

*Constraints to the Use of
Economic Instruments,
and Ways to Overcome Them*

Draft Synthesis Paper

Draft Synthesis Report on the Constraints to the Use of
Economic Instruments, and Ways to Overcome Them

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Introduction

While most countries have been struggling for decades to find good environmental policy packages, there has been an increasing recognition over the last decade that market-based incentives could usefully and successfully complement command and control to achieve environmental and sustainable development objectives. Appropriately designed and implemented economic instruments (EIs), complemented with appropriate policy frameworks, can make an important contribution to achieving sustainable development, and can be used to strengthen implementation of multilateral environmental agreements (MEAs). They can also be a powerful tool to achieve both economic efficiency, and environmental and sustainable development objectives.

To date, however, a number of constraints have prevented a wider use of economic instruments to achieve environmental and sustainable development objectives. These constraints include concerns about the effects on competitiveness and market access, lack of legislative and institutional capacity, inadequate information about costs and benefits, as well as lack of understanding of the role of EIs in achieving environmental and sustainable development objectives. Thus, promoting the use of economic instruments to support command and control measures will require an enhanced understanding of their use and effects as well as increased institutional and human capacities for their design and implementation. International cooperation is required in order to achieve this.

It is in this view that UNEP in collaboration with UNCTAD established a Working Group on economic instruments for environmental policy, June 2001, as suggested at the High-Level Meeting on Environment, Sustainable Development and Trade held in Berlin, March 2001. The overall aim of the Working Group is to enhance policy coordination at the national level related to the design and use of economic instruments, including maximizing the net development gains from trade liberalization. More broadly, there is a need to facilitate an open debate on issues relating to the optimal design, implementation and monitoring of economic instruments, and the identification of entry points and possible scenarios within the current political economy for their introduction, through specific activities, including an on going exchange of information, provision of technical assistance and capacity building to countries.

This draft synthesis is the result of the first activity identified by the Working Group, which was to take stock of existing experiences, including through a literature review and interviews with relevant stakeholders, to illustrate the use of economic instruments as well as to identify impediments to their use and ways by which these impediments might be addressed. Ultimately, it aims to assist policy makers in making better use of economic instruments.

The paper will be reviewed by the Members of the Working Group and other experts (including team leaders of the UNEP Country Projects completed) at the next meeting of the WG, 31 January- 1 February 2002.

Why Economic Instruments?

Appropriately designed and implemented economic instruments (EIs), complemented with appropriate policy frameworks, can make an important contribution to achieving sustainable development, and can be used to strengthen implementation of multilateral environmental agreements (MEAs). They can also be a powerful tool to achieve both economic efficiency, and environmental and sustainable development objectives.

Economic instruments have the potential to offer a wide range of benefits over the regulatory alternatives. These benefits include (Klarer, J., P. Francis and J. McNicholas, 1999; Andersen, 1994?):

- *Cost efficiency.* Due to the flexibility granted to polluters in achieving pollution targets, EIs encourage pollution reduction where abatement activities can be implemented in the most cost efficient way.
- *Dynamic efficiency.* EIs create permanent incentives to reduce pollution. As a result, they lead to least-cost solutions to environmental problems, especially in the long run. As a result they increase firms' competitiveness as well as the efficiency of the whole economy compared with less efficient policy measures.
- *Positive effects on innovation and competitiveness.* Because of these dynamics, EIs encourage the development of clean and efficient technologies, which in turn contribute to lower costs and increase competitiveness of firms.
- *Contribution to "diffuse pollution" reduction.* Pollution coming from increasing small sources can be better and more cost-efficiently controlled by EIs than traditional policy instruments.
- *Revenue raising for environmental investments or other government expenditure.* For instance, revenues from eco-taxes can be used to create an environmental fund to finance priority environmental investments.
- *Compatibility with current trends towards increasing reliance on market mechanisms.* EIs can contribute to making government policy more effective, reducing cost, promoting technological innovation, encouraging private investment and reducing distortions in fiscal systems.

Which Economic Instruments?

Economic instruments encompass a rather heterogeneous toolkit of policies whose main defining feature is that they provide market signals in the form of a modification of relative prices and/or a creation of new markets, in the aim of inducing an evolution of behaviors so as to meet a given political objective. In the field of environment, "*any instrument that aims to induce a change in behaviour of economic agents by internalising environmental or depletion cost through a change in the incentive structure that these agents face (rather than mandating a standard or a technology) qualifies as an economic instrument*" (Panayotou, 1998). Economic instruments for environmental management can be classified into the following categories:

1. *Price-based incentives* assess a fee or tax on the amount of pollution that a firm or source generates. Consequently, it is worthwhile for the firm to reduce emissions to the point where its marginal abatement cost is equal to the tax rate. Price-based incentives encompass charge systems, fiscal and financial instruments as well as deposit-refund systems and bonds. (Stavins, 2000)

1.1 *Charge systems* include the following: *emission charges* i.e. direct payments based on the measurement or estimation of the quantity and quality of a pollutant; *user charges* i.e. payments for the cost of collective services, primarily used as a financing device by local authorities (e.g. for the collection and treatment of solid waste and sewage water); *user fees* i.e. payments for the use of a natural resource (e.g. park, fishing, or hunting facility); *product charges* are charges applied to products that create pollution either through their manufacture, consumption, or disposal (e.g. fertilisers, pesticides, or batteries), aiming to modify the relative prices of the products and/or to finance collection and treatment systems. (OECD, 1999)

1.2 *Fiscal instruments* such as taxes and subsidies are used to bridge the gap between private and social costs, by either taxing or subsidizing the polluters to reduce pollution to the optimal level. (UNEP, 1994).

1.3 *Financial instruments* have many similarities with subsidy and tax incentive systems. The main difference is that financial instruments are often extra-budgetary and financed from foreign aid, external borrowing etc. They include revolving funds, green funds, relocation incentives and subsidized interest or soft loans. (UNEP, 1994)

1.4 *Deposit refund system* are a special case of pollution charges, where consumers pay a surcharge when purchasing potentially polluting products and receive a refund when returning the product to an approved center, whether for recycling or for disposal (Bohm 1981; Menell 1990).

