Opportunities, Prospects, and Challenges for the Use of Economic Instruments in Environmental Policy Making

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Preface

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# Table of Contents

**PREFACE**

**ES.  EXECUTIVE SUMMARY .................................................................ES-6**

ES.1 Why EIs are Attractive .................................................................ES-6

ES. 2 Choosing Appropriate Policies ..................................................ES-7

ES. 3 Policy Implementation .................................................................ES-8

ES. 4 Common Policy Responses ........................................................ES-8

ES. 5 Next Steps ..................................................................................ES-10

**1.0 INTRODUCTION ...............................................................................1**

**2.0 ENVIRONMENTAL IMPROVEMENT USING ECONOMIC INSTRUMENTS 3**

2.1 Overview of Policy Options .........................................................3

2. 2 Balancing CACs and EIs in Practice ............................................5

2.2.1 Baseline conditions required for CACs and EIs..........................5

2.2.2 Status quo: existing policies shape current options ..................6

2.2.3 Costs of iteration and transition ................................................6

2.3 Economic Instruments In Detail .....................................................8

2.3.1 Baseline Conditions ..................................................................8

2.3.2 Functional Impacts of EIs ..........................................................10

2.4 Summary ......................................................................................12

**3.0 POLICY DESIGN AND IMPLEMENTATION......................................16**

3.1 Assembling Existing Information in a Structured Way ..................17

Phase 1: Template for Assessing Important Factors Affecting Instrument Choice .........................................19

3.2 Phase 1: Moving from the Template to Draft Policy Options ..........25

3.2.1 Recognizing Policy Trade-offs ..................................................25

3.2.2 Make realistic assessments of policy limitations .......................26

3.2.3 Measure, measure, measure .....................................................28

3.3 Phase 2: Engaging Stakeholders ...................................................29

3.4 Phase 3: Policy Implementation and Evaluation ............................30

3.5 Summary ......................................................................................31
4.0 LEARNING FROM THE EFFORTS OF OTHERS: CASE STUDIES OF EIS, WITH AN EMPHASIS ON THE DEVELOPING WORLD ........................................ 32

4.1 Limiting Access to Publicly-Owned Resources .............................................................................................................................. 33
4.1.1 Tenure Reform, Mankote Mangrove (St. Lucia) .............................................................................................................................. 33
4.1.2 Protecting Fishery Resources Using Transferable Quotas (Multiple Countries) .............................................................. 34
4.1.3 Summary ...................................................................................................................................................................................... 36

4.2 Recovering Reasonable Fees from Resource Users ....................................................................................................................... 36
4.2.1 Management of Forest Reserves in Botswana .......................................................................................................................... 37
4.2.2 Grassland Pricing Reform (Philippines) .................................................................................................................................. 37
4.2.3 Water Charge for River Basin Access (Brazil) .......................................................................................................................... 38
4.2.4 Summary ...................................................................................................................................................................................... 39

4.3 Managing Government Sales of Publicly-Owned Natural Resource Assets .................................................................................... 39
4.3.1 Receiving Fair Value on Asset Sales ......................................................................................................................................... 40
4.3.2 Protecting Gains for the Long-term: The Alaska Permanent Fund .......................................................................................... 41

4.4 Reducing Pollutant Loadings to the Environment .......................................................................................................................... 41
4.4.1 Nutrient Trading at Sewage Treatment Plants (New South Wales) .......................................................................................... 42
4.4.2 Lead Trading in the USA ............................................................................................................................................................. 42
4.4.3 Emission Fees in China ............................................................................................................................................................... 43
4.4.4 Summary ...................................................................................................................................................................................... 44

4.5 Transitioning to More Sustainable Alternatives .......................................................................................................................... 44
4.5.1 Timber Discounts for Reforestation ............................................................................................................................................. 44
4.5.2 Leveraging Existing Subsidies for Environmental Protection: Soil Conservation in the Dominican Republic .......................................................... 45
4.5.3 Seed Capital: Externally Financed Development of Premium Bulb Markets in Turkey .......................................................... 46
4.5.4 Summary ...................................................................................................................................................................................... 46

4.6 Conclusions ...................................................................................................................................................................................... 47

5.0 LESSONS LEARNED AND OPPORTUNITIES FOR FURTHER RESEARCH .............................................................................................................. 48

5.1 Generalized Solutions ................................................................................................................................................................. 49

5.2 Next Steps ...................................................................................................................................................................................... 51

ANNEX A: DETAILED LISTING OF EIS .............................................................................................................................................. A-1

ANNEX B: GLOBAL METRICS OF ENVIRONMENTAL AND GOVERNMENT PERFORMANCE ........................................................................................................... B-1

ANNEX C: DETAILED ANALYSIS OF CASE STUDY APPLICATIONS OF ECONOMIC INSTRUMENTS

- Individual Tradable Quota (ITQ) for Fisheries Resources in South Africa ........................................................................ C-1
- Water Charge for River Basin Access ........................................................................................................................................ C-6
- Strengthening User Rights for Biodiversity Conservation and Sustainable Use: Mankote Mangrove ........................................ C-9
- Fishery ITQs .................................................................................................................................................................................. C-12
ACRONYM GUIDE/GLOSSARY

REFERENCES

Table of Exhibits

Exhibit 1: Impact of EIIs on Incentives of Firms and Individuals ................................................................. 13
Exhibit 2: Template for Assessing Important Factors Affecting Instrument Choice ................................. 19
ES. Executive Summary

Threats to human health and environmental quality continue to grow worldwide. Patterns of industrial production, as well as in the use of natural and land resources, are important contributing factors. Transitioning to more sustainable use patterns is both difficult and expensive. UNEP’s Economics and Trade Branch has convened a Working Group on Economic Instruments with the objective of increasing the effective use of economic instruments in achieving environmental protection in more flexible, lower cost ways. These approaches can be extremely important in the developing world, where available funds are pulled in many directions to service basic needs of the populace.

Economic Instruments (EIs) encompass a range of policy tools from pollution taxes and marketable permits to deposit-refund systems and performance bonds. The common element of all EIs is that they operate on a decentralized level through their impact on market signals rather than through government fiat. EIs are often contrasted to Command and Control (CAC) policy approaches that determine pollution reduction targets and allowable control technologies by edict. In reality, CAC and EIs approaches often operate in tandem. For example, governments may set caps on allowable pollution for a region or country, with market-oriented approaches such as tradable permits used to allocate the allowable emissions in an efficient manner.

