institutional factors will continue to constrain the implementation of any form of environmental management: whether it takes the form of a CAC or MBI approach.

"LEGISLATION is really not the critical factor in environmental improvements. Legislation cannot guarantee that the intent of the legislator will be implemented in practice. The major problems result from the difficulty of establishing control and enforcement mechanisms to apply the legal provisions."

United Nations Environmental Programme, 1976.

### Institutional Development in LAC

Many of the countries in the panel have been proceeding through a similar rationalization process. But the cross-section suggests that the full movement to a completely streamlined environmental management sector in each country is far from complete.

### *Legislative Basis*

The legal frameworks, while based on international parameters, have – as would be expected – been tailored according to each country's pattern of resource exploitation and degradation. For example, countries with a larger industrial base – such as Mexico and Brazil – have been more prone to address industrial issues as a priority. Peru and Chile, by contrast, have focused on mining and fisheries while Caribbean states have concentrated on environmental impacts associated with tourism activities.

But in spite of local nuances, environmental policies in Latin America today can be regarded as highly sophisticated by international standards and there are numerous common elements in the panel. Most of the countries rely on an umbrella environmental law and have already established executive environmental agencies. Countries such as Colombia, Peru and Venezuela have environmental targets entrenched within their National Development Plans; these plans also include references to economic instruments.

In addition, and particularly in South America, the new constitutions promulgated during the recent democratization period present specific chapters and amendments on environmental issues regarding conservation goals, use of natural resources and liability measures.

Codified legislation is basically very similar across the panel. The various laws and acts typically provide guidelines for environmental management by establishing guiding principles, goals and instruments for environmental policies. Based on the laws, enabling regulations, norms and procedures are defined by the environmental agencies. The proposed instruments are mainly command-oriented ones. Standards and sanctions, licensing permits, zoning guidelines, environmental impact assessment (EIA) requirements and liability actions are found in most cases with only slight design differences. They are longer established and more numerous in Mexico and Brazil, perhaps due to a higher degree of industrialization and urbanization.

The main regulated areas are also very similar. Conservation norms, such as, preservation areas and clearing restrictions have generally been in place for a long time; in some instances they were first proposed more than 60 years ago. The exploitation of natural resources, such as fisheries, mining and forestry, are usually highly regulated through zoning and licensing schemes. Also, water use is an area of traditionally intense regulation throughout the panel.

Pollution issues have been introduced more recently. Due to the rapid industrialization and urbanization of many of these countries from the 1970s onwards, pollution from waste water discharges and air emissions was immediately fit into the 1974 Stockholm Conference's environmental management pattern; this resulted in the promulgation of standards, sanctions, EIA requirements and licensing procedures that were heavily targeted to the industrial sector. Mobile sources of air pollution are currently high priority areas resulting from the growing car fleet and unsolved public transport problems.

The most recent legislative development concerns solid waste collection and treatment from households and commercial activities. Sanitation, traditionally targeted within the public investment arena, has been now introduced into the environmental agenda at the highest priority level as water supplies and aquatic habitats are being seriously threatened and as health costs increase.

### *Institutional Basis*

Institutional fragility remains a well recognized key barrier to successful governmental management in LAC. The case of environment, rather than an exception, can be seen as a typical example since environmental management demands strong governmental integration, public participation and budgetary needs. Although the institutional rationalization process has progressed to accommodate both intersectoral and decentralized authorities, many of the institutions are still very weak.

A specific environmental sector within the government is found in all countries in the panel (Table 1). Federal management today is concentrated at a ministry level or in national councils (as in Chile and Peru). Environment secretariats and executive agencies are also in place at regional levels. Although most countries have created executive agencies, overlapping mandates among related sectoral agencies are a common feature in the panel. General roles and responsibilities might include diverse functions such as implementation of economic incentives, preparation of environmental assessments, delegation to local authorities, or initiation of public participation processes.

#### Intersectoral Authorities

In some countries – such as Brazil, Chile and Peru – regulations are discussed by cross-sectoral councils, on which different governmental and private sector agencies have representatives. In Peru, the environmental sector has only been recently organized to address urban sector pollution issues. But the degree of integration among the various agents, within all of these countries, is very low.

Sanitation and water companies are usually controlled by states and municipalities whereas solid waste collection is run mainly by municipalities. Energy matters are typically regulated within energy agencies without effective participation of the environmental agencies. Usually green (forestry, fishery and fauna/flora protection) and pollution issues are empowered to distinct agencies within the environmental sector and sometimes, as is the case of Peru and Barbados, within distinct renewable resource sub-sectors. Such arrangements have led to multiple instances of conflicting jurisdiction with existing agencies, and to inconsistent norms and sanctions.

In general, integration between the environmental sector and other governmental sectors is very weak. Because of this, environmentally harmful sectoral incentives are often designed with the exclusion of input from the environmental sector.

#### Decentralized Authorities

Since the 1970s countries like Brazil, Colombia, Venezuela and Mexico have had a decentralized management structure where regional agencies are responsible for applying federal norms and for introducing appropriate regional adjustments. However, weak integration between federal and regional levels is often identified as a serious institutional problem.

Regional decentralization is mostly located at state levels and in some cases at municipalities with very high proportion of national population (such as Quito, Santiago and Bogota).

### **Competence and Uncertainty**

#### *Human Resource Constraints*

Relationships within and among legislatures typify the continental tendency of these representative houses to overlegislate. Parliamentary participation on executive bills is usually

## LAC countries have distinct environmental management sectors.

**Table 1**  
**Environmental Management Sector in LAC**

Country	National Environmental Law	Ministry of Environment	Environmental Constitutional Chapter	Executive Environmental Agency
Barbados	×	✓ in process	×	×
Brazil	✓ 1981	✓ 1991	✓	✓
Chile	✓ 1994	✓ 1994*	✓	✓
Colombia	✓ 1993	✓ 1993	✓	✓
Ecuador	✓ in process	✓ 1994	×	×
Jamaica	✓ 1991	×	×	✓
Mexico	✓ 1988	✓ 1994	✓	✓
Peru	✓ 1990	✓ 1995*	×	×
Trinidad & Tobago	✓ 1995	×	×	✓
Venezuela	✓ 1976	✓ 1976	✓	✓

\* National Commission.

passive by ignorance and reactive by lobby interests. Parliamentary initiatives on environmental legislation are often passed without active agency engagement. The failure to establish channels of expertise within these houses has hampered the possibilities of designing or promulgating easily enforceable laws.

These intra- and inter-governmental integration issues reflect the degree of institutional capacity in the continent. The environmental sector in these countries has been facing serious budgetary problems. Even in cases where earmarked resources are available, the amount reaching the sector is usually reduced by accounting devices within the governmental financing bureaucracy.

Because of public and political pressure, services required from the environmental sector are growing fast. However, budget allocation has not followed this same pattern. Even if investments on laboratories, monitoring network and other equipment are made available from external sources (earmarked revenue, international agency's loans, foreign aid and NGO funds), environmental agencies still lack appropriate human resources to make efficient use of them. Because of the low level of public servant remuneration – imposed across the continent as a result of the necessary macroeconomic stabilization policies – the public sector in general can hardly keep their qualified workers and count on the expertise available in the market.

Goals, norms and instruments are therefore set above the current managerial, monitoring and enforcement capacities at the disposal of environmental agencies.