2. *Marketable permits, rights, or quotas* are based on the principle that any increase in emission or in the use of natural resources must be offset by a decrease of an equivalent, or sometimes greater, quantity. (OECD, 1999)

3. *Adjusting barriers to market entry* can also serve as market-based policy instruments. When prices do not reflect external costs, or when government covers liabilities that should have been covered by the private sector for instance, raising market barriers can contribute to achieve environmental objectives. On the other side, when infant/green industries face barriers to entry for example, it can be good to reduce them. Two types of market barrier adjustment stand out:

3.1 *Waiving liability rules* offers firms the opportunity to shift liabilities on to society, as in the case of nuclear power for instance. This represents a subsidy that artificially reduces barriers to entry.

3.2 *Transparency Improvement* by means of information programs, such as voluntary measures or eco-labeling.

4. *Government subsidy reductions* are the fourth category of market-based instruments. Subsidies, of course, are the mirror image of taxes and, in theory, can

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provide incentives to address environmental problems. In practice, however, many subsidies promote and lock in economically inefficient and environmentally unsound practices. (Stavins, 2000)

The above can be summarized in the following table:

Table 1: Classification of environmental economic instruments

Category	Instrument	Examples
<i>Price-based incentives</i>		
	<i>charge systems</i>	emission charges, user charges, user fees, product charges.
	<i>fiscal instruments</i>	pollution taxes, input taxes, import tariffs, financial aid in installing new technology, subsidies for environmental research and development.
	<i>financial instruments</i>	revolving funds, subsidized interests, soft loans and grants.
	<i>deposit-refund systems and bonds</i>	deposit-refund schemes to encourage recycling, environmental performance bonds, land reclamation bonds.
<i>Marketable permits, rights or quotas</i>		tradeable emission permits.
		property rights.
		quotas.
<i>Adjusting barriers to market entry</i>		
	<i>liability rules</i>	liability insurance legislation.
	<i>Transparency improvement</i>	Information programmes, voluntary measures, eco-labeling.

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<i>Government subsidy reductions</i>		

Adapted from Panayotou, 1998; OECD, 1999; and Stavins, 2000

Constraints and Obstacles to the Use of Economic Instruments

The Use of Economic Instruments Undermined by Constraints

Most studies on and guidelines for the use of economic instruments primarily focused on their optimization, in terms of cost-effectiveness and economic efficiency notably. Economists who wanted to address the constraints to the use of market-based incentives (MBIs) mainly addressed the removal of their efficiency's basic assumptions, thus dwelling for long upon concerns such as market failures which may potentially undermine the optimal properties of these instruments. On the contrary, they have seldom questioned basic issues such as the alleged superiority of MBIs on command-and-control standards and regulations (CACs), nor pointed out the influence of the policy making process, or the technical and institutional capacity, on the final effectiveness and efficiency of economic instruments.

Most case studies on the design and application of economic instruments (in industrialized and developing countries as well as countries with economies in transition) indicate that constraints may limit the successful introduction and application of economic instruments. Various classifications of those constraints can be found in literature. The one that is used in this paper distinguishes four categories: 1) Inadequate Communication and Information; 2) Political and Socio-cultural Constraints; 3) Technical, Financial Institutional and Constitutional Constraints; and 4) Market-related Obstacles.

1. Inadequate Communication and Information

The design and implementation of an economic instrument require thorough analytical studies as well as intensive information collection and communication. Failures in one of these fields can seriously undermine the use of the instrument.

1.1. Communicational Failures

This is the case when communication is lacking or insufficient between the stakeholders concerned by the use of EIs. Communicational failures can have two negative impacts: first, they can lead to *lack of knowledge*, although information does not "lack" per se but remains unshared and inaccessible. This can happen when discussion about the introduction of a measure is shared by experts only, the analysis being mostly carried out on a theoretical level only. It can also happen when several stakeholders but the private sector are involved - who are likely to lack basic information about the sector.

Second, communicational failures can lead to *lack of cooperation* between entities, which can turn out to seriously undermine the effectiveness of an environmental policy, as the application of such policy seldom rely on a single organization. Typically, an environmental agency, tax collection authorities and relevant ministries for the sector to which the policy applied, at least are concerned by the policy and should be involved in the process.

1.2. Insufficient Information

Insufficient information can constrain the use of EIs in two major ways. It can lead to arbitrarily chose or reject an instrument due to *lack of knowledge or trust of the potential of EIs*. It can also lead to the inaccurate design and/or implementation of an instrument, due to *lack of knowledge either on the conditions* needed for the implementation of the instrument *or on the economic context* in which the instrument will have to be applied.

Misconception of economic instruments is a particular problem arising from lack of information, as well as unexpected evolution of the macro- or microeconomic factors. Setting the parameters of an MBI with limited information about the market is a hard thing. Thus, it is proved very difficult to avoid misconceptions, even if very thorough studies have been carried out and all available information has been collected. In addition, some misconceptions might be performed consciously, if they were proven unavoidable during the design or implementation process (for instance, tax rates are often set at sub-optimal levels because an optimal rated tax could not be enforceable).

Examples:

- The initial allocation of Air Pollution Permits in Chile was not well defined because of initial limited institutional capacity. This resulted in the fact that polluters found it easier to challenge this allocation into court, rather than buying permits, to get new pollution permits (case study).
- The decision to calculate emission reduction levels according to *relative* –rather than *absolute*- baselines in an emission trading programme in the USA resulted in a considerable increase of administrative costs, which discouraged trade (case study).
- An emission trading system for VOC (volatile compound organics) in the Basel region (Switzerland) encountered a low level of exchange, because it only involved large plants (which had already made major efforts to reduce emissions because of previous environmental legislation) and not small ones (with considerably lower marginal abatement costs). (case study)

Perverse incentives may be a particular kind of misconception that induces people to behave in a way that worsens the environment. This usually happens when the possible set of behaviors in response to the introduction of an EI has been misestimated. For instance, a tax based on concentration rather than volume of pollutants emitted can constitute a perverse incentive to dilute pollutants rather than to cut emissions as aimed to.

Examples

- Enterprises are allowed to count most emission fee payments as production costs in China (therefore lowering their tax liabilities in this system) and 80% of fee revenues are returned to enterprises (ending up being used for non-environmental purposes in many cases). As a result, the emission fee system encourages firms to pollute because fee payment is profitable for them (case study).
- Local environmental authorities in China heavily depend on emission fee revenues for financial support. They are thus encouraged to perpetuate non-compliance to maintain a steady flow of fee payments (case study)

2. Political and Socio-cultural Constraints

2.1. Insufficient Consideration of the Country's Overall Context

Acceptability of an instrument by people and groups of people is a key aspect that has often been over-neglected in the past, causing the failure of instruments which seemed otherwise appropriate for the case. The way people perceive environmental policy within the overall society is a key factor in policy making: first, because public support and involvement is necessary for the successful design and effective application of a policy; and second because politicians are generally reluctant to impose policy measures that could undermine their own popularity. Several considerations may account for the perception of an environmental policy.