In large part because many EI policy options are not well understood, CAC approaches are applied far more often throughout the world. Opportunities for much greater environmental and economic gains are therefore lost. Using input from technical experts from around the world, supplemented by a variety of case studies, the Working Group on Economic Instruments developed this guidance manual for policy makers to help them understand when to use EIs and under what conditions they are likely to work. The manual provides a structured way for policy makers to organize existing information, evaluate data gaps, and assess the pros and cons of policy approaches.

ES.1 Why EIs are Attractive

Economic instruments operate by realigning rights and responsibilities of firms, groups, or individuals so that they have both the incentive and the power to act in a more environmentally-responsible manner. Markets inherently use less of more expensive inputs, and invest more in activities that promise higher returns. EIs drive up the price of environmentally-damaging inputs, as well as increase the returns to more sustainable approaches. When implemented carefully, EIs tend to reduce the societal cost to achieve any given level of environmental quality. Some of the most important benefits of EIs are:

- **Pay if you pollute.** Most CAC approaches allow emissions/extraction below the regulatory threshold to occur for free. EIs tend to price all units of pollution/resource use, encouraging people to use goods and services that do less environmental damage. Firms can also sell extra reductions to other companies, encouraging firms to install
controls that can go beyond the requirements. This provides a more dynamic incentive to continually improve abatement technologies.

- **Secure property rights.** Granting of long-term property rights to particular areas or resources often encourages owners to adopt a more sustainable development path since they bear direct financial loss if the resource base is damaged. If others damage their property, they can sue for compensation.

- **More flexible compliance regime.** People are given more control over when and how they meet emissions reductions guidelines than under CAC approaches. Coordinating emissions control upgrades with regular equipment replacement can greatly reduce costs. The ability to purchase emissions shortfalls from others who over-controlled also greatly reduces the risks of trying emerging abatement technologies, facilitating more rapid development of these approaches.

- **Compensate public sector for services provided.** Publicly-owned or delivered resources (such as drinking water or oil) are sold at market (or at least full cost-recovery) price. This reduces the use of the resource, and also generates important revenues that can be used to finance continued provision of government services.

EIs must be part of an integrated system of mutually-supporting policies in order to be effective. Much of the challenge of choosing and implementing an appropriate policy solution comes in how to weave more flexible EIs into the existing policy and institutional conditions in the country. The assessment templates developed in this manual can be an important input to meeting this challenge.

**ES. 2 Choosing Appropriate Policies**

Determining which economic instrument to use, and how to apply it in solving a particular environmental problem can be a difficult task. Central elements in this process include assessing existing information and baseline conditions; and working with stakeholders to more clearly understand support for, and opposition to, particular approaches.

**Assessing Existing Information in a Structured Way.** Country-level policy makers often know far more information about the issues they are facing than they initially think. Organizing this information into a structured template can help narrow the most promising policy options and identify remaining informational gaps. The template helps refine the problem to be solved, assess baseline institutional capacities and deficits, evaluate factional interests that can derail a timely solution, and identify threats to longer-term policy viability.

**Engaging Stakeholders.** Open discussions with stakeholders about policy options in order to collect important information on how to refine policy options and to gauge major resistance points is important. Case studies evaluated suggest that where this outreach was not done, the policy timeline was substantially delayed. However, outreach does not mean that developing a consensus among stakeholders should necessarily be an objective of this engagement process. Because there is usually a direct economic beneficiary even from environmentally-destructive practices, consensus will often be impossible.
Nonetheless, the elusive search for it can take years with little environmental improvement to show.

**ES. 3 Policy Implementation**

While the details of a specific problem and institutional structure will affect the most appropriate solution for a given situation, there are a number of generalized conclusions associated with the policy development and implementation process from our research:

- **Baseline conditions are critical.** Spend time up front defining the problem you are trying to solve, identifying factional interests, and evaluating past attempts within the country to apply EIs. Initial compilation of information should be done quickly, followed by stakeholder feedback to revise the initial problem assessment.

- **Don’t overreach current institutional or economic capabilities of the country.** Improving baseline conditions concurrent with addressing environmental problems greatly increases the risks of failure. However, where baseline capacities are inadequate and the environmental problem sufficiently severe, there may be no alternative to capacity building.

- **Political agreements are hard to reach.** Don’t underestimate the political difficulties in reaching agreements among parties. Case studies sometimes had gestation periods of more than a decade, and even this did not guarantee a satisfactory end result. Stakeholder involvement provides an understanding of the terrain, but should not be used with the expectation it will lead to consensus. Clear definition of timelines and structuring of the stakeholder process can speed development of policies. The threat of financial or legal penalties if a solution is not reached within this timeline helps to focus participants on achieving a solution.

- **Look for opportunities to integrate EIs with CACs, rather than replacing them.** Existing environmental laws constrain the use of alternative control approaches. However, meeting many CAC-based targets can be done more efficiently by integrating EI approaches with the existing regulatory structure, than by regulations alone.

- **Implementation is merely a beginning.** Monitoring and enforcement are the lynchpin of achieving environmental progress. Expectations regarding how seriously to take the limits/permits/taxes will be set early, so policy makers need to set the tone properly and build in strong capabilities from the outset.

- **Transitional subsidies are useful but require careful structuring.** Subsidies to transitional behaviors/sustainable practices can alleviate impacts of policy changes on the poor. However, subsidies are often co-opted by the wealthy, and difficult to stop once they begin. Thus, care is needed in how such policies are targeted and structured.

**ES. 4 Common Policy Responses**
Although no two situations are exactly the same, UNEP’s case research does suggest a number of common approaches to using EIIs to solve environmental problems:

- **Overuse of natural resources by local users.** Rights-oriented approaches can work well in these situations, protecting jobs while providing direct incentives to manage the resource for the long-term. Where subsistence use patterns have been long-lived, modifying land tenure to formalize rights can help achieve this balance. If consumption must be curbed, buy-out or phase-out of the existing de facto rights is a possibility. For all of these approaches, accurate and empowered monitoring and enforcement functions are needed.

- **Industrial pollution, disparate technologies.** Where emissions result from many different sources, there are likely to be widely varying costs to abate the pollution, with large efficiency gains from pollution taxes, fees, or tradable permits.

- **Industrial pollution, standard technology, few producers.** Few producers and similar technologies suggest minor gains from trading with potentially large oversight costs to create a market. In this situation, CAC regulatory approaches may be the more efficient option.