Finally, environmental public awareness has increased in urban areas where certain environmental costs have already accrued to the majority of the population. But the costs of protection are not yet fully grasped by the population as a whole. In areas where the

environmentally regulated activity is the main source of income, political barriers are reinforced by public opposition.

### *Uncertainty*

It is a general understanding that environmental legislation in the continent contains the most advanced norms and procedures already undertaken in richer countries. But the lack of systematic and qualified monitoring – and consequent lack of reliable inventories, databases and indicators – detracts from the effective enforcement of reliable standards. For example, the failure to generate data and indicators has made zoning and permit instruments completely ineffective. Lack of staff and expertise to analyze EIAs and auditing reports turn such monitoring exercises into costly procedures with very low effective results in terms of environmental improvement. This lack of enforcement creates uncertainty within the investment community and tends to perpetuate non-compliance.

Political constraints often impede heavy sanctions on non-compliance, particularly in sensitive economic sectors. The threat of job losses in small cities or in declining regions – arising from the enforcement of sanctions – represents a very powerful reason for the public to accept governments' otherwise arbitrary relaxation of sanctions. Frequently, this results in the over-ruling of penalties and defaults or in the postponement of abatement and preservation measures established in official agreements.

Finally, when enforcement does succeed, the court system – historically clogged with other claims – imposes its own delays in prosecution.

### *Political Barriers and MBRs*

The above difficulties faced by environmental management in LAC can only be overcome by addressing certain political barriers.

As noted earlier, environmental management faces the effects, in terms of budget constraints, resulting from the general crisis affecting the public sector in the continent. Consequently, structural adjustment policies remain part of the development agenda in LAC.

Macroeconomic stabilization plans attempt to limit public expenditure and to eliminate sources of price escalation. Consequently, environmental policies that seek to internalize environmental costs (either through CAC or MBIs) within the economic system are not easily accepted politically, even if they have economically and environmentally beneficial consequences.

Further, the need to find short-term incentives for rapid growth tends to create opposition to any environmental regulation that restricts investment. Although new capital stock normally includes cleaner technologies, bureaucratic procedures often impose delay costs through a 'regulatory drag'. Even if the production system as a whole may not be heavily affected by stricter environmental enforcement, some sectors and some firms may be hit hard because of their historical investment patterns. For example, environmental problems may be intractable where old vintage capital embodies inefficient and dirty technologies and where environmental conversion costs can be higher.

In short, both MBI and CAC procedures face similar difficulties: even if such procedures appear to be environmentally and economically beneficial, they may be politically unacceptable if they appear to be inconsistent with other MBRs.

## Summary

Countries within the panel have undergone substantial environmental reforms over the past decades, both in terms of their legislation and their institutions. On paper, it would appear that everything should be in place to enable improved environmental management. In reality, however, a number of persistent constraints continue to hamper effective management. Foremost, institutions are themselves still weak and lack an adequate degree of participation among stakeholders: new norms and standards often conflict with existing conventions or with current structural adjustment efforts.

The major implications that this has for continued development – of either CAC regimes or MBI regimes – is: (i) institutional strengthening, in particular through human resource development and through financial support to local agencies, is a high priority in all LAC countries; and, (ii) the implementation of either MBI or CAC regimes must take into account existing MBRs.

## SECTION 2

### Market Based Instruments in LAC

This Section describes the current experience with MBIs in the study countries. As previously discussed, environmental management in the country panel has historically been based on CAC instruments. However, the study survey presents a number of market-oriented experiences already in place in the region. The survey demonstrates the relatively wide experimentation with MBIs, and on their focus as a revenue generating device. It also reveals the need for strong institutions to implement MBIs. As additional detail is provided in the Executive Summaries for each country study, this Section highlights some of the more commonly used instruments; tradable permits (which have seen only limited application) are discussed in the following Section because of their added complexity.

#### Credit and Tax Incentives

Most of the countries in the panel offer subsidized credit and taxation relief for environment related investments, as shown in Table 2. They cover abatement investments or clean technology adoption in the industrial sector in Brazil, Mexico and Colombia, the tourism sector in Barbados, reforestation activities in Chile and Colombia, mercury emission control in artisanal mining in Ecuador, cleaner energy uses in the Caribbean, Ecuador and Brazil (solar, wind and gas/hydroelectricity sources, respectively) and CFC phase-out in Colombia, Chile and Brazil.<sup>2</sup> Only in Peru, where environmental management is very recent, is no experience reported, although the new legislation has generated some initiatives.

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<sup>2</sup> Other countries in the region have also used such incentives. In St. Lucia, a solar water heater subsidy is credited with increased sales of such units. In Argentina, a 1995 tax exemption has induced widespread adoption of compressed natural gas (CNG) vehicles as a more environmentally benign substitute for diesel or gasoline vehicles.

Subsidies for abatement investments have, however, been of limited impact since environmental enforcement has not been effective enough to increase firms' demand for these expenditures. Moreover, it is reported that firms are using these incentives inadequately because of the lack of proper follow-up procedures, in fiscal and environmental terms, to monitor their investments.

	<b>Credit Subsidies</b>	<b>Taxation/Tariff Relief</b>
Barbados	To defray costs of environmental technologies in the tourism sector	Income tax rebate for water conservation and solar energy use in the tourism sector
Brazil	For abatement investments in the industrial sector	Income and value added tax rebates for clean technology adoption
Chile		For forestry activities
Colombia	For abatement investments in the industrial sector	Income and value added tax rebates for abatement investments
Ecuador	For investments on mercury recovery in artisanal mining	For investments on mercury recovery in artisanal mining
Jamaica		For abatement investments in free zones
Mexico	For abatement investments in the industrial sector	
Venezuela		For abatement investments in the industrial sector

Subsidies for resource inputs, however, have been successful MBIs in dynamic markets. Reforestation subsidies have been an important factor for forestry sector expansion in Chile (reforestation of 1.7 million ha in 20 years), whereas energy subsidies have succeeded in Barbados and Ecuador to foster energy substitution.

### **Cost-Recovery Tariffs**

Pricing of water supply, sanitation, solid waste collection and energy can play an important role in pollution control and resource use. Moreover, a full cost-recovery approach is essential for service expansion and it allows for cross-subsidies to low-income groups.

#### *Sewage*

In Brazil, industrial sewage tariffs based on organic matter and suspended solid contents have been in place since 1983 in the states of São Paulo and Rio de Janeiro. In the case São Paulo, because of monitoring difficulties, the sanitation company has included only 95 big firms in the new tariff scheme in the Greater Region of São Paulo. Even with this small spatial coverage, revenue raised represented more than 11% of total industrial sewage revenue in 1993. It has been reported that the new tariff on pollution contents has induced pollution control by improved housekeeping procedures, raw material substitution and conservation.

#### *Sanitation*

In the case of Guayaquil in Ecuador, a concession was let to an independent Canadian firm. A solid waste collection fee is applied as a 10% surcharge on electricity bills. Although it may not

induce rationalization of waste generation, collection costs of such a scheme are low and effective.

Venezuela has recently attempted to introduce waste volume and landfill tipping fees, whereas Jamaica and Barbados are about to introduce similar systems. Mexico and Chile are also contemplating the possibility of adopting these instruments for households and firms. The Venezuelan case confirms, however, that these instruments require strong institutional capacity to monitor waste volumes in households and firms and to restrict illegal dumping.

### *Energy*

The removal of energy subsidies has also followed a revenue perspective due to macroeconomic constraints. Although, in some cases, it has incidentally induced the substitution for cleaner fuels, pricing control policies have restrained important changes in relative prices as the case of gasoline in Venezuela. A successful example of energy pricing for environmental purpose was the substitution of charcoal consumption in Jamaica by lowering the kerosene price.