Primarily, the historical and cultural background of a community might prevent the government from implementing certain policy options (for instance attempts to introduce a new land Bill failed in Zambia, among others, because the new Bill under-estimated the cultural values attached by people to communal lands) or on the contrary facilitate the use of other instruments. Secondly, specific values and considerations might influence the choice of instruments. Specific considerations include *ideological considerations* (for instance, people sometimes reject tradable permits because they perceive them as "license to pollute"; on the contrary, earmarking revenues from pollution charges to environmental funds can be positively perceived as it implements the "polluter pays principle"), *equity concerns* (public opposition due to concerns about distributional impacts is likely to be all the stronger as the environmentally regulated activity is the main source of income), *reject of tax saturation* etc.

Examples:

- In Tanzania, tribes opposed livestock fees, because cattle traditionally is a prestige and is used to pay for marriages etc (Tanzanian Questionnaire).

2.2. Contradictions between Environmental Policy and other Political Criteria

Internalization of the social costs of pollution or natural resource exploitation can rarely be achieved without interfering with a multiplicity of other factors that are crucial to society, including social, cultural, ideological and economic issues. In developing countries and countries with economies in transition especially, priority is often set on *poverty reduction, equity and fast economic growth*, on which environmental policies are likely to have a harsh impact.

Examples:

- In Botswana, land was privatized for environmental goals. However, it made the poorest loose access to land and land-based resources. (case study).

These inter-dependences strongly complicate the *environmental policy making process*, as actors with divergent, if not contradictory, goals participate in the process. Given the trade-offs between various policy objectives, societies have to reach compromises that, in order to be successful, must be sufficiently supported and workable. More precisely,

tensions between environmental economic instruments and non-environmental concerns may occur over a number of conflicting factors, as described below.

Long-term versus short-term.

Equity versus efficiency. Economic instruments and command-and-control measures have different distributional effects. Governments often favor the use of those which are more equitable even if they are less efficient.

Private versus societal efficiency. Governments faced with urgent environmental problems caused by few polluters might choose to use CACs instead of MBIs, favoring the more efficient solution for the whole economy at the expense of the private efficiency of polluters.

Certainty versus efficiency. MBIs rely on the economic responses to price changes that are sometimes difficult to predict. Hence, Governments usually prefer to use CACs, for they ensure the desired environmental outcomes when properly monitored and enforced – which often is not the case, though. This is the reason why, for instance, regulatory approaches are especially favored over economic instruments in the case of extremely toxic substances.

2.3. Vested Interests

Several interest groups might be very influential and lobbying successful in each country. Willing to keep the bargaining power they are used to have through regulation, they usually discourage the Government from using economic instruments or influence the rates imposed, to the detriment of the overall economic efficiency.

In South Korea for instance, the waste disposal-refund system in place in 1997 provided for a deposit that is only 10-20% of the necessary waste collection and treatment cost; yet, efforts to raise the deposit fee were strongly resisted, not only by industry but also by consumers. (UNEP, 1997)

Industry in particular, although generally favoring market mechanisms over direct governmental interventions, prefers regulatory approaches and subsidies in the case of environmental policy. Firms' responsiveness can differ from citizens' responsiveness within the two following factors: their *means*, because firms may put greater pressure on politicians and civil servants, and their *motivations*, being concerned about additional cost burden and related concerns about loss of international competitiveness.

3. Technical, Financial, Institutional and Constitutional Constraints

The legal, technical and institutional requirements of economic instruments are different from those of command and control regulations, but they are just as essential. Property rights, and enforcement of contracts are essential for the efficient operation of markets, on which the effectiveness of market-based instruments, depends. (UNEP, 1997)

3.1. Lack of Technical Capacity

Technical capacity encompasses capacity that people in general and staff of governmental institutions especially, have to design, implement and monitor policy measures. As technical capacity relies on education, research and training as well as

“learning by doing” processes, its level is likely to be lower as the country has got low educational and training capacity as well as relatively few experience in the use of policy measures.

Lack of technical capacity to use economic instruments for environmental purpose, hence, is exacerbated by the complexity of the instrument. It is also exacerbated by lack of acceptability and credibility, which increase public resistance towards the instrument and hence the need for more administrative interventions.

Examples:

- In the Philippines, technical capacity was a barrier to the implementation of instruments for forest management: field staff faced difficulty in identifying species and assigning appropriate grades to forest timber (Philippines Questionnaire 2).

3.2. Inadequate Institutional Capacity

Lack of institutional capacity for the implementation of environmental measures is a common phenomenon worldwide, as “perfect” control would require a very heavy administration with tremendous costs. However, it is more particularly a problem for developing countries, because they often lack effective institutions and staff to perform even basic monitoring or enforcement tasks.

Inadequate institutional capacity is thus a major constraint to the use of economic instruments, as the whole process depends on its practical feasibility and can collapse because of an impotent administration. Problems encountered during the implementation of instruments can also arise from an inefficient internal organization or an inappropriate coordination that is not especially due to a lack of funding. In particular, a number of institutions are not able to successfully implement economic instruments because their staff has been trained and their structure conceived for the application of command-and-control measures only. This is illustrated, for instance, by the use of environmental taxes in Hungary where the administration succeeds to monitor taxes on fuel, while it fails to monitor taxes on solid waste. This is due the fact that taxes on solid waste are monitored by the Environment Agency, which is less competent in this task than the traditional fiscal institutions in charge of monitoring taxes on fuel.

Examples

- Due to gaps in the legislation, the user charge system on sewage in Bulgaria is inefficient for imposing fees in case of delayed payment and for enforcing obligatory payment (case study).

3.3. Funding Constraints

Lack of technical capacity to design, manage and monitor an economic instrument is always linked to lack of funding to a certain extent. Funding constraints can restrict the country’s entire institutional system in the following areas: education and research necessary to educate experts and collect data; administration to implement and enforce an instrument; judicial to sanction non-compliance with the environmental policy.

Both funding constraints and misuse of institutional structures contribute to problems of weak analysis, monitoring and enforcement capacities. *Weak analysis capacity* includes

poor educational and research background (which will likely induce the constraint that we called previously "lack of knowledge") as well as lack of capacity to collect information and carry out studies (for instance, an ineffective accounting administration or institute for statistics). *Weak monitoring and enforcement capacities* can be exacerbated by other political factors such as, for instance, distrust against the federal level in some countries which seriously increase evasion from taxes collected by the federal tax authorities, as compared to the local tax authorities.