- **Known damage thresholds.** Where regulators have a good sense of the point at which emissions cause health problems or ecosystems begin to fray, tradable permits are often the best choice. Caps can be set in advance, either based on absolute values (e.g., tons of salmon that can be caught) or on relative values (e.g., percent of total allowable catch), allowing markets to allocate the rights efficiently.

- **Government-owned enterprises.** The objective with these institutions is to institute pricing that achieves full recovery of costs through user fees, but with a rate design that protects the poor for subsistence consumption needs. Cost recovery should not be considered an "environmental fee" as it often is, but simply a payment for services by customers.

- **Government-owned enterprises in highly politicized environment with substantial rent diversion.** Government-owned enterprises in natural resource areas face difficult challenges in preventing corruption (large cash flows, often poor transparency) and in instituting appropriate environmental controls (government litigation against itself is uncommon). In such cases, both the fiscal and environmental well-being of the country can be served through privatizing the enterprise or at least by instituting a powerful independent audit oversight. Privatization can be done either through a direct sale, or by floating a portion of the company on the stock market in the developed world (as PetroChina has done).\(^1\) The listing requirements provide important leverage to facilitate disclosure and

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\(^1\) This example is used only to demonstrate how stock market listings can provide transparency and fair pricing of assets, and does not imply any views with regards to the firms business or environmental strategy.
transparency. However, the privatization process itself offers ample room for corruption, so care is needed.

- **Long-term program support should come from within.** External resources (e.g., from NGOs or international agencies) can support initial research or training. However, they should not be relied on to operate the program, as the entire effort will be at risk when funding priorities change. Ideally, user fees should support ongoing program management.

**ES. 5  Next Steps**

This report provides a starting point for evaluating better ways to identify and apply economic instruments to environmental problems, especially in the developing world. Additional learning in a number of core areas would make these systems even more effective. These include more detailed analysis of the ways that EIs can support poverty reduction, integration of subsidy reforms to correct existing damaging pricing distortions, and integration of institutional capacity building.
1.0 Introduction

Interest in the use of market mechanisms to achieve environmental protection has been growing. Rather than having governments stipulate the technologies that must be used to curb pollution or the maximum allowable emissions (a process known as "command and control", or CAC), economic instruments (EIs) use marketable permits, changes to property rights, emissions or access charges, or other financial approaches to modify behavior. EIs work by increasing the prices that individuals and industries must pay to use resources or to emit pollutants. As resources or emissions become more expensive, consumers have strong monetary incentives to reduce resource use, either through conservation, or by substituting materials with a more favorable environmental profile.

EIs are generally less expensive, more flexible, and more dynamic than CACs. As such, their increased use can offer wide ranging benefits to the countries that use them. Economic instruments have been proposed and implemented around the world to address a host of environmental concerns from solid waste to biodiversity, land use to air pollution. They have had varying degrees of success.

The purpose of this report is to provide policy makers with context on both economic instruments and commonly-applied command and control approaches at regulation. The report then provides practical guidance on when EIs may be appropriate; the process of introducing them in the existing environmental policy regime; the supporting conditions needed for them to work; and the potential effects of EIs on important societal factors such as poverty. The necessary baseline conditions for particular approaches to work are examined in particular detail, as identifying when not to use EIs can be as valuable to policy makers as when to use them. This information will be helpful to policy makers who must decide which specific types of EIs are likely to work given the prevailing economic, political, social, institutional, and environmental circumstances in their countries.

To support this goal, Chapter 2 provides general background information on both EI and CAC approaches to resolve environmental problems. Chapter 3 focuses on choosing an appropriate mechanism for environmental protection, and includes a template for assessing baseline conditions within a country or region, identifying appropriate EI options (if any), and identifying appropriate flanking measures. For example, impacts of any instruments on poverty levels and equity must be an important consideration from the outset.

Chapter 4 presents both success stories and failed applications of EIs from around the world and identifies important lessons from these case studies. Chapter 5 provides a summary of key findings, remaining research gaps, and future opportunities that expand the opportunities to apply EIs in equitable and efficient ways. The report also includes three Annexes. Annex A provides a detailed listing of economic instruments to serve as a reference. Annex B provides background information on a number of global metrics that
may be helpful to policy-makers in assessing baseline conditions in which they need to operate. Finally, Annex C provides detailed information templates of a number of country case studies to demonstrate how the tools presented in the report can be used in practice.
2.0 Environmental Improvement Using Economic Instruments

While environmental problems are quite varied in their specifics, they generally involve either overuse of a natural resource or emission of damaging pollutants. The objective of any government action in this area is to modify, slow, or stop resource extraction; or to reduce or eliminate emissions of concern. Normally, the more severe the damage, and the stronger the link between specific activities and environmental harm, the more rapid and extensive the policy response will be.

There are two main approaches that governments use to manage the environmental problems: command and control policies (CACs) and economic instruments (EIs). This chapter provides background on both approaches and how they are often integrated in practice. The chapter also provides a method for organizing the many economic policy instruments in a way that makes their applications easier to see.

2.1 Overview of Policy Options

Both CAC and EI approaches attempt to shift the costs and responsibilities associated with pollution back onto the polluter (the "polluter pays principle"). However, the mechanism by which this responsibility is assigned differs. Command and control policies rely on regulation and law to set explicit requirements for resource users and polluters. Normally, common standards will be applied to large groups of firms, individuals, or pollution sources (the target will depend on the exact nature of the problem). These standards stipulate what modifications will be required, either by installing new control equipment (technology-based standards) or by reducing emissions/resource use (performance-based standards), when they must be in place, and the penalties for non-compliance.

While "commanded" by a central authority, CACs do often have some flexibility built in. For example, many CACs exempt very small polluters or provide later compliance deadlines for sub-groups considered to be less significant contributors to the problem. Performance-based standards allow polluters freedom in how they curb emissions so long as a pre-set numerical target is attained. However, the flexibility possible with CACs is fairly limited. Prescribed targets must be met by virtually all parties regardless of widely differing costs of doing so.