### *Summary*

Although water supply, sanitation (sewage collection and treatment) and electricity tariffs have been increased in real terms across the region, only Chile and Colombia are already fully adopting a long-run marginal cost approach. Private participation in the sector, already envisaged in some countries, may speed up the adoption of this tariff policy.

It must be noted, however, that experiences in cost-recovery approaches, even in private participation schemes, have not fully incorporated environmental costs since private costs are the main concern and environmental costs are only borne when they are imposed through regulatory or other means. However, cost-recovery pricing for these services can be regarded as a first step towards charging the right price for pollution and natural resources. In most cases, adoption of cost-recovery approaches can be carried out with relatively low legal and institutional barriers.

### **Deposit-Refund Systems**

Voluntary deposit-refund systems for consumers are reasonably well developed in the countries of the panel (Table 3). Moreover, informal collection of paper, plastic and other recyclable materials is an important occupation for unskilled workers.

Voluntary deposit-refund systems for returnable glass bottles are traditionally adopted in most countries due to the predominance of the beverage and beer packaging system. Refund payments for aluminum cans, due to the high value-added from recycling and the expanding use of such containers, are now increasing considerably in Brazil and Venezuela.

Ferrous materials and paper recycling, and, to a lesser extent, plastic, are a well established business in the region. Wholesalers collect material from firms and informal collectors and then sell the material to recycling companies. Collection is undertaken mostly at the curbside level and at dumping sites. Cooperatives of collectors – supported through municipal programs – are now common in the major Brazilian cities; this has improved health conditions and collection efficiency.

The introduction of voluntary deposit-refund system for consumers in the region can be seen as a good MBI opportunity with fairly low legal, institutional and political barriers. In fact, such initiatives may count on private participation and public support. Compulsory systems for firms and consumers, however, will certainly be more difficult because of legal and political barriers,

and also because monitoring capacity needs may be an important constraint. One of the few cases of mandatory schemes is found in Mexico. Car batteries are now under a compulsory deposit-refund scheme through which a new battery can only be sold with the return of an old one. Results of this program have not yet been evaluated.

	<b>Deposit-Refund System</b>	<b>Solid Waste Levy &amp; Tipping Fees</b>
Barbados	Voluntary for glass beverage containers on consumers	Tipping fees under introduction
Brazil	Voluntary for glass and aluminum beverage containers on consumers	Flat fees
Chile	Voluntary for glass and plastic beverage containers on consumers	Flat fees. Tipping fees under discussion
Colombia	Voluntary for glass beverage containers on consumers	Electricity surcharge
Ecuador	Voluntary for glass beverage containers on consumers	Flat fees paid by Municipality
Jamaica	Voluntary for glass beverage containers on consumers	Flat fees
Mexico	Voluntary for glass beverage containers on consumers and compulsory on car batteries at wholesale level	Flat fees. Levy and tipping fees for hazardous waste under discussion
Venezuela	Voluntary for glass beverage containers on consumers	Flat fees

### **Resource Use Charges**

Table 4 presents a summary of several types of user charges implemented in the region. In Brazil, Colombia and Venezuela, a forestry tax is charged for wood consumption when the harvesting is not compensated by equivalent reforestation activity. These taxes are usually set at very low levels and with very weak enforcement, particularly in frontier regions where monitoring is very difficult. Also, royalties paid out of natural resource exploitation are already in place in Brazil, Colombia, Ecuador and Venezuela with relative success.

In Brazil and Colombia, these royalties, created in the 1990s, are a small proportion (varying from 4 to 6%) of gross revenue of hydroelectricity, mineral, and oil production. In reality, these royalties are earmarked revenue sources for municipalities where exploitation takes place; some funds are also earmarked for regulatory and environmental agencies. In the case of Colombia, the use of royalty funds for preservation purposes is more strictly earmarked than it is in Brazil. Therefore, the Brazilian experience has been one of using the royalty revenue as a supplementary budgetary source for general revenue purposes.

Royalties in Ecuador and Venezuela are strictly based on oil revenue. In Ecuador the royalty is a form of tax levy on oil passing through the pipeline from the Ecuadorian Amazon; the levy is earmarked to the Ecuadorian Institute for Eco-Development in the Amazon Region (ECORAE) formed in 1992. Royalty resources in Venezuela, by contrast, finance the federal general budget.

As can be seen, royalties may turn into an important source of revenue for environmental agencies and also a powerful tool for natural resource rationalization. While revenue aims can be achieved through a small share of the exploitation value, the appropriate royalty level on environmental grounds may require a more complex technical analysis. Collection costs are low and will not depend much on institutional capacity and sophisticated legislation. Political constraints may arise in countries where the private sector is dominant in the taxed sectors and where the sector faces strong international competition.

## Water Charges

The most active MBI pricing initiatives are water charges (Table 4). These charges can be part of a national charge scheme already in place, as in Mexico and Colombia, or in the context of a river basin authority, as is the case of the Brazilian legislation under Congress consideration.

	<b>Forestry Taxation</b>	<b>Charges on Natural Resource Exploitation</b>	<b>Water Charges for Use and Pollution</b>
Brazil	On forestry activities without adequate reforestation	Over mineral and hydroelectricity production to compensate municipalities where exploitation takes place	Sewage tariffs based on pollution contents in place in some states. Full water charges based on river basin authority already approved in some states and under discussion at federal level.
Colombia	On forestry activities without adequate reforestation	Over mineral and hydroelectricity production to compensate municipalities where exploitation takes place	Charges based on cost-recovery partially implemented being replaced by charges reflecting full environmental costs
Ecuador		On oil to finance environmental research and management institute	
Jamaica			Under discussion
Mexico			Wastewater discharge at national level partially implemented and under revision
Venezuela	On forestry activities without adequate reforestation		

### *Mexico*

Pollution charges in Mexico have been in place since 1991 and they have revealed enormous enforcement problems. The Mexican water legislation allows that the National Water Commission (CNA) applies the 'polluter pay principle' on water discharges from municipalities and industrial plants exceeding determined standards of organic matter and suspended solid. For volume discharges below 3000 m<sup>3</sup>, a simplified approach is adopted based on volume rather than pollution contents.

Lack of enforcement has reduced substantially the revenue raised. Although since its introduction revenue has increased from N\$17.4 to N\$52.4 million, it still represents a minor percentage of the potential revenue. Poor monitoring and opposition from polluters are the main reasons for enforcement failures.

National coverage of the water system has required monitoring resources beyond the current financial situation of CNA. The lack of private and public participation, accompanied by the general lack of reliable information or careful analyses of expected impacts, has motivated polluters' opposition on competitiveness and distributive grounds.

The current revision of this water charge legislation is now attempting to remove these political barriers by enhancing participation, information and institutional capacity. A more participatory and realistic approach may create an excellent opportunity for Mexico to realize an effective system of economic incentives for water management, while also providing financial resources to develop institutional capacity.

### *Colombia*

In Colombia, water charges for effluent discharges and water uses have been applied since 1974 by the regional environmental agencies (CAR). The very few applications of these charges were implemented with a cost-recovery approach attempting to cover operation costs of monitoring systems. It is noted that the relevant legislation contemplates renewable resource uses, including also air, fishing and forests. Fishing and forest charges were poorly implemented as in the case of water whereas air pollution charges were never applied.