3.4. Inadequate Legal Basis

Constitutional rigidities may deprive a country from the institutional capacity of using an economic instrument, even though institutions exist that would be materially able to implement and enforce it. This can happen when constitutional principles or basic laws whether forbid the use of a kind of economic instrument, or impede a specific administration from getting involved in a given sector. For example the introduction of new taxes with environmental purpose was constrained in Brazil in 1994, by the constitutional prohibition of more than one tax per transaction; similarly, tradable pollution permits were apparently preceded by the "unbaibility" of environmental damages (Serôa da Motta and Reis, 1994).

Examples:

- An industrial effluent discharge fee was cancelled by the court in Argentina, on the ground that it was unconstitutional because the fee could not be justified as a payment for service (Case study).

4. Market-related Obstacles

Economic instruments are proved to have optimal properties in the restricted context of "perfect market" - as it is called in economic theory. Thus, micro- or macroeconomic factors can constitute market-related obstacles to their optimal properties. Unlike the ones presented so far, these constraints are somewhat independent of the design and implementation processes.

4.1. Macroeconomic Instability

Macroeconomic instability induces constant unexpected evolution of prices and increases uncertainty within markets, therefore tremendously complicating the management of market-based instruments. Moreover, economic instruments are often designed in order to have "optimal" properties in a given economic situation. Thus, in a context of instability, not only their cost-effectiveness but also their environmental efficiency becomes questionable. For instance, a high inflation rates rapidly decrease the real rate of charges or taxes, if they are defined with a nominal rate rather than indexed on inflation. Macroeconomic instability is also likely to worsen social negative impacts of MBIs.

Examples:

- In Bostwana, land taxes set at a low level in 1975 have never been adjusted. They are badly eroded by inflation and fail to improve land management (Case study).

4.2. Imperfections in the overall Tax System

The overall tax system can create distortions and incentives, such as perverse subsidies, that may undermine or counterbalance the effects of environmental EIs.

Sectoral or trade policies which subsidize energy, new materials or agricultural inputs to attain sectoral or national objectives such as food self-sufficiency, input substitution, or export promotion, stand in the way of the introduction of economic instruments that aim to internalize environmental costs. Distortionary subsidies may be thought of as negative MBIs; without their removal, the introduction of MBIs would be meaningless and wasteful even if feasible. For example, carbon taxes and emission charges are unlikely in Brazil as long as the objective of self-sufficiency calls for fuel subsidies (UNEP, 1997)

Examples

- Energy subsidies in Russia create perverse incentives that have a negative impact on the environment. It has been shown that their removal would generate a 16% reduction in SO₂ and a 14% reduction in CO₂ (case study).

4.3. High Transaction Costs

Asymmetry of information and transaction costs are sources of market imperfections. In general, when a wide part of economic activity is not involved in the market, the capacity of markets to efficiently internalize environmental or social externalities is undermined. This is especially in the case in countries with a large public sector and/or substantial informal non-market sector.

Examples

- For EPA's Emissions Trading Program, relative baselines were used to calculate reduction levels. This created significant transaction costs by essentially requiring prior approval of trades as the authority investigates the claimed counterfactual from which reductions are calculated and credits generated (case study).

4.4. Strategic Behavior

The effectiveness of an economic instrument relies on the responsiveness of demand and supply to the incentive it creates. Behavior is thus a key issue in the usefulness of incentives. When *elasticities are low*, the incentive effect is likely to be little.

Firms' strategic behavior and market power constitute common market failures undermining the success of the use of EIs. For instance, if a system of emission permits has been set up, a firm may devise a strategy of predation on other firms, attempting to buy a wide number of permits so as to increase prices. The *internal organization of firms* may also account for a low incentive effect. For instance, if the finance and production departments of a firm are separated, the production may not react to an incentive made on the finance department.

Examples

- Firm privatization in Russia favored "insiders" i.e. managers who were already in charge under the communist system, and who still rely on their networks of personal

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contacts and mutual services and can make claims on public funds. This results in soft-budget constraints and cost-ineffective behaviors that undermine the potential effectiveness of market-based incentives (case study).

How to Address and Overcome Constraints?

A primary factor to take into account when considering the use of economic instruments for environmental purpose, is that several constraints are inherent characteristics of a country and cannot easily be overcome, at least in short or even medium term. Therefore, policy makers should primarily aim to find the best instrument given the country's specific context and related constraints. In effect, an ill-designed economic instrument or one which is alien to the context of the country and the structure of the industry could have higher informational and enforcement requirements than well-designed command and control regulations. For example, effluent charges applied to scattered, small-scale industries in developing countries with a larger underground economy have enormous information requirements and little chance of successful implementation. Under these circumstances product taxes and deposit-refund systems, though indirect instruments, are overall more efficient. On the contrary, when the instrument is tailor-made to fit the country's specific context, the informational and enforcement costs are minimized. (UNEP, 1994)

While every effort should be made to choose instruments, designs, and modes of introduction that minimize the informational and management/enforcement requirements, there is however an irreducible minimum level that must be met if environmental policy is to produce results on the ground. Informational and management requirements are translated into institutional and human resource requirements—two resources in high demand and limited supply in developing countries. There are several ways by which constraints to the use of economic instruments are to be addressed. Some of them are sources of inefficiencies or stem from imperfect organization, which can be addressed as per the recommendations below, in terms of step to follow, characteristics to meet and stakeholders to involve. (UNEP, 1994)

1. Increasing Communication and Information

In order to reasonably reconcile private and general interests towards the sustainable use of environmental goods, *transparent and democratic policy-making processes* are required, from the selection and design to the implementation of environmental economic instruments. This encompasses developing communication and collaboration as well as gaining and exchanging information between governmental entities, the public and relevant stakeholders.

1.1. Developing Communication and Collaboration with Stakeholders

In order to ensure that incentive measures are developed in a participatory manner and will ultimately be effectively implemented, one of the most important requirement is that stakeholders be involved in the whole process of policy development. This implies that participation processes are established to facilitate dialogue between the government and relevant stakeholders, and that stakeholders accept the selected policy options. Relevant stakeholders include experts, scientists and policy-makers but also members of the local communities impacted by a measure who might have practical knowledge associated with the issue and could be key players in its successful implementation.