In contrast, EIs comprise a wide variety of policy approaches that "encourage behavior through their impact on market signals rather than through explicit directives regarding pollution control levels or methods," or resource use. Examples of EIs include assigning property rights, establishing tradable access/emission/use/development rights; taxes on undesirable behavior or subsidies to desirable behavior; access charges; and

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environmentally-related performance bonds or legal liabilities. Some analysts also group voluntary industry standards or labeling programs as an EI. These are somewhat of a hybrid. While successful programs can create market-based pressure for many firms to comply, many voluntary measures lack effective enforcement mechanisms.\(^3\)

Normally, policy makers have an ultimate goal for how much they want resource use or emissions to fall, just as they would for CAC methods. However, rather than assigning this target to each resource user/polluter, they apply it to the group of all resource users or polluters. This averaging across a larger group drives down compliance costs by providing flexibility in when, and how much, a specific affected party must change behavior. In addition, relying on voluntary reactions to prices rather than mandated actions to drive environmental improvement allows environmental improvements to be concentrated where they are least expensive to achieve. Depending on the instrument or mix of instruments chosen, EIs can:

- **Reduce the overall cost of achieving emission reductions by providing flexibility.** Rather than forcing every firm to meet a specific emissions level, EIs often ensure the overall economy hits a particular level, but allow the markets to determine which specific firms control how much pollution. This encourages industries where emissions reductions are less costly to control more than required, reducing the economy-wide cost of meeting a specific abatement target. Flexibility in implementation also allows firms to upgrade pollution control equipment at the same time they replace production equipment. By reducing premature capital equipment replacement, compliance costs are much lower.

- **Allocate natural resources to parties who value them most.** EIs that fairly auction access to publicly-owned resources, be they oil, minerals, or grazing land, enable those who value them most to obtain them. If structured properly, these auction-based EIs encourage more sustainable use of flow resources (such as land and water) and more careful use of stock resources (such as oil and coal), as well as raising revenues for the government. However, if structured improperly (such as when assets are transferred in rigged auctions or other corrupt methods at a fraction of true value), resource depletion can actually be accelerated.

- **Encourage use of innovative abatement technologies.** Because firms can control less pollution than the emissions target by paying extra taxes or fees, they face much lower financial risk from trying emerging technologies that may not meet CAC standards at first. However, over a longer-period of time, these unproven techniques often lead to more effective and less expensive control approaches. In addition, because excess reductions have financial value (reductions can be sold to others with emissions trading; tax bill declines with pollution taxes) firms have a continued incentive to innovate even if already in compliance.

\(^3\) Voluntary measures often face higher transaction costs to bring in partners, as well as foregoing the revenues that could otherwise have been generated through pollution fees or permits. See OECD, *Environmentally Related Taxes in OECD Countries*, 2001, p. 41.
• **Encourage self-enforcement by aligning public and private interests.** EIs create groups of firms and individuals with vested interests in the proper use of resources and in emitting only as much pollution as allowed.\(^4\) For example, firms that wish to sell excess pollution rights will watch to be sure that firms that need to buy rights do so. Mechanisms for granting or securing access to resources are also important. Groups who are given communal property rights in perpetuity have a greater incentive to ensure other people don't encroach on the land, and to manage assets for the long-term – if only to protect the resale value of these rights. The effect is to create a more decentralized enforcement system for environmental policies, reducing the burden on the State.

• **Increase transparency.** CACs often generate complex permits and reporting requirements, many of which are difficult to obtain and analyze. In contrast, the costs and rights associated with many EIs (pollution taxes, marketable permits) are more visible. As a result, evaluating investment tradeoffs is easier to do, and lobbying for special privileges or exceptions becomes more difficult. These characteristics suggest that EIs are more likely to support the polluter pays principle than CACs.\(^5\) Note that both types of policies still require effective monitoring, data generation, and enforcement functions.

• **Recover costs of public provision of services.** Publicly-owned or delivered resources (such as drinking water or oil) are sold at market (or at least full cost-recovery) price. In addition to generating important revenues that can be used to finance continued provision of government services, the fees can also encourage increased conservation. Planning to mitigate impacts of new charges on impoverished citizens through subsidies is sometimes needed.

2. 2 **Balancing CACs and EIs in Practice**

In practice, environmental policies are part of a complex system of existing and proposed government actions. In addition to having to compete with other government objectives, economic instruments for environmental protection must also operate effectively with environmental policies already in place. Constraints associated with existing institutional and policy structures, as well as with the transitional costs of new policies, will all affect the most appropriate policy choice.

2.2.1 **Baseline conditions required for CACs and EIs**

Both CACs and EIs require many common elements in order to be effective. Information on the source and impact of the environmental concern must be accurate and timely. Measurement and enforcement are also needed to ensure compliance with

\(^4\) For additional detail on this important incentive, see OECD, *Domestic Transferable Permits for Environmental Management: Design and Implementation*, 2001.

\(^5\) Borregard and Selpuveda, 8.
whatever policy regime is instituted. Without these basic governmental functions in place, environmental protection has a high likelihood of failure regardless of the specific instruments applied. Policy comparisons need to take common weaknesses into account for a fair evaluation of policy options.

There are some variations in baseline requirements depending on policy type that are important in deciding when to apply a particular instrument. CACs, for example, often require much more detailed information on regulated industries than would EIs. Certain EIs rely on supporting infrastructures -- functioning markets, tax, and fiscal payments systems -- that are sometimes taken for granted, but are actually quite complicated and do not operate properly in many countries of the world. CAC instruments in these environments would not require the same systems. However, the same corruptive forces undermining fiscal payment, tax, and legal systems would also likely undermine the standard setting, monitoring, and enforcement functions of government needed with CAC approaches. In contrast, EIs can help substitute for weak institutions in circumstances where the parties who buy rights monitor cheating on a decentralized level -- so long as sanctions can be taken against cheaters once detected.

### 2.2.2 Status quo: existing policies shape current options

New policy solutions always occur in the context of existing institutional, legal, and economic conditions. Rarely is it possible to wipe the slate clean and start again; nor would such a move always be desirable. Environmental laws, for example, have been developed over many years and with great political effort. They can provide an important framework and justification for other actions, even if they are not as efficient as EIs might be. Furthermore, it is important to remember that EIs can be beneficial when they are integrated as a part of a broader set of measures -- they need not be the sole policy response. Thus, command and control regulations are often used to set the broad parameters (e.g., total emissions, licensing requirements, etc.) under which EIs are used to obtain a more efficient allocation of compliance responsibility across firms. EIs can complement rather than replace many CAC policies.