Failure to expand coverage and introduce pollution/use criteria in charge level determination was because of similar reasons as in the Mexican case: lack of appropriate design of the instrument, lack of information about impacts, incompatibility with the available monitoring system and inadequate planning of its coverage. These factors have resulted in fierce public and political opposition and have undermined political support.

Only US\$116,000 were collected from a potential charge revenue of US\$90 million. Interestingly, in the few cases where these constraints were overcome, it is reported that successful charge applications have induced changes in water use patterns with consumption and pollution reductions.

In 1993, new environmental legislation (Law 99/93) was passed in Colombia in which pollution charges are clearly specified based on the criteria of full environmental costs. That is, the charge level must be defined according to the value of environmental services and the cost of environmental damages (Box 1). In fact, the new criteria attempt to bring charge levels to optimum levels in the pigouvian sense measured by economic welfare losses.

This new legislation eliminates the cost-recovery limitations of charges which now may be fixed on a tax levy basis. However, the constraints previously discussed are now even more severe. The new rules demand a sophisticated institutional capacity since new charge determination is complex and bound to vary significantly with activity and spatial factors. In addition to this technical constraint, the administration of these new charges can be extremely costly. The resulting higher uncertainty in economic and social impacts is, consequently, generating strong opposition among polluters and users.

Aware that the complexity of some proposed MBIs is overshooting domestic institutional capacity, the Colombian environmental agency is attempting to streamline the current legislation and regulations; charge levels are to be determined in stages where rates are gradually estimated and implemented. Moreover, attention has been paid to a careful analysis of economic and social impacts for future negotiations with polluters and users. The necessary adjustments for the existing institutional capacity vis-à-vis the charge system are also being considered.

Once more, as in the Mexican case, these charges may be an excellent opportunity to promote effective water management in the country and to generate the needed financial resources required to overcome budgetary constraints.

### *Brazil*

The Brazilian experience on river basin management dates from 1978 when river basin committees were formed in some of the most problematic basins to carry on studies and suggest actions to rationalize water use.

These committees, composed of users, polluters and governmental agencies, have no normative power and financing autonomy. That is, they do not have a legal basis to impose sanctions and charges. Therefore, most of the relevant committees' proposals were not put in practice and member's engagement was very weak.

### ***Can a Pigouvian optimum be achieved?***

#### **Box 1**

#### **Colombia's New Environmental Tax**

Colombia's new Environment Law 99, under Title VII on Income from Tariffs for the Regional Autonomous Corporations (CARs) states that, for polluting industry, the Environment Ministry (MinAmbiente) or the CARs will apply a method of fixing pollution effluent and emission tariffs based on a wide range of factors (listed below.)

MinAmbiente is currently assessing the costs of pollution treatment as a way of establishing the tariffs to be levied within this context.

- for each of the factors that are included in the establishment of a tariff amount, the MinAmbiente or CARs will define the variables that will permit the measurement of environmental damage based on quantitative variables.
- each factor and its variables should have a coefficient that permits the weighting of damage together with the factors and variables considered.
- the coefficients should be calculated based on resource availability and scarcity, diversity of the regions, pollution assimilation capacity, the contaminating or polluting agents, the socioeconomic variables of the population affected, and the opportunity cost of the resources.
- the factors, variables, and coefficients thus determined and measured would be integrated into mathematical formulas that permit the calculation and determination of the corresponding tariffs.

The growing degradation of the Brazilian rivers led several initiatives within the environmental and energy sectors to develop new legislation on water resource management. The 1988 Constitution, at federal and state levels, has finally introduced requirements that would provide basin authorities with normative and financing mandates. Since that time several projects based on river basin authorities have been discussed and currently a new version has been under discussion in the Federal Congress for three years. All projects introduce water charges based on use and pollution contents covering a wide range of activities.

The main disputes arising from these bills are related to: (i) jurisdictional overlaps with other governmental levels and their agencies where the basin is located; (ii) criteria to apply water charges whether on cost-recovery or damage cost basis; and (iii) charge revenue allocation whether by general funding or basin budget. Politicians are reluctant to create one independent jurisdiction confronting the existing state and municipal boundaries and users are concerned to avoid new forms of taxation and bureaucratic passes. Environmental agencies are confused on

how to reconcile current standards with charges on non-compliance and legal penalties. It is also argued that the country has no institutional capacity to deal with such innovative management at a national basis without creating other bureaucratic barriers and resource waste agencies. That seems to be a plausible argument as the institutional fragility of the Ministry of Environment has failed so far to find ways of clarifying and addressing these constraints.

In the most developed states, where environmental agencies are more active, such legislation is already approved or about to be. Nevertheless the political constraints faced by the federal bill are now impeding implementation. In these cases, while water charge revenues are seen as a catalyst among mayors seeking funds to carry on sanitation programs, their distribution criteria and resulting institutional arrangements make consensus difficult. Users are often absent from official discussions but are very active behind the scenes.

Therefore, the Brazilian experience on water charges has been very ineffective since discussions have not been participatory among stakeholders. In order to overcome this, state and federal levels are considering the introduction of the basin experience through charges at pilot-projects, subject to users' agreement and consensus. It is also agreed that charges must first fulfill administrative and monitoring costs and gradually move to levels where use and pollution patterns could be induced to change. Based on these experiments, regulations would be subsequently improved to reconcile contrary interests.

## **Conventional Taxation**

### *Colombia*

A percentage of the property tax in this country is set aside in municipalities for expenditures by the regional environmental agencies. Under the proposed fiscal system reform, there will be a greater reliance on municipal taxes to finance environmental management. The main driving force behind this approach has been decentralization and the lower transaction costs of these fiscal devices.

### *Brazil*

Another interesting use of conventional taxation for natural resource preservation is Brazil's "green value-added tax" (Box 2) from which municipalities may take a bigger share of tax revenue due to legislation on land-use restrictions. This tax distribution criteria is an example of a low cost instrument where political barriers were overcome and where current legislation was used.

### *Mexico*

A tax representing a very small percentage of the gasoline price – one cent by liter – was introduced to finance the installation of safety measures in gasoline station tanks to reduce fuel evaporation. The low transaction costs of this earmarked fiscal source, which is easy to collect and fund, has allowed that program to be successfully implemented.

The current CAC approach, based on car emission standards and maintenance monitoring, has not been enough to assure the desired air quality level improvement. Therefore, a gasoline price rise was considered as a potential instrument. But the surcharge on gasoline prices to reduce car use, and consequently, emissions in Mexico City, has been facing strong opposition.

*Conventional taxation can be an effective mechanism.*

**Box 2**

**Brazil's Green Value-Added Tax**

Revenue from the state valued-added tax (ICMS) is distributed among municipalities according to origin, generation and population criteria. Since 1992, three Brazilian states – São Paulo, Rio de Janeiro and Paraná – have introduced environmental revenue distribution criteria based on the area of restricted land-use (from conservation and watershed protection). The main aim was to create a budgetary increment to compensate municipalities where land-use restrictions, which benefited society as a whole, could impose barriers to development of economic activities in these areas. An advantage of the scheme is that it did not need a new fiscal instrument. Moreover, it is expected that additional financial resources can also motivate the implementation of sustainable activities.