Ongoing access to information and communication such as meetings at the local level to explain the incentive, organizing training workshops or establishing control and follow-up systems with appropriate government agencies might all be important elements to consider in the successful application of an incentive measures. This includes the involvement of all stakeholders such as members of other ministries, parliament, industrial groups and environmental citizens' organizations including NGOs. (UNEP, 2001)

In the long run, such an approach can reduce costs associated with implementing and monitoring incentive measures where relevant groups have a stake in a successful outcome and accountability has been established through shared responsibility for the successful implementation of a measure. Furthermore, stakeholders can help build the capacities of local institutions in order to enable them to better negotiate the terms and conditions of the incentive measures. (UNEP, 2001)

In particular, *ownership and control* by the industry itself must be ensured. An industrial sector dominated by public enterprises facing a soft budget constraint or cost-plus pricing formulas does not respond to pollution charges or to fines for non-compliance. (UNEP, 1994)

Examples

- The introduction of the environmental criteria in Brazil's Value-Added Tax (ICMS) was carried out with a careful political approach involving mayors and representatives in the state congress (Philippines Questionnaire (1)).

1.2. Gaining and Exchanging Information

Adequate information should be exchanged between policy-makers, target groups and the general public about any aspect of the new instrument they might be interested in. Important features are the value and distribution of the costs and benefits of the policy, purpose and technicalities of the instruments, time of introduction, possible future adjustments, etc. New elements must be timely announced. Target groups should also be aware of the interrelations between different policy fields. Consultation with target groups should as far as possible be involved in the execution of the instruments. Instruments on the interface of different policy fields should be presented to all parties concerned. (OECD, 1991). Policy-makers should also ensure that adequate exchange of information occurs between all relevant administrative institutions, including all involved ministries, and bodies within the political sphere, at both local and national levels.

The government may decide that the introduction of a new policy measure like an emission charge at the national level involves an unacceptable degree of political risk. In that event, local experimentation could be a less risky way of testing public reaction as well as determining the effectiveness of the instrument. In this way, it could be fine-tuned before an attempt is made to replicate it at the national level. It seems highly likely, in most cases, that emission charges or other pollution taxes would need some fine-tuning, unless governments are exceptionally well-informed about the shapes of abatement cost functions and demand curves. In some cases, a uniform national policy would not be appropriate since the problem itself is localized -- e.g. photochemic smoke in a particular city. Nevertheless, other cities facing similar problems could clearly derive useful lessons

from a local policy experiment and avenues for transferring those lessons need to be opened where they do not already exist (e.g., through a council/conference of municipal or provincial environmental policy makers). (OECD, 1996)

Examples

- The establishment of an entrance fee for forest recreation and ecotourism has been successfully tested in the Makiling Forest Reserve, and is currently being replicated in other forest reserves in the Philippines (case study).

2. Addressing Political and Socio-cultural Constraints

Problems to implement environmental policy often reflect deficiencies in instrument design. Those deficiencies can be of a few sorts. One occurs when the instrument is overly complex, requiring sophisticated technical capabilities on the part of those charged with its implementation. Another occurs when instrument design is insensitive to the political dimension of successful implementation – i.e., the impact on and likely reaction of powerful interest groups. Implementation problems may also arise from a weak legal and institutional framework, which is often the case in developing countries and countries with economies in transition. (OECD, 1996)

Thus, the selection of relevant economic instruments has to be based on an assessment of the country's specific needs and conditions. It is necessary to carefully address these specific conditions during the first part of the design phase – the assessment of the framework and objectives of the environmental economic instruments to be developed.

2.1. Taking into Account the Country's Overall Context

It is important to understand the socio-cultural and political context in which policy options are to be put into place for environmental purposes, and to comply with them as much as possible in order to ensure that they have a better chance of success.

Socio-cultural Traditions of the People. The way people interact with the society and perceive policy options is a key factor to the successful implementation of economic instruments. Hence, their acceptability of and behavior toward each type of economic instrument should be carefully assessed ex-ante. The historical and cultural background of a community as well as its specific values and considerations, such as *ideological considerations, equity concerns* etc, must be carefully studied and taken into account when designing and ultimately implementing environmental economic instruments.

Technical, institutional and legal capacities are crucial criteria for the choice of environmental policy instruments. Indeed, the ultimate success of any incentive measure is contingent upon its successful management, monitoring and enforcement, which primarily depend on the available technical, institutional and legal capacity. Hence, the choice and design of any economic instrument should take great account of the existing country's capacities. This will ensure that the instrument is easily monitored and enforced, instead of requiring a great deal of changes in the technical, institutional and legal systems and risking to face more barriers. For instance, collection of an emissions charge depends on a reasonably effective tax administration, and it also requires monitoring capabilities if charges are to be linked to actual emissions (OECD, 1996). To

these requirements should be added the need for a functioning judicial system to resolve disputes, decide more serious enforcement cases and protect property rights (Russell, C., P. Powell and W. Vaughan, 1998).

The level of development and structure of the economy are critical factors (because they determine enforcement needs and capabilities), as are social organization and culture. For example, in a country in an early stage of development with an economy dominated by agriculture, small-scale industry, and a large informal sector, regulations such as effluent standards and economic instruments such as effluent charges are likely to be ineffective because they are costly to monitor and enforce. Given the smallness, scattered distribution, and elusive nature of small-scale industry, the costs of monitoring are likely to be high relative to the damage caused by the individual polluting activity; similarly, the administrative costs of collecting charges for such entities are likely to be large relative to the expected revenues. Under such circumstances the right intervention would be indirect instruments, such as product charges and differential taxes, imposed at easily monitored points (i.e., imports, exports, raw material production, etc.). Moreover, economic instruments in developing countries need to be at the same time both simpler and more sophisticated than in developed countries: simpler, because the developing countries have a limited administrative capacity for tax and charge collection; more sophisticated because the resource systems and ecology (especially in the tropics) are more complex than in temperate developed countries. (UNEP, 1994)

2.2. Ensuring Compatibility between Environmental Policy and Other Political Criteria

First of all, it is important to identify the *underlying causes of environmental degradation* in order to select the appropriate measure to stop or reverse it. Policies that create incentives without removing the underlying causes for environmental degradation (including perverse incentives) are unlikely to succeed. Therefore, prior to embarking on an exercise to develop incentive measures for conservation or sustainable use, it is important to undertake a thorough study to identify and evaluate the respective and mutually reinforced impacts of any underlying pressures. This includes threats generated by social or economic forces. In some cases social and economic issues are at the root of unsustainable practices and while addressing market and policy failures with incentive measures may help to correct this behavior, they may not address core problems such as lack of resources or poverty.