How instruments are combined must, nonetheless, be thoughtfully done. A number of researchers have suggested that mixing different policies instruments carelessly, where there is overlap rather than complementarity, can drive up administrative costs with little environmental gain. Similarly, applying different instruments to different sectors of similar communities can create problems of equity.\(^6\)

### 2.2.3 Costs of iteration and transition

Because ELs do not mandate specific reduction levels, environmental improvements can be difficult to predict in advance. Rather, businesses make incremental decisions; as a result, the market may sometime overshoot or undershoot the target control level. Normally this is fine.\(^7\) ELs can be adjusted to address the observed response (e.g., by increasing fees or decreasing permits), or caps can be set (as with tradable permits) to set minimum abatement targets ahead of time. Furthermore, ELs are generally less expensive and more effective over the long-term than many CAC approaches.\(^8\) However, there are some cases where this process of iteration is not acceptable. One involves the need to control imminent threats to health or the environment very quickly. Here, CAC approaches -- often in the form of a ban -- are usually superior. Similarly, where subgroups can no longer afford the resultant price of emissions or resource access, and therefore lose their livelihoods, transition strategies and other protections for the poor are needed to prevent hardship.

In most countries, CAC approaches dominate environmental policy making. These approaches are often viewed as more "secure" because they are prescriptive. Blackman and Harrington note a couple of other factors driving this domination. First, the primary benefit of ELs, increased efficiency, is often not demanded in developing countries, while the continued domination of existing market leaders is. Second, monitoring requirements of CACs may be less sophisticated (e.g., is a particular technology installed versus what were emissions of SO2 last month?) Third, CAC is the status quo, and inertia prevents change.\(^9\) Sometimes, ELs are impugned because they allow people to "pay to pollute." CAC approaches may also dominate in part because they rely on a legal approach to behavior modification, and the majority of legislators in many countries have a legal background.

Some of the claims supporting the use of CACs are open to challenge. For example, CACs require a sophisticated and corruption-free government to promulgate and enforce, conditions many countries do not have. In addition, because CACs set specific pollution limits, all emissions below that level are essentially free for the polluter. In contrast, most ELs price all units of pollution, and firms that go far below the allowable standards can resell incremental reductions to other parties. The potential benefits of ELs in terms of efficiency and long-term environmental improvement can be substantial, and worth careful consideration for new policy development or reforms of existing approaches.

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\(^7\) OECD points out that while ELs have greater uncertainty with regards to the levels of abatement achieved, CAC approaches have greater uncertainty with regards to the costs of reaching a particular abatement level. (OECD 1997, 28).

\(^8\) OECD analyzed numerous empirical studies on the efficiency gains associated with ELs, finding fairly strong evidence of beneficial impacts. (OECD 1997, 31). The gains associated with any specific EI, however, would be highly influenced by the specifics of the tool applied and the political context in which it was used.

2.3  Economic Instruments In Detail

If properly constructed, EIs can add flexibility, efficiency, and equity. However, the sheer number of options makes choosing the right instrument or mix of instruments a daunting exercise. Equally challenging is the task of integrating EI choices into the existing policy regime. To better understand the issue of instrument choice, this section discusses important baseline conditions needed for EIs to work (many of these are needed for any type of environmental policy to work). Importantly, we also group instruments by their functional impact, rather than by their type. For example, road charges and pollution charges are sometimes grouped together because they are both charge systems. Their functional characteristics, however, are very different. Road charges recover the direct costs of investment into highways. In contrast, pollution charges aim to capture the much less tangible damage that particular emissions have forced on those exposed to the emissions (a pollution externality). The goal of the functional grouping is to provide an intuitive picture of why particular approaches might be used in particular circumstances.

Solution of complex environmental problems often requires multiple, integrated policy responses. Some may be CAC approaches; others EIs. The specific manner in which these rights and responsibilities created by the various policies are aligned, however, is critical in order to end up with a functioning system of checks and balances. In fact, OECD noted that "much of the institutional effort on the application of the EI should be concentrated on its design in order to select 'viable' instruments not the 'best' or 'desirable' ones.”

2.3.1 Baseline Conditions

Baseline conditions involve many of the basic elements needed for functioning markets and governance in general. Successful application of specific EIs requires a minimum legal/institutional platform. Where institutional gaps are significant, whether from lack of funding, inadequate institution building, or widespread levels of corruption, any instrument, be it market-based or regulatory, will be far less effective. The issue of corruption is a case in point. Quantitative analysis of corruption indices developed in conjunction with the Environmental Sustainability Index found that environmental sustainability had the highest level of correlation (-0.75) of any of the 67 variables

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11 The Environmental Sustainability Index was produced by a partnership of the World Economic Forum Global Leaders for Tomorrow Environment Task Force, the Yale Center for Environmental Law and Policy, and the Center for International Earth Science Information Network (CIESIN) at Columbia University.
The higher the level of corruption, the lower the level of environmental sustainability.

The functioning of legal, political, and fiscal institutions is also important to evaluate:

- **Legal Authority and Efficacy.** Payanotou notes that "property rights and enforcement of contracts are essential for the efficient operation of markets, on which the effectiveness of economic instruments…depends." However, many countries have gaps both in the authority and functioning of the legal system. Some may not have established legal basis for implementing certain EIs -- for example pollutant charges -- without legislative or constitutional action first. In many other cases, changes for which there is adequate legal basis may not be adequately enforced in practice. If the legal system is not capable of enforcing property rights, using permits to curb emissions or granting access rights to indigenous people to restrict unfettered access will not be possible. Property rights are both a baseline condition (in that general enforcement of rights is a prerequisite to many EIs) and an EI itself (in that specifically-defined property rights such as tradable permits can by themselves generate improved resource management and markets in emissions controls).

- **Political Structure and Priorities.** Political institutions that oversee the policies must have appropriate leverage: to ensure competitive markets, to enforce existing law and contracts, and to punish violators. A reasonably democratic government with strong fiscal oversight ministries will likely be needed to employ privatization effectively, to assign initial property rights fairly, or to equitably and reasonably efficiently distribute transitional or targeted subsidies. Where natural resource industries are owned by government rather than by the private sector, action by environmental ministries against the commercial activities of the government can be particularly difficult. Where policy priorities lie outside of the environmental realm, environmental agencies may not have sufficient political capital to bring about meaningful policies of any type.

- **Fiscal Norms and Perverse Incentives.** The fiscal baseline also matters. For example, enforced payment of regular taxes must be the norm for pollution tax and user fee based systems have a chance of success. In addition, existing fiscal distortions can affect the efficacy of environmental controls. While many of the proposed EIs aim to reduce pollution or to slow exploitation of natural resources, there may be concurrent fiscal policies that are subsidizing emissions and resource extraction. Thus, identification and removal or mitigation of such "perverse" incentives should be an integral part of any policy package. Even where political factions preclude true subsidy reform, identification (and

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13 Panayotou, 111.
publication) of existing perverse subsidies is an important step in achieving better decisions.