The introduction of the environmental criteria was conducted with a careful political approach involving mayors and representatives in the state Congress. As total tax revenue was not changed and, therefore, the new criteria reduces other municipalities' shares, political resistance was acknowledged. Studies were undertaken to estimate budgetary impacts on municipalities where gains and losses were expected. As a first step, it was agreed that a very small share of total revenue (varying from 0.2 to 0.5%) would be devoted to these criteria. Nevertheless, legislation allows for periodic revisions to the criteria, indicators and shares based on the results. These revisions have, in fact, occurred in São Paulo and Paraná where the system has already been in place for about three years. Major changes announced to date are restricted to redesigning indicators where monitoring difficulties have been encountered.

To induce changes in car use patterns (due to low gasoline own-price elasticity) a much higher surcharge level would certainly bring about public reaction.

Increased taxation on old cars was adopted for revenue reasons but it may offer, if the level is increased and differentiated by vehicle performance, incentives to fleet renewal and promote anti-pollution and fuel consumption improvements. Although tax differentials can be easily implemented, most of the countries in the region differentiate tax towards old cars due to equity issues.

Strong opposition to gasoline price increases is a typical case of misinformation and lack of participatory discussion. Gasoline price increases have a marginal effect on general price levels. With the earmarking of surcharge revenue to public transportation investments, passenger car owners could change their transport patterns and low-income groups, relying on mass transport, would enjoy an improved transport system with better safety and environmental standards, and a reduced journey time.

## **Tradable Permits**

The use of tradable permits is currently under strong consideration in countries such as Chile, Peru and Mexico.

### *Water Use*

Tradable permits for water rights are only in place in Chile and are still under discussion in Peru. In Chile, individual tradable fishery quotas are also being implemented, but information is scarce to analyze the experience.

The Chilean experience with tradable water permits dates to the 1920s. A general legal basis was, however, set in the 1951 Water Code that allows the State to give water concessions to private parties according to water use priorities. Water transfers were allowed provided that use remained the same. In 1969, during the agrarian reforms, water became state property and trade concessions were prohibited.<sup>3</sup>

The new 1981 Water Code reintroduced the permanent water rights, which were completely separated from land rights and could be freely traded for consumptive and non-consumptive uses. Conditional use was abolished and simultaneous requests were arbitrated through bidding.

Today there are approximately 300,000 water users in Chile. However, only 35-50% of them have legal title. Users are organized in private associations controlled by the General Directorate of Water (DGA), within the Ministry of Public Works, which is responsible for water rights regulation, approval of hydraulic works and technical reports of conflict resolution. Irrigation has a specific national commission – composed of public and private institutions – to plan, evaluate and approve public investments in the sector. These investments are coordinated by the Directorate of Irrigation and are executed by private companies.

A revision to this tradable permit system is under discussion in Congress to avoid speculation and motivate trade, to address pollution problems, and to enhance management capacity in planning and monitoring. A complementary system of tradable water emission permits is also under discussion.

Transaction records in 1992 showed that trade tends to be more intense near the Santiago area because of scarcity reasons. In that year, only 3% of total water flow was traded in the area, with an estimated value of US\$366,000. Moreover, 94% of total transactions occurred between farmers and, therefore, did not involve changes in beneficial use. Trade between urban users and farmers did not exceed 3% of total trade transactions.

This low rate of transactions may reflect either a failure of the system or a close to optimal allocation of initial rights. Such an evaluation requires further research. It is, however, reported that trade has avoided political disputes and reduced investment expenditures.

In Chile, tradable water rights have been politically acceptable and enforceable because of the country's long tradition in water property rights. Even water rights that are not legally inscribed are respected and traded.

The lesson from this is clear. Property rights assurance and acceptance are particularly important for trading (or even taxing) water rights. Controversial equity issues are bound to arise for this essential natural resource and countries with no similar tradition should first legalize

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<sup>3</sup> See Brehm and Quiroz (1995)

existing property rights titling and define criteria for new assignments. The water permits already in place in many countries may provide an initial endowment.

In addition, permit holding fees may be considered as a recurrent financing source for management and monitoring activities.

### *Air Pollution*

For stationary sources, legislation for tradable air pollution permits was passed in 1991 and is currently under design in Mexico. But most of the experience relating to trading again occurs in Chile.

A successful road auctioning system for bus transportation licenses has been implemented in Santiago to address pollution from transport congestion. It is a clear example of introducing an economic incentive within an existing licensing system, thus benefiting from lower transaction costs, a fairly high level of revenue generation, and few legal and institutional barriers.

The Chilean case for air pollution permits, however, has not been fully implemented to date. The system is to be applied in the Santiago when air pollution problems are very serious. Existing pollution sources are required either to comply with standards or to offset excess emissions by trade. Initial endowments were based on 1992 emission levels (a 'grandfather system'), while new sources are required to offset all emissions.

The implementation of the Chilean tradable system is under the Programme of Fixed Source Air Pollution Control (PROCEFF) within the National Environment Council (CONAMA). PROCEFF's initially limited institutional capacity delayed system implementation; private laboratories working with PROCEFF had been corrupted and some technical problems in measurements were also responsible for constant delays in enforcement. Currently, PROCEFF has gained additional resources and is training personnel in private laboratories, certifying the equipment and defining adequate technical procedures.

Offset trading started within the Chilean system in 1995 with very few cases, mostly intra-firm. However, it is recognized that emission standard compliance – the CAC part of the system – has improved with beneficial results to air pollution concentration in the area of Santiago.

Uncertainty arising from institutional fragility may explain the low rate of trade to date. It is also argued that savings on abatement costs in existing sources are too low to motivate firms to trade.

With the reduction of these transaction costs and the arrival of new investments in the region, the system will undergo more definitive testing.

Although institutional capacity was a major constraint in this case, it is worth noting that the assignment of air pollution property rights was accepted by polluters. In fact, because of the free market environment of the Chilean economy, the system's political acceptance was high and private companies were active in discussing standards and criteria.

These lessons can now be of extreme importance in the Mexican case pursuing a similar system in the Greater Metropolitan Area of Mexico City. In Mexico, a significant change will be required in the environmental legislation to incorporate tradable permits. Therefore, it is important to support explicitly the free market principles embodied in tradable permits and to promote polluter participation at the beginning of the design process.

### *Policy Synopsis*

There are numerous opportunities for introducing tradable permits in LAC; the major constraint to their implementation will be finding an equitable initial allocation and trading regime that is consistent with local market reform processes. Their potential to generate revenue is substantial if initial allocation is done by auction and if fees are charged annually for holding both exercised and unexercised permits.

### **Legal Redress and Advocacy**

A number of examples illustrate the use of voluntary measures and reliance on consumer advocacy to achieve environmental management in LAC countries.

#### *Trinidad & Tobago*

The 1995 Environmental Management Act in Trinidad & Tobago provides for the use of MBIs in any environmental regulatory efforts. While few are yet in place, this focus has largely been a response to the difficulties encountered with enforcing strict CAC measures. The court system in the country is heavily backlogged, and enforcement and regulation is constrained by inadequate financial resources.

Although there is no legislation in place to mandate corporate liability for environmental damages, PetroTrin established a voluntary policy of full compensation of environmental damages in 1990. The move was prompted by a number of uncontained well blowouts through the 1980s that damaged local homes, flooded farmers' fields with oil, and caused a significant public outcry in response to health damages when the company gave no assistance in removing people from potentially lethal effects of the spills. After, the voluntary policy was implemented, two notable trends happened: (i) blowout prevention devices on wells improved, such that spills and upsets became less frequent; and, (ii) when a spill did occur, it was easier to contain the impacts and any damages were readily compensated. An incident in the early 1990s, for example, required rapid evacuation of about 1000 residents from a village when a blowout occurred; affected people were subsequently compensated for damaged land and loss of convenience, and their farms were restored at company expense.