Examples

- In Botswana, the efficiency of water user charges is undermined by the continued subsidization of water supply to promote social justice (case study).

In the case of industrial pollution especially, a successful intervention is differentiated according to a number of factors. Firstly, *scale of production* must be considered. In the case of a small number of large industrial conglomerates for instance, emission standards, effluent charges, tradeable pollution permits, and even mandatory installation of pollution equipment can be effective because monitoring and enforcement are relatively easy. In contrast, a large number of small cottage industries call for indirect instruments such as input taxes, refundable deposits, and waste delivery incentives. Second, *composition of*

industrial pollution must be taken into account. Flexible systems for example, such as pollution charges/permits or enforced standards, can be inappropriate if the pollution is dominated by waste for which the environment has no assimilative capacity (i.e., heavy metals, corrosive materials, or radioactive wastes). In this case, strict regulations, manifest systems, performance bonds, and central collection treatment and disposal facilities can be more appropriate. (UNEP, 1994)

The environmental economic instruments selected for implementation must not conflict with the top *priorities of developing countries* and countries with economies in transition, which usually include mainly economic development and poverty alleviation. Therefore, instruments are required to achieve their environmental purpose at the lowest cost possible. Whatever that cost is, they must not be such as to adversely affect the lowest-income people nor the competitiveness of the country's exports as a whole.

Distributive impacts. Policy instruments have various distributive consequences. In designing incentive measures, it is important to ensure that the definition of beneficiary communities is inclusive and equitable, according to the overall social guidelines of the country. The distributional impact of economic instruments depends on how the property rights or pollution permits are allocated, and how revenues from environmental taxes and charges are spent. In Barbados for instance, the deposit-refund system on plastic bottles is used as a source of revenue for poor people (Acquatella, 2001).

Examples

- In South Africa, the Government has ensured that a larger share of the quotas in the fishery sector benefits domestic fishermen (case study).

While recognising the interaction of many factors, incentive measures should remain as simple and targeted as possible, allowing for faster implementation and clearer assessment of their effect. An incentive measure should have a clear target that is where possible measurable. For instance, in the case of a charge system, the number of pollutants covered by the system should be minimized and the charge rate system made as simple as possible. Indeed, the ultimate success of any incentive measures is contingent upon the successful monitoring and evaluation of its impact. Without indicators of success or failure, it is unclear how to adapt so as to address failings and reinforce success through corrective action. Of course, no single measure is likely to be flexible and rigorous enough to address all aspects of a specific concern. A combination of incentive measures may be necessary in order to realize both the public benefits of protecting the environment and the private benefits brought about by the sustainable use of resources.

2.3. Enhancing the Acceptability of Specific Economic Instruments

Concern about the acceptability of an instrument should take place from the early stages of the design process, as both its economic and environmental efficiencies depend on its overall acceptability. Indeed, public and political responsiveness, as well as firms' opposition can alter the design of the instrument during the policy making process and undermine its effectiveness through reluctance to comply or pay fees once it has been implemented.

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Generally, public and political support to an economic instrument can be raised through providing trusted information about the expected consequences of its application. Indeed, if the private sector often aims at regulation although it is often less efficient for itself and for society as a whole, it is because it does not have the adequate information to understand the whole picture. In order to overcome such information asymmetry, design of new economic instruments should rely on ex-ante assessment, pilots, pre-existing similar instruments, etc. rather than purely theoretical studies. Reforming existing instruments so as to meet a given environmental objective can also be easier than creating brand new ones, which are likely to face more opposition. On the same way, all measures designed to decline uncertainty, including suppressing legal uncertainty and minimizing reliance on administrative procedure, are likely to boost acceptability.

Examples

- A system of tradable property rights on water could be implemented in Chile without opposition because of the country's long experience of property rights on water (case study).
- The same situation occurred with the tradable transportation license system in Santiago (case study).

Furthermore, acceptance by the industry can often be accomplished through a new-source bias or grandfathering system that assures the industry that the objective is not punishment for past pollution but redirection of new investments towards less polluting technologies and industries. Gradual escalation and implementation is also necessary in order to allow time for industry adjustment and to preserve competitiveness. (UNEP, 1994)

3. Ensuring Compatibility between Technical, Financial, Institutional and Constitutional Capacity and the Use of Economic Instruments

3.1. Addressing Problems of Technical Capacity

- **Making better Use of Existing Technical Capacity**

To minimize technical demands, maximum use must be made of existing technical knowledge and skills to use economic instruments.

Examples

- Trading of ozone-depleting chemicals permits has been substantial in the US because traders already had experience to trade with each others (case study).

- **Improving Technical Capacity**

Nevertheless, training is often a necessary component for the effective implementation of economic instruments, especially in developing countries which have so far seldom used such incentive measures. Among the new skills required are specialists in environmental impact assessment and valuation (damage or betterment assessment), environmental auditors and inspectors, environmental engineers and economists, financial analysts, environmental tax experts, etc. While some of these skills may not be available in developing countries, related skills exist and can be easily retro-fitted for the use of

economic instruments in environmental management. External training and technical assistance might be needed for some time in certain countries but local expertise would not take long to respond if effective demand exists because related skills are often available. (UNEP, 1997)

3.2. Addressing Problems of Institutional Capacity

Successful interventions consider explicitly the *monitoring and enforcement capabilities* and provide for an institutional support system. Where the feasibility of monitoring and enforcement is low and shut-down undesirable, mandatory installation of pollution control equipment may be preferable provided that effective use can also be mandated and monitored. Even then, taxation of inputs and performance bonds might be preferable because they have generally lower monitoring and enforcement costs. (UNEP, 1994)

- **Making better Use of the Institutional Structures in Place**

To minimize institutional demands, maximum use must be made of existing administrative structures (e.g., existing tax collection, bureaucracy, industry licensing procedures, vehicle registration system, the town and country planning department, the government tourist agency, line ministries or departments such as forestry, mining, industry, and agriculture). For example, product taxes can be integrated with existing sales, excise tariffs, or Value Added Tax systems and collected by the relevant collection agencies. Betterment charges can be integrated with the property taxes and collected by the existing property tax department. Wastewater treatment charges or watershed protection charges can be incorporated into the monthly water bill and collected concurrently. Transferable development rights or land-use taxes can be implemented through the land registration department to maximize use of the private land market institutions (e.g., real estate firms, land surveyors, property value assessors, etc.) Using existing institutions would significantly reduce the need for new institutions and additional human resources though it will not eliminate it entirely. For example, water rights, tradeable catch quotas, or emission permits would require a special registry which is regularly updated. Issuance of secure land titles require cadastral surveys and a process for the resolution of conflicting claims, while land use taxes call for land use registry. Performance bonds require a financial institution that will manage and reinvest the funds, pay interest, assess performance, and dispose the bond accordingly. Effluent charges require a monitoring and collection system which has relatively high institutional and human resource requirements because it calls for specialized knowledge and measurement capabilities. (UNEP, 1997)