For any new policy, both the institutional structure and the existing policy landscape are important to evaluate. While institutional deficits may be difficult to overcome in the short-term, there are many opportunities to integrate EIs with the existing mix of CACs currently guiding environmental management. Quite often these openings come through meeting already-stipulated targets using market-based approaches. Past assessments of economic instruments have grouped them by the media they are applied to (air, water, soil) or by the type of instrument they are (charge systems, permit systems). Since the objective here is to build an intuitive grounding for what EIs might be appropriate to solve particular problems, we focus instead on how particular instruments affect the incentives of firms and individuals. This approach is described in more detail below.

### 2.3.2 Functional Impacts of EIs

The ultimate objective of government actions in the environmental policy realm is to protect and improve human health and the environment. However, the mechanism of action differs depending on the specific instrument used. EIs are normally structured to achieve some mixture of three main goals: fixing problems with property rights that contribute to pollution or poor stewardship of resources; establishing and enforcing prices for resources consumed and environmental damages associated with production; and subsidizing the transition to preferred behaviors. Many EIs have the added benefit that they generate revenues for the public sector.

- **Establishing, clarifying, or improving property rights.** Property rights entail a range of approaches (e.g., contracts, permits, rights to sue) that spell out who may do what with particular resources during what time period. Ensuring property rights are clear to all parties can add security and flexibility to the management of natural resources by removing pressures to "get what you can" while it is still there. Rights-related EIs allow owners to invest in the resources and to extract/harvest them at a more sustainable rate (though this does not always occur in practice). Importantly, property rights need not be individualized. For instance, communal property rights can also provide more secure tenure to impoverished indigenous population groups.

- **Ensuring that resource users pay a fair price for what they consume.** Fees are the public sector's version of prices. Their function is the same: to recover the cost of providing goods and services from the groups that use them.\(^{14}\) Often, many kinds

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\(^{14}\) Setting appropriate fees is not always straightforward. To do so, public sector agencies must have acceptable accounting standards that give them an accurate view of their expenditures to provide particular services, at least on a gross level. Care is needed to be sure that the cost of capital (such as interest on public funds invested in infrastructure), liabilities, costs of public employees used on a project, and other similar costs are properly captured. In addition, governments should divide the recipients of their services into user classes to be sure that they are not taxing poor residential consumers unduly to pay for more
of environmental fees and charges are lumped into a single category of instruments. Although all help clarify price signals and encourage efficient use of resources (a critical benefit of these approaches), different types of EIs aim to solve different problems. The elements can be additive; aggregate fees need to be high enough to achieve the appropriate cost recovery and environmental charges.

- **Recover the costs of government-provided goods and services.** Even before thinking about making a profit, private firms must cover their costs from the sale of their products in order to stay in business. This most basic of business principles is often ignored in the public sector, where users expect that drinking water, sewage treatment, or electricity should be heavily subsidized. User fees set to cover costs correct this problem. Though care is needed in rate design to ensure the poor have continued access to life sustaining services, there is little economic or environmental logic in subsidizing all customers.

- **Ensure adequate return on sale of public assets.** When governments choose to sell assets, be they oil reserves in the ground or expansive government-owned enterprises (e.g., electrical generating stations or oil production facilities), it is critical that these sales earn appropriate returns on invested public capital, or on the sale of limited resources. Too often such sales have been used instead as financial payoffs to political supporters.

- **Compensate public for/protect public from environmental damages caused by private production.** EIs such as pollution taxes help capture the societal costs (such as medical problems) that private firms cause by their emission of pollutants. They are effectively a charge for the use of the public resource of environmental quality. A number of litigation tools help recover costs for damages associated with past production. In addition, bonds and deposit/refund systems create financial assurance that taxpayers won't incur a debt if future producers do not properly clean up after their projects or products.

- **Subsidizing cleaner alternatives.** There are many different EIs that can transfer resources from the public to the "preferred" private alternatives. If done properly, such efforts may be able to accelerate the development of these environmentally-superior alternatives. However, great care is needed to ensure that subsidies are appropriately targeted and don't end up making the problems worse instead of better.

Marketable permits and pollution taxes are commonly recognized forms of EIs. In reality, many more options are available to policy makers. Exhibit 1 provides a detailed overview of the functions EIs serve. By providing examples for each category, as well as issues to consider during implementation, the Exhibit aims to provide a general view of how different EIs work. For a more extensive listing of potential EIs, as well as the parameters that can be modified to fine tune the tools, please see Annex A.

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expensive or difficult-to-provide services to industrial customers. This process is known as "rate design" and is widely used in the United States to set electricity, water, and wastewater treatment tariffs.
2.4 Summary

As further illustrated in Exhibit 1, economic instruments can add flexibility, precision, and dynamism to policy packages addressing a wide range of environmental problems. Rights to sue, creation of tradable permits, and granting of property rights to subsistence populations can all serve to provide a decentralized, non-governmental enforcement mechanism to ensure environmental responsibilities are upheld, a benefit in countries with severely limited enforcement budgets. Pollution taxes and marketable permits can provide effective ways for pollution reduction activities to be concentrated in firms with the lowest costs of abatement. By making compliance less expensive, pollution reduction can be less of a burden to both governments and the private sector, of great benefit both within the developed and the developing world. Finally, many EIs can leverage existing CAC policies, by adding increased flexibility to achieving existing dictated control standards. Chapter 3 examines the choice of policy instrument in greater detail.
Exhibit 1
Impact of EIIs on Incentives of Firms and Individuals