#### *Colombia*

One very innovative liability instrument involving consumer actions that are enhanced by an economic incentive was devised in 1992. Anyone pursuing an environmental liability judicial action is entitled to receive a fee equivalent to 10 to 15% of the total compensation. It is reported that, in the last three years, the number of actions has significantly increased.

### *Policy Synopsis*

Consumer advocacy through voluntary measures and public pressure (at times linked to formal or voluntary liability instruments) in these cases plays a potentially critical role as an MBI in LAC countries. To a large degree, these mechanisms are interpreted as substitutes for historically weak institutional capacity.

## **Final Demand Instruments**

Export firms in the region are increasingly introducing environmental management procedures to enhance their international competitiveness, particularly to comply with standards and norms in regional markets, such as EEC and NAFTA. Certification based on ISO (International Standards Organization) series has been a key factor to improve these companies' exporting performance. In Brazil, Chile and Mexico, eco-labeling has been the subject of discussions between governmental agencies and the private sector.

For Brazilian exporting firms, ISO 14000 environmental certification, as with the ISO 9000 quality series, has become an unavoidable commitment. Brazil's participation in the respective ISO meetings has been very active. In addition, mainly within the domestic market, joint efforts with environmental agencies and other normative bodies have been made to define criteria and norms for eco-labeling

In Ecuador, a successful program was carried out by Quito's municipal government in an industrial district, El Inca, to identify cost-effective pollution prevention measures. While not motivated by environmental consciousness, the costs saved in energy, materials and residual control have been enough to motivate firms to apply to the program.

## **Summary**

MBI applications currently represent a major initiative in environmental management in LAC. The potential efficiency gains from MBI have been recognized, but the driving force towards MBI implementation has been, as elsewhere in OECD countries, the revenue-raising aims. Therefore, the misplaced conflict between MBI and CAC instruments does not seem to appear in LAC's experiences.

The current budgetary constraints faced by the environmental management sector turn MBIs into a very attractive option to collect the necessary funds to improve CAC application. It is very clear that MBI initiatives are sought as complementary actions to CAC. The imposition of standards, licensing, zoning and permits are still in place and, in fact, MBIs are innovative and flexible ways to enforce them.

Administrative intensity of MBIs remains high. Monitoring requirements, legal design requirements, public consultation needs, and enforcement or collection needs of MBIs are not always noticeably different from strict CAC approaches. MBIs are therefore not a substitute for weak institutions or for CAC; some regulatory elements are inevitably required and a strong institutional base is a prerequisite to MBI implementation. The major benefit of implementing MBIs is as a complementary tool to CAC procedures.

The main challenge in these initiatives is then to design MBIs that can be successfully applied within the context of the same institutional and political barriers that are constraining the CAC approach. The challenge is to make MBIs a useful tool considering the current institutional fragility and the macroeconomic and social restrictions.

## SECTION 3

### Additional Issues in MBI Design

From an operational perspective, MBIs should be designed with a number of key points in mind to ensure urban sustainability. In general, they should incorporate the following elements:

- The mechanism should reflect the polluter pay principle to ensure that externalities are reduced. This can be achieved by setting charges or taxes at levels high enough to induce polluters and users to reduce their total level of degradation.
- The complementarity between regulations and incentives must be reflected in the design of all systems; incentive charges may still, for example, be complemented with some baseline standard that must not be breached under any circumstances.
- Revenue generation should be designed in a manner that allows some of the revenue to flow to local level authorities to provide an incentive and a means for local empowerment.

This Section addresses additional MBI design issues that arise from the above; in particular, there are a number of interesting dimensions in the LAC context relating to: (i) social issues of distribution, poverty and tax incidence; (ii) prevalence of ‘perverse incentives’; and, (iii) role of MBIs in small island states.

#### Distribution, Poverty and Tax Incidence

The dramatic level of poverty and income inequalities in the continent creates serious barriers to undertaking stricter environmental practices when distributive effects are unknown. Remarkably, the reviews in the ten countries provided very few examples of how various MBIs would impact on different income groups. Opposition to many MBIs, as well as to CAC procedures, is based on alleged regressive impacts. This shows that there is, in fact, an interest in the distributive impacts of various policies and that the social dimensions of MBIs – as expressed through their potentially regressive nature or incidence – is a significant concern in LAC.

This reinforces, however, the need to undertake more work on the relative incidence of different mechanisms. Flexible instruments with efficiency and distributive gains have to be sought as politically viable options to the current procedures. Moreover, information regarding the incidence of impacts from various mechanisms must be made broadly available to all stakeholders; this will permit decisions and compromises to be made in an atmosphere of informed choice as opposed to an atmosphere of un-informed opinion.

#### Perverse Incentives

Perverse incentives refer to a class of MBIs that, while intending to improve environmental quality, in fact work in the opposite direction. Presence of such incentives indicates poor design or inappropriate application of an MBI. Two relatively common perverse incentives in the panel of countries indicates that experience in developing appropriate MBIs is still limited.

First, proposed or existing effluent charge schemes in some of the countries were still based on pollutant concentrations as opposed to pollutant volumes or loads. The effect of using concentrations as an indicator of pollution is that it creates an incentive for firms to dilute the

pollution through, for example, abstracting more water and then depositing a larger gross volume of diluted waste into water bodies. Taxes or charges based on pollutant concentrations may, in fact, have the perverse effect of reducing water conservation, increasing industrial costs of treatment, and increasing pollutant damages.

Second, although tax differentials on equipment can be easily implemented, most of the countries in the region apply differentiated taxes such that there is an incentive to keep older vehicles on the road for longer periods of time. Given the poor condition of these vehicles, these tax treatments have the perverse effect of increasing fuel consumption, increasing pollution, and increasing maintenance costs; the alleged ‘social equity’ impacts of such schemes are, moreover, typically specious.

### **Small Island States**

In contrast to their larger neighbors, MBI design in Caribbean countries must reflect the following ‘stylized facts’ about island states:

- *small island vulnerabilities and institutional opportunities are conceptually different from those in larger riparian countries.* Extensive research over the past few decades has illustrated that economic, environmental and social vulnerabilities make small island communities more susceptible to external shocks. Also, however, the smaller size can be an advantage in pursuing low-cost interventions with low institutional overheads.
- *the ‘urban challenge’ in small-island states does not stop at the city’s edge.* Although the connections between urban and rural activities are often less than clear even in large countries, the distinction becomes even more problematic in small island states with relatively low populations.

As a consequence of these conditions, some of the implications for implementing MBIs under such circumstances differ markedly from those in other studies.

### *Subsidies vs Charges*

Most of the MBI approaches used to date in the Caribbean focus on providing incentives through subsidies rather than taxing or charging for damages. Even where damage charges are assessed, a subsidy element in the form of a rebate is often introduced that makes the overall intervention revenue-neutral, even though it does provide an effective incentive. The role of revenue neutral systems in small island states is often seen locally as an effective means for avoiding distortions that may effect the fragile competitive position of many of these economies. As such, self-financing mechanisms for many such economies are not possible because of local political constraints and perceptions.