Examples

- Colombia found an original way to overcome its lack of enforcement capacity through fostering private enforcement. A "people's action" law has been set up, which allow any citizen suing a polluter into court to claim for 15% of the fee (case study).
- As systematic backlog in courts impedes an effective enforcement of environmental legislation, Trinidad and Tobago promoted voluntary liability. This resulted successful in the field of Oil Pollution (case study).

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- Hungary improved tax payment collection of a fuel charge on transport through committing this collection to the tax authorities rather than the environmental agency (case study).

Successful intervention accommodates *control region heterogeneity* (and hence, high information requirements) through the decentralization of authority to local agents and an allowance for locally tailored solutions; the more diverse or heterogeneous the control region is, the greater the need for locally tailored policies and instruments that automatically figure in the local conditions.

- **Improving Institutional Capacity**

In addition, it might be useful to restructure existing institutions and add specialized organizational and human resources to better monitor and enforce environmental economic instruments. This includes improving scientific and technical capacity, as well as capacity related to administrative, educational, and training and communications related issues. While in many cases there will be an ongoing need in the implementation phase of incentive measures for training of trainers, managers and other workers, public education programs and other forms of human capacity building (see the above chapter “Gaining Technical Capacity”), in other cases there may be a need for physical capacity building including installing monitoring equipment or other infrastructure needs.

3.3. Addressing Funding Constraints

- **Overcoming Funding Constraints over the First Period**

Despite the favorable financial implications of economic instruments over the medium to long term, depending on the instrument, a short-term cash flow problem may be created by the effort to introduce economic instruments such as secure land titles, water rights, fishing licenses, and tradeable emission permits, etc. The financial deficit may arise from the fact that property rights acquire value after they are issued. Since cadastral surveys, resolution of conflicting claims, and title issuance and registration take time, a cash flow problem is created for the issuing agency which assumes the cost without an immediate means of cost recovery. Given the severe scarcity of domestic financial resources in many developing countries, external financial assistance or borrowing are necessary for the implementation of certain instruments such as property rights. For example, Thailand in the 1980s received a \$30 million loan from the World Bank, in conjunction with its structural adjustment program, specifically for the purpose of cadastral surveys, land registration, and titling. Market creation instruments, such as tradeable emission permits or fishing licenses, may also face a financial problem because in order to secure acceptance by the industry, the government may allocate, free of charge, permits to all existing firms to cover fully their current emissions. Not only are the costs of establishing the system not recovered, but the government needs substantial additional financial resources to buy back a large number of permits or licenses in order to reduce emissions or fishing effort to the desired level. These costs can later be recovered through a capital gains tax on the market value of the permits, which will rise as more licenses are withdrawn and as demand for permits rises over time due to economic growth. (UNEP, 1994)

- **Overcoming Funding Constraints in the Long-term**

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Revenue generated by user charges or full-cost pricing for wastewater treatment, road access, water use, or other public utilities are payments for services rendered and are retained by the utility for cost recovery. On the other hand, tradeable emission permits, tradeable catch quotas, transferable development quotas, fishing licenses, and other forms of market creation do not automatically generate revenue, unless they are auctioned by the issuing authority, in which case they can generate substantial amounts of revenue. When they are given free of charge, the issuing authority may introduce a capital gains tax on the price of the permit or quota to finance the administrative costs of issuing, registering, and monitoring the permits. Administrative fees may similarly be imposed for issuance of land titles, water rights, and transferable development rights to defray costs. Capital gains from these rights may also be taxed to raise general budget revenues. The financing advantage of economic instruments has long been recognized by environmental policy makers in both developed and developing countries where pollution charges or property taxes are more often levied as sources of revenue than as incentives for more environmentally sound behavior. Hence, they tend to be set at a high enough level to generate the targeted expenditures, but not high enough to induce a change in behavior. (UNEP, 1994)

Examples

- Guayaquil city (Ecuador) has set up a sufficient and regular funding of solid waste management through a 10% surcharge on electricity specifically earmarked to solid waste collection (case study).

• Use of Revenues from MBIs

There are, of course, issues as to whether the revenue from environmental taxes should be earmarked and used for environmental investments or go to the treasury to be used for general expenditure, or for the reduction of other taxes. While earmarking tax revenues for environmental expenditures enhance transparency and hence acceptability by the public, it also reduces government flexibility (OECD, 1996).

Since the incentive function of MBIs is either ignored or effectively sacrificed to the revenue generation function, the effects of economic instruments on environmental protection, social welfare and sustainability depends critically on the allocation and use of the revenues generated. If they are expended largely on consumption, inefficient bureaucracies, low-cost loans for inefficient and unprofitable firms, and subsidies for environmentally harmful activities, the effects on environment, welfare and sustainability would be unambiguously negative. If, on the other hand, the MBIs-generated revenues are invested in strengthening, monitoring, and enforcement capability and in replacing depleted natural and environmental capital through investments in natural, human, and man-made capital, environmental protection, intertemporal welfare, and sustainability would all be enhanced. Furthermore, the more decentralized the collection and allocation of revenues the more likely that they be used to restore degraded environments than to support bloated bureaucracies. For instance in Brazil, 1997, royalty revenues were distributed 45% to the state, 45% to the municipalities where production takes place and the remaining 10% to government agencies concerned with the specific activities (e.g. forests in the case of forestry royalties). While this is no guarantee that the royalties would be invested rather than consumed, decentralization of both taxation and

expenditure is likely to both save tax revenue and advance sustainable development as local solutions are applied to local problems by elected officials accountable to immediately affected constituents. (UNEP, 1997)

3.4. Improving the Legal Basis

Property rights, and enforcement of contracts are essential for the efficient operation of markets, on which the effectiveness of market-based instruments depends. Where property rights cannot be defined in physical space, they can be defined in legal space (e.g., permits, licenses, quotas) which assigns right of use. Economic instruments require enabling legislation, legitimation, or legal frameworks, not detailed regulation. Environmental charges need to be legislated, unless they qualify as taxes or user charges permissible by executive decision within existing legal frameworks. Similarly, performance bonds and transferable development rights need to be legislated and environmental funds need to be legally constituted. (UNEP, 1997)

Where constitutional rigidities deprive a country from the use of economic instruments, which would otherwise be adapted to the needs and context of the country, it is possible for the Government or environmental entities to change Law.