<table>
<thead>
<tr>
<th>Functional Impact of EIIs</th>
<th>Examples</th>
<th>Factors in Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establish, clarify, or improve property rights: sustainable management and use; establish clear rules</td>
<td>creating markets for unpriced resources and environmental services to provide incentives for resource access to control overuse.</td>
<td>-Granting property rights is meaningless unless there is a fair court system to enforce them. -Where courts are strong, granting of authority/right to sue to third parties can overcome weak administrative ministries. -Monitoring of many rights regimes (e.g., fisheries, emissions) can be complicated and substantial. -How initial rights are to be distributed is often controversial, and can generate windfalls to existing producers that may be viewed as inequitable or that put small business at a competitive disadvantage. -Ensuring that rights are transferable is important in establishing a strong incentive for long-term management. A secondary market in rights ensures regular repricing of rights and continued efforts to reduce permits needed if prices are high.</td>
</tr>
<tr>
<td>-Invest for the long-term. Clear property rights enable owners to benefit from longer-term investment and management of a resource. -Curb tragedy of the commons. In many cases, property rights approaches eliminate the &quot;tragedy of the commons&quot; problem, in which unlimited access destroys the common resource base. -Incentive to control as much as possible. In the case of pollution permits, the rights enable people to profit from reducing pollution more than required under current laws. -Manage for future owners. So long as rights can be sold, owners have an incentive to continue to manage the property carefully in order to attain a high resale value. This also provides some incentive to avoid accidents and post-closure contamination. -Independent enforcement. Ability to enforce rights through litigation can ensure make rights regimes more effective without needing central government intervention.</td>
<td>-Granting formal harvest rights to indigenous populations or allowing transfer of existing rights. -Establishing and requiring tradable permits or licenses for parameters of concern (e.g., plant emissions, fishing access). -Allowing farmers to sell existing water rights to urban areas. -Establishing or enforcing rights to sue parties (including the government) for violation of existing property rights.</td>
<td></td>
</tr>
<tr>
<td>2A. Recover direct costs of environmental services or oversight provided by public agencies from the beneficiaries: policies ensure that users see realistic costs for the publicly-provided services they are using.</td>
<td>-Recover full costs of municipal energy, water, sewerage, solid waste services from customers. This must include real cost of financing construction.</td>
<td>-Many countries face political barriers to implementing and enforcing equitable user charges. -Privatization can be one solution to</td>
</tr>
<tr>
<td>-Self-sustaining revenues. Charging for services earns important revenues enabling the continued provision of critical municipal services without having to fully privatize the functions.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Functional Impact of Els

- **Incentive to conserve.** These charges also send more accurate price signals to consumers that help conserve resources such as energy and water, and allow existing infrastructure capacity to last longer as demand falls.
- **Costs borne by sub-groups responsible.** Ensuring that higher-cost user groups (high peak demands; high requirements for government oversight; more complex discharges for treatment plant; higher distribution costs; etc.) pay more refines price signals further.

### Examples

- Charge higher rates to higher cost customers.
- Narrow consumption subsidies to target only the poorest users of the product or service.
- Sell government owned enterprises to the private sector to correct pricing problems. Ensure continued service to poor via direct subsidies or regulatory oversight.

### Factors in Application

overcome this problem, but is not possible without rule of law. In addition, states must be careful to avoid privately-owned monopoly providers by ensuring there are multiple vendors.
- Recovery of aggregate costs will not be efficient if certain user groups receive cross-subsidies from others in the rate structure.
- Enterprises must be able to retain receipts for reinvestment (rather than remitting to the Treasury) if the Els are to help ensure the enterprise's continued existence.

### 2B. Receive just compensation for sale of publicly-owned assets to private sector entities: policies ensure taxpayers are fairly treated in purchases, and that purchasing entities make resource development/consumption decisions based on realistic prices.

- **Tap revenues for general society.** Els that create markets and transparency for the sale of publicly-owned assets ensure that the returns from these sales go to the general population rather than to political or military elites.
- **Reduce opportunities for corruption.** Transparent procedures can also help reduce or eliminate the ability for corruption to flourish.
- **Rational development path.** Because political and military power for individuals is often short-lived, individuals may rush natural resource extraction to maximize diversions to personal wealth. Transparent markets encourage a more rational development path.

### 2C. Establish financial charges and accountability for environmental harm: policies internalize the cost of environmental damages and the risk of potential damages.

- **Polluter pays more than under CAC.** In many CAC systems, at least a portion of the pollution is

<table>
<thead>
<tr>
<th>Current activity</th>
<th>-Pollution taxes/permits</th>
</tr>
</thead>
</table>

- In countries with high corruption, much of the returns on both public resource deposits and cash flows from nationalized industries are diverted to finance political interests. As such, reforms can be difficult.
- However, pressure from outside funders or investors can play a positive role in ensuring some of this change occurs.
- Some portion of receipts should support continued environmental management.
<table>
<thead>
<tr>
<th>Functional Impact of ELs</th>
<th>Examples</th>
<th>Factors in Application</th>
</tr>
</thead>
</table>
| granted to corporations for free (the amount from zero up to the statutory limit). Charges and financial accountability force more of the social and environmental costs of polluting activities to be reflected in the price of the associated products, increasing the incentive to develop cleaner products. | *Past activity*<br>-Civil and criminal penalties for natural resource damages<br>-Future activity*<br>-Required liability or environmental insurance<br>-Performance bonds for proper site remediation/closure<br>-Deposit/refund systems for proper product returns. | bureaucracy to monitor.  
- Care is needed to avoid “hot spots” where the local environment and/or populace is subject to excessively high emissions as a result of the trading or charge schemes.  
- Financial assurance and deposit/refund systems require enforcement of rules in order to work. This may not be possible in high-corruption environments.  
- Care is needed to identify and monitor the credit quality of providers of financial assurance.  
- Governments may need to stipulate the required terms of coverage in order for financial assurance mechanisms to be effective.  
- Third-party legal suits can be abused. |
| **Incentive to leave site in good condition.** Performance bonds and other mechanisms establish financial responsibility for clean-up prior to the beginning of a project, greatly reducing the public sector risk from negligence. |                                                                                  |                        |
| **Responsible for natural resource damage/non-compliance.** Legal controls can create a "market" in compliance enforcement, empowering third parties to bring suit for environmental non-compliance. |                                                                                  |                        |

3. **Subsidize transition to, or investment in, more sustainable alternatives:** policies promote mechanisms that can accelerate the development and adoption of cleaner technologies using both direct funding and government programs.

- **Cleaner products faster.** Can accelerate the development and/or market adoption of improved products or production methods.
- **Reduced burden of transition.** Can reduce transition costs for private parties to invest in new production methods.
- **Poverty amelioration.** Where the poor will be adversely affected by the change, subsidies can help cushion the pain from the shift.
- **Pay private stewards of important global resources.** Can compensate parties or countries for foregoing private gain in order to steward resources with high social values (e.g., biodiversity).

- Fiscal subsidies including grants, loans, loan guarantees, indemnification, or tax breaks.
- Forgiveness of environmental fees, taxes, royalties, penalties in return for investments in environmental improvement.
- Differential tax rates depending on environmental impact of the product.

- Everybody wants subsidies and can make some claim to justify why they need it.  
Care is needed to provide a much narrowed conceptualization of the market segments requiring public subsidy.  
- Where subsidies are provided, they must be transparent and trackable. They should also phase out automatically after a pre-specified period of time.  
- Where transitional subsidies are to be paid as a political price for accepting policy changes, these must be evaluated carefully to curb excesses and confirm there are no alternatives.

Source: Earth Track, Inc.
3.0  Policy Design and Implementation

One of the most difficult challenges facing policy makers is choosing an effective policy package that will both address the environmental problem they are facing and fit with the existing institutional capabilities and environmental policies already in place. Country analysts noted that there was often no formal process of evaluation at all prior to recommending a particular policy approach. The goal of this chapter is to make an evaluation of alternatives easier to do. We provide guidance on important issues to consider up-front, and a way to organize existing information to better support the policy development process. While extensive research on the environmental problem and potential solutions can yield a more refined policy approach, many developing countries do not have the staff time or funds to conduct such research. Using the approaches presented in this chapter, policy makers should be able to narrow their options considerably, often based on what they already know.

Policy choice and implementation involves three main phases. Phase 1 involves assembling existing information in a structured way. The template presented later in the chapter can be a helpful tool in this regard. Phase 2 involves open discussions with stakeholders about policy options in order to collect important information on how to refine policy options and to gauge major resistance points. This input feeds back into the information summaries developed in Phase 1 in order to choose an appropriate policy package.

Case study research indicates that policy implementation was substantially delayed in instances where outreach activities were deficient. However, developing a consensus among stakeholders is not the primary objective of outreach conducted during Phase 2. Because there is usually a direct economic beneficiary from environmentally-destructive practices, consensus will normally be impossible, though the elusive search for it can take years. While interchange between policy makers and stakeholders is likely to occur multiple times, care is needed to structure these interchanges to avoid needless delays.15

Phase 3 involves the process of implementation. At the outset, this involves establishing a timeline for implementing the chosen policy package. Explicit timelines put pressure on the many groups that will seek to intervene at this point to delay or alter aspects of the proposals that they don't like. However, parallel work on ensuring effective monitoring and enforcement needs also to occur. Ideally, early efforts to improve information flows can make it more difficult for opposing interests to derail the new policies. Similarly, additional work on flanking measures needed to assess impacts of the change on poverty or international competitiveness may also be required.

15 There are many examples where private interests have used a lack of full consensus as a lever to delay any action. This was an issue in the ISO standard setting process related to environmental standards and the application of eco-labels.
3.1 Assembling Existing Information in a Structured Way

Country-level policy makers often have better information about the issues they are facing than they think at first. Careful consideration regarding problem definition and the interests of various stakeholder groups can prove valuable. Some key questions to ask are presented below, followed by a sample template to organize this data in a way that makes the choices, information gaps, and trade-offs easier to see.

- **What is your goal?** What outcome would you like to see? Goal definition should include your primary goal (e.g., curb overfishing and ensure future catches are sustainable), and any secondary goals that may be lurking under the surface. Secondary goals might include protecting subsistence fishermen or coastal fishing communities. While primary goals are generally related to human health and the environment, secondary goals often relate to poverty reduction, job protection/creation, or preserving a "way of life." In some situations, secondary goals can be cleanly blended in a policy to achieve the primary goals. Most times, however, trade-offs are needed.

- **What are your baseline conditions?** The appropriate policy response hinges directly on a clear and realistic understanding of your baseline conditions. While every country wants to portray an image of clean and efficient governance, few nations actually have such systems. The level of competence and corruption for any area/institution that will be used to develop, promulgate, monitor, or enforce the policy in question needs to be realistically assessed. A number of international metrics (discussed in Annex B) are also being developed, and can support internal judgments in a more politically-sensitive way.

- **Institutional baselines.** Many EIIs rely on functioning tax, legal, or fiscal systems. Despite being more efficient in theory, if the institutional capabilities needed to promulgate and enforce the EIIs in a fair and unbiased manner are missing, the performance of the EIIs will suffer. One caveat is that CACs also rely on many of these same factors, and policy comparisons should take common weaknesses into account when evaluating options.

- **Mandate and level of power.** Many environmental protection packages come out of the environmental ministries, and these organizations generally have far less political power than the finance or trade ministries. Powerful interests also reside in the heads of the executive and legislative branches, all of whom may try to use the power of government to appease or compensate particular constituencies at the expense of environmental quality. Policy makers need to assess their relative power accurately and plan accordingly about how to address their weaknesses. For example, approaches that generate revenues as well as solve environmental problems can bring in allies in the fiscal ministries that would not otherwise come forward. Agency mandate and level of power can have a strong effect on the choice of instruments - often towards CAC approaches.
• **Factional analysis.** Policy changes involve far more than government bodies. Assessing the major players with an interest in the status quo, and in the projected change, is important. This baseline assessment should also evaluate which groups are most powerful, and what their primary goal is likely to be. In many cases, their primary goal will be linked to protection of their jobs and/or access to valuable resources. Environmental quality may be a distant second. The factional analysis should also assess what options exist for buffering any transitional dislocations (especially on the poor) that may occur from the policy reform.

• **What is the long-term viability of the package?** Countries may get international money to conduct policy research or for initial implementation of EI-based approaches. However, this money does not last forever. A long-term plan for implementing and overseeing the policy should be considered at the outset. Because different policy options can place very different long-term monitoring and enforcement responsibilities on the government, advance attention can ensure a more robust policy solution in the long term.

The key sections of the template presented as Exhibit 2 include the problem definition and a detailed evaluation of baseline conditions. Initial completion of the template should be based on existing knowledge or impressions, subsequently enabling policy makers to identify information gaps. The template then becomes a guideline to the process of policy development, incorporating the views of other stakeholders, and then actually implementing the policy package. It is intended as a generalized example to provide a structure and a list of detailed questions that can help guide evaluation of your particular situation.
**Exhibit 2**

**Template for Assessing Important Factors Affecting Instrument Choice**

<table>
<thead>
<tr>
<th>Issue</th>
<th>Clarifying Questions</th>
<th>Implications on Policy Choice and Application of Economic Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Assessing the Problem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What is the damaged resource?</td>
<td>-Human health considerations?</td>
<td>-Exposure to particular emissions of concern would require more detailed assessment of the sources of emissions to assess appropriate control strategy.</td>
</tr>
<tr>
<td></td>
<td>-Pollutant emissions of concern?</td>
<td>-Ecosystem degradation can often be addressed through property-rights approaches.</td>
</tr>
<tr>
<td></td>
<td>-Ecosystem degradation or destruction?</td>
<td>-Gaining control of development path may require a mix of increased transparency, adequate cost recovery on government provided goods and services, and