### *Role of Voluntary Self-monitoring*

The lack of implementation capacity has consistently undermined collection efficiency, regulatory monitoring, and enforcement of those charges and regulations that do exist. Even the simplest forms of monitoring, those involving metering, have traditionally seen poor performance. As a consequence, even the simplest CAC procedures are likely to be ineffective unless incentives are put in place that induce self-monitoring. From this perspective, market creation mechanisms and voluntary systems of damage compensation that take advantage of social (‘peer-group’) pressures are likely to see broader success rates in a small island context than they would in a larger country.

*Liability Instruments*

Liability instruments are an appropriate mechanism that take advantage of the flexibility inherent in small island institutions. They have few administrative overheads and create fewer burdens in a small island context than they would in a larger country where other institutional imperatives might conflict with those of the particular liability instrument.

*Ecosystem Orientation*

Institutional boundaries in many Caribbean states are orienting towards ecosystem boundaries that are appropriate to a systems analysis and implementation approach. In part, this is dictated by the lower implementation capacity available, but it also reflects a need to coordinate ecosystem-based problems that overlap districts or cross over between urban and rural boundaries.

## SECTION 4

### Concluding Remarks

As the countries and issues reviewed were not a complete cross-section of LAC, the conclusions drawn in this study are largely suggestive, rather than definitive prescriptions. Nonetheless, conventional wisdom may need to change to incorporate a more coherent view of the use of economic incentives in LAC within a context of *institutional fragility*.

Public management in LAC has been historically bureaucratic, very sensitive to political interference and unable to enforce its policies. Improper targeting is often recognized, particularly in social policies. Historically, economic development was strongly regulated by command and control instruments usually applied within an authoritarian political system. Social inequalities, economic stagnation, macroeconomic destabilization, and weak international competitiveness have led countries to adopt – with delays in some cases – liberalization policies committed to free markets and trade.

Adoption of MBIs in this new economic scenario was rapidly accepted. In fact, these are very important political factors favoring the application of economic incentives. The use of MBIs is now clearly high on the agenda of the environmental management sector in LAC. Countries in the region are already implementing instruments such as royalties, user charges, tradable permits and green taxation in distinct policy contexts. The current trend towards MBIs is enhanced by the need to generate earmarked revenue to the environmental management sector.

Nonetheless, reductions in excessive regulation and of high public expenditures have become the main pieces of governmental reform, fully supported by society as a whole. But there is still a failure to recognize that regulation and public expenditures must be redefined and better targeted.

### Ten Commandments for MBIs

**REALISM.** Be modest. Do not try to implement policies and instruments beyond the institutional means available.

**GRADUALISM.** National or regional policies can be gradually implemented by pilot projects or experimental programs. The establishment of plausible and enforceable norms, standards and guidelines is an important starting point.

**LEGAL FLEXIBILITY.** Legislation must allow low-cost revisions.

**INTEGRATION.** Intra- and inter-governmental integration must be pursued to overcome barriers and to merge institutional strengths. Government economic agencies must be included, as well as parliamentary representation.

**LEADERSHIP.** The environmental management sector must take leadership in the decision-making process by identifying stakeholders, barriers and channels to consensus building.

**PARTICIPATION.** Public participation is a key issue. Participation by stakeholders must be planned and based on information building and sharing. Avoid stalemate issues that may paralyze the process. Equity issues must be properly identified, evaluated and addressed.

**MARKET RELIANCE.** The growing market reliance must be incorporated in environmental policy and MBI design. Avoid high transaction and collection costs. Try always to be cost-effective. Do not go faster than market adjustments that are not fully accepted.

**REVENUE GENERATION.** Many MBIs can generate earmarked revenue. Although correct pricing of environmental goods and services is an MBI aim, the cost-recovery approach may be easier to build consensus, remove barriers and guarantee budget resources to finance environmental institutions.

**MASTERING.** Human resources in the environmental field are scarce and public servant remuneration is not attractive in the region. Restructure human resource profiles to make the most of limited budgets. Be small and rely on external expertise, concessions and research centers. Be executively strong to keep external input effective and coherent.

**CONTINENTALISM.** Do not reject OECD experiences and recommendations, but increase ties to regional agencies where economic and cultural contexts may be more familiar.

The environmental management sector has, for one, been targeted in an ad hoc manner. Environmental consciousness has increased in the region due to democratization, international awareness and the obvious environmental consequences of rapid industrialization and urbanization. But this has not been translated into adequate budgetary allocations as other social sectors with immediate urgency – such as health and education – received higher priorities and macroeconomic stabilization programs constrained public expenditures.

Demand for environmental institution effectiveness has thus grown over its budgetary allocation. Policies, legislation and norms have not properly recognized that reality and enforcement failures have created institutional discredit, increased bureaucratic costs and introduced a high uncertainty into environmental rules. This uncertainty – What is the norm and how effective will be its enforcement? – can today be regarded as the major criticism made in the region by the business sector and by people affected by environmental problems.

Therefore, to some degree, the relatively broad use of economic incentives could also be considered as another overshoot of the environmental management sector in the continent. The use of MBIs has not been a substitute for CAC, nor has it removed the need for strong institutions; MBIs have, in fact, potentially *increased* technical and financial burdens on already fragile institutional structure.

The conventional wisdom in LAC seems to be: where the CAC approach has failed, the MBI approach cannot succeed. But that is certainly incorrect. On one hand, economic incentives do need good institutional capacity to succeed. But it must be recognized that if MBIs are properly applied, then they can be the last resort to the environmental management sector in the region to overcome many institutional barriers: MBIs introduce economic rationale in policy implementation, thereby reducing social costs; they make markets more efficient; they may allow for effective equity considerations and, if necessary, they can generate revenues to enhance institutions.

One might have presumed that the LAC environmental management sectors have transposed OECD experiences without taking into account their own country realities. But the MBI experiences in the region deny this. Most of the MBI cases reported are genuine attempts to conform MBIs to each country's economic and cultural characteristics. However, weak public participation inherited from earlier authoritarian regimes, general public sector crisis and social inequalities are very difficult barriers to overcome quickly. Sound and enforceable policies remain elusive.

One opportunity has, however, been missed. To date, LAC countries have failed to talk to each other about their successes and mistakes in environmental management. This stands in contrast to the interchanges on macroeconomic matters that have frequently been a matter for cooperation and information exchange.

One reflection of this is that international agencies and donors are prone to recommend OECD solutions with little regard to local institutional issues. Exchange of experiences, therefore, has historically concentrated in a north-south direction. While this study makes a start at filling this gap of experience exchange within the region, further initiatives should be supported and countries in the region must take a lead in this process.

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## Executive Summary

The use of economic instruments -market-based instruments (MBIs)- is at the top of the agenda of the environmental management sector (EMS) in Latin America and Caribbean.

As can be seen in the following table, countries in the region are already implementing a very wide scope of MBIs.

### *Market oriented instruments are seeing wider application in LAC*

	Barbados	Brazil	Chile	Colombia	Ecuador	Jamaica	Mexico	Peru	Trinidad & Tobago	Venezuela
Credit Subsidies	▲	▲		▲	▲		▲			
Tax/Tariff Relief	▲	▲	▲	▲	▲	▲				▲
Deposit-refund Schemes	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Waste Fees&Levies	▲	▲	▲	▲	▲	▲	▲		▲	▲
Forestry Taxes		▲		▲						▲
Pollution Charges		▲		▲		⊕	▲			
Earmarked Renewable resources taxes		▲		▲	▲					
Earmarked Conventional Tax Levy		▲		▲			▲			
Tradable Permits			▲				⊕			
Eco-labelling		▲	▲		▲		▲			
Liability Instruments				▲					▲	

▲ in place

⊕ under discussion

MBIs are widely regarded as being an economically efficient and environmentally effective alternative to strict CAC approaches. In theory, by providing incentives to control pollution or other environmental damages, MBIs have lower compliance costs and can provide much needed revenue for local government coffers. Administration costs associated with MBIs, however, may be higher. Monitoring requirements and other

enforcement activities remain as for CAC, and additional administration efforts may be required to cope with the design and institutional changes arising from MBI application. The recognition of this extra institutional burden is one of the main subjects of this study.