Examples

- The pilot test of a watershed protection fee in the Philippines Makiling Forest was stopped by the legislation which states that public goods are free. The monitoring Institution convinced the President of the Republic to sign an Executive Order that allows the collection of such fees in that area. (Philippines Questionnaire (1)).

A main constraint to be faced while trying to change Law is opposition from groups which lobby for their particular interest against the overall society's one. Ways to overcome this barrier are similar to the ones described in 2.3 "Enhancing the Acceptability of Specific Economic Instruments": generally, public and political support to a measure can be raised through providing trusted information about the expected consequences of its application. This implies that the design of new Law should rely on ex-ante assessment, pilots, pre-existing similar instruments, etc. rather than purely theoretical studies. Reforming an existing Law so as to meet a given environmental objective can also be easier than creating a brand new one, as it is likely to face very little opposition. On the same way, all measures designed to decline uncertainty, including suppressing legal uncertainty and minimizing reliance on administrative procedure, are likely to boost acceptability.

4. Overcoming Market-related Obstacles

4.1. Addressing Macro-economic Instability

Need to develop.

4.2. Enhancing the Overall Tax System

Introducing an economic instrument in isolation with the overall tax and policy system often results in a failure. Policies need to be comprehensive in order to avoid clashes

between instruments and regulations used, within the same sector as well as through different sectors.

4.3. Overcoming the Problem of High Transaction Costs

Need to develop.

4.4. Addressing Problems Arising from Strategic Behavior

Successful environmental intervention is differentiated according to the *degree of competition*. Monopolistic or oligopolistic industries do not respond to economic incentives to the degree that competitive firms do because the demand for their product is more inelastic. Therefore, standards and mandated control equipment which do not depend on market response can be more effective in attaining the desired level of pollution control. (UNEP, 1994)

Examples

- In Ecuador, taxing mercury in artisanal gold mining would be ineffective because the demand is quite inelastic. Thus, policy makers promote the use of retorts to reduce mercury loss in the amalgamation process of artisanal gold mining. (case study).

Summary Table

In summary, the choice of economic instruments can be made against the consideration of their advantages, disadvantages and applicability to a given context, as summarized in the table below:

Table 2: Economic instruments, advantages, disadvantages and applicability

Category	Instrument	Examples	Advantages	Disadvantages	Applicability
<i>Price-based incentives</i>					
	<i>charge systems</i>	effluent charges, user charges, product charges, administrative charges, impact fees, access fees.	Savings in compliance charges, revenue raising, flexibility.	Low charges have a minimal impact and can lead to resource-overutilization, high price elasticity and regular adjustment are required.	
	<i>fiscal instruments</i>	pollution taxes, input taxes, import tariffs, financial aid in installing new technology, subsidies for environmental research and development, tax differentiation	High economic and environmental efficiencies, easily understandable, induce a more eco-friendly production at any rate, encourage the development of cleaner techniques, leave the choice between paying taxes or investing in cleaner technology.	Rely on measurability of single components, taxes tend to be use for revenue generation, regional aspects are difficult to consider, inflation may decrease the effects, high monitoring costs, low willingness to accept by the public and the target group concerned.	Applicable in situations where impacts are easily measurable and sources of impacts can be easily mounted.
	<i>financial instruments</i>	financial subsidies, soft loans, subsidized interest rates, green funds, revolving funds.	Popular with recipients, promote desirable activities rather than prohibiting undesirable ones, Funds are transparent and have high visibility.	Require funding, may lead to economic inefficiencies, may encourage rent-seeking behavior.	Applicable in situations where a desirable activity would not be undertaken without support or to create a differential in favor of such activities where it is not feasible to discourage the undesirable alternatives. Funds are applicable

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					where governments have difficulties raising general funds, where fiscal infrastructure is weak and where clearly identifiable and popular causes exist.
	<i>deposit-refund systems and bonds</i>	deposit-refund schemes to encourage recycling, environmental performance bonds, land reclamation bonds.	Induce safe disposal, reuse or recycling of products; Effectiveness in reducing waste stream volume; Flexibility; Foreign exchange savings.	Possible ill-adaptation of distribution systems; Risk of evasion (illegal dumping); Quite high administrative costs if the controlling is done through the companies.	Serious environmental problems attached to disposal; Recycling or reuse feasible and profitable; Co-operative behaviour of producers, retailers and users; Low administrative cost.
<i>Permits and property rights</i>		tradeable emission permits	Result in the most efficient allocation of resources between users, raise revenue if initially sold, allow for specific pollution standards, can focus on regional environmental problems, low monitoring, flexible through permits buy-up.	Difficult to control and supervise, can lead to monopolistic or oligopolistic situations, threshold hard to find, rights for polluting are not considered as environmental instruments by public, transboundary effects often omitted, only selected hazardous factors can be considered	Applicable where clearly defined property rights can be established and upheld for easily identifiable goods and services, and transaction costs are low enough and interested parties numerous enough to allow regular trade.
		property rights	Transaction costs very low, Internalized forever and no further intervention required, Administrative costs low (after property rights are assigned), adjust automatically to changing circumstances, market distortions very low	Politically sensitive issue (community conflicts and cohesiveness), Property rights difficult to distribute, Require institutional cohesion and perfect markets.	Applicable where resources are enclosed (land, water, minerals).

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<i>Market barrier reductions</i>					
	<i>liability rules</i>	liability insurance legislation.	assess and recover damages ex-post but can also act as preventive incentives.	require an advanced legal system, high control costs.	
	<i>Information programmes</i>	voluntary measures, eco-labeling.			
<i>Government subsidy reductions</i>			Can be sufficient to induce eco-friendly production and improve economic efficiency, reduce fiscal expenditures and make them transparent.	Perverse subsidies can be difficult to identify, politically difficult because of the strong opposition from recipients.	Applicable where clear benefits in terms of budgetary, economic, social and/or environmental goals can be identified and potential compensatory measures exist to facilitate the support removal process.

Based on OECD, 1991; Stavins, 2000; UNEP, 1994; UNEP 2001

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