Several studies have already attempted to describe and analyze MBIs experiences in developing countries *vis a vis* the current OECD experiences. That approach will be somewhat avoided in this paper since our main focus will try to capture intra-regional features instead. The purpose of this work was to investigate the use of MBIs in the Latin America and the Caribbean (LAC) context. The investigation covers a panel of ten countries – Barbados, Brazil, Chile, Colombia, Ecuador, Jamaica, Mexico, Peru, Trinidad & Tobago, and Venezuela – and a cross-section of issues – water supply/abstraction, water quality, air quality, energy, solid and liquid waste management (including toxic substances), noise, and agriculture – within an urban setting. This paper is a reduced version of the study sponsored by the Division of Latin America and Caribbean (LA3EU) in the World Bank and its full version will be soon published as a World Bank Report by the title: "**Market Based Instruments for Environmental Policymaking in LAC Countries**".

### **Key Findings: Existing MBIs**

The review revealed some general conclusions that applied to the sample of study countries as a whole.

*MBIs are Widely Used in LAC.* MBIs across a wide range of mechanisms have been developed and applied in all of the countries investigated.

*Primary Historical Role of MBIs in LAC is to Raise Revenue.* The major impetus behind using many of the MBIs in LAC has been to raise revenue. Other potential objectives – such as reduction of environmental impacts or improving cost-effectiveness of regulations – have been under-emphasized or not attained.

*Public Awareness is Low and Uncertainty is High.* Weak participation among stakeholders, largely inherited from authoritarian regimes of past decades, poses a real constraint to the rapid implementation of complex MBI mechanisms.

### **Exploding a Myth: MBI or CAC?**

A common assumption regarding MBIs is that they form a ready substitute for out-dated or inefficient CAC regulatory procedures. This substitution opportunity is not shared in LAC. For a number of reasons, the implementation of MBIs will not provide a quick panacea for the problems often associated with CAC procedures. Although there is definite scope for careful and timely implementation of certain MBIs, significant constraints will persist in three areas.

*Institutional Constraints to MBI Implementation remain Pervasive.* Most of the countries surveyed had existing legislation that established environmental institutions and that provided for the use of economic incentives in environmental management. On paper, therefore, everything is in place to use MBIs. In reality, however, institutional weaknesses – such as under-funding, inexperience, unclear jurisdiction, or lack of political will – limit the effective implementation of MBIs.

*Administrative Intensity of MBIs remains High.* Monitoring requirements, legal design requirements, public consultation needs, and enforcement or collection needs of MBIs are not always noticeably different from strict CAC approaches. MBIs are therefore not a substitute for weak institutions or for CAC; some regulatory elements are inevitably required and a strong institutional base is a prerequisite to MBI implementation.

*Market Based Reforms (MBRs) may Hinder or Help MBI Implementation.*

Macroeconomic reforms such as trade liberalization, public sector commercialization, and fiscal reform are key features of recent LAC experience. In some cases, these MBRs provide an economic environment that is conducive to implementing MBIs, while in other instances the MBIs are inconsistent with ongoing reforms. In either event, failure to account for the linkages between MBIs and MBRs inevitably undermines MBI implementation.

### **Specific Design Issues and Opportunities**

The review also provided insights into five specific design areas.

*Distribution, Poverty and Tax Incidence.* The social dimensions of MBIs – as expressed through their potentially regressive nature or incidence – is a significant concern in LAC, which has one of the highest levels of inequality in the world.

*Perverse Incentives.* Some of the MBIs reviewed had demonstrably perverse effects. For example, while the intent of a water pollution charge may be to reduce pollution, it may increase pollution if it is based on effluent concentrations.

*Tradable Permits.* There are opportunities for introducing tradable permits in LAC; a major constraint to their implementation is finding an equitable initial allocation and trading regime that is consistent with local market reform processes.

*Advocacy.* Consumer advocacy through voluntary measures and public pressure (at times linked to formal or voluntary liability instruments) plays a potentially critical role as an MBI in LAC countries. To a large degree, these mechanisms are interpreted as substitutes for historically weak institutional capacity.

*Small Island Issues.* Small island states will need to rely to a greater extent on revenue neutral subsidies to achieve a desired incentive effect; the revenue potential for MBIs is generally limited in such conditions.

### **Future Focus**

Because the panel of countries and issues reviewed was not a complete cross section covering all of LAC, the conclusions drawn in this study are largely suggestive rather than definitive prescriptions. The MBI experience does, however, point to some important areas for future work.

First, MBIs can be an important, if not the only, means for introducing some added efficiency to existing CAC mechanisms. The scope of the MBIs must, however, match the institutional capacity to implement them. To this extent, MBI approaches that introduce *gradual and flexible reforms* are more likely to be consistent with ongoing institutional changes.

Second, while the revenue collection task of MBIs has been highlighted, there still exists a strong need to *channel revenues to local authorities* to assist in building institutional capacity.

Finally, international donor agencies are most prone to recommend OECD solutions with little regard to institutional issues; to date most of the information flow regarding MBIs has been of a 'north-south' variety. An important opportunity has been missed to share environmental management experiences among LAC countries. Increased *information sharing* in a 'south-south' dialog will benefit all parties. The ten commandments to guide MBI application can be summarized as in the following table.

## Ten Commandments for MBIs

**REALISM.** Be modest. Do not try to implement policies and instruments beyond the institutional means available.

**GRADUALISM.** National or regional policies can be gradually implemented by pilot projects or experimental programs. The establishment of plausible and enforceable norms, standards and guidelines is an important starting point.

**LEGAL FLEXIBILITY.** Legislation must allow low-cost revisions.

**INTEGRATION.** Intra- and inter-governmental integration must be pursued to overcome barriers and to merge institutional strengths. Government economic agencies must be included, as well as parliamentary representation.

**LEADERSHIP.** The environmental management sector must take leadership in the decision-making process by identifying stakeholders, barriers and channels to consensus building.

**PARTICIPATION.** Public participation is a key issue. Participation by stakeholders must be planned and based on information building and sharing. Avoid stalemate issues that may paralyze the process. Equity issues must be properly identified, evaluated and addressed.

**MARKET RELIANCE.** The growing market reliance must be incorporated in environmental policy and MBI design. Avoid high transaction and collection costs. Try always to be cost-effective. Do not go faster than market adjustments that are not fully accepted.

**REVENUE GENERATION.** Many MBIs can generate earmarked revenue. Although correct pricing of environmental goods and services is an MBI aim, the cost-recovery approach may be easier to build consensus, remove barriers and guarantee budget resources to finance environmental institutions.

**MASTERING.** Human resources in the environmental field are scarce and public servant remuneration is not attractive in the region. Restructure human resource profiles to make the most of limited budgets. Be small and rely on external expertise, concessions and research centers. Be executively strong to keep external input effective and coherent.

**CONTINENTALISM.** Do not reject OECD experiences and recommendations, but increase ties to regional agencies where economic and cultural contexts may be more familiar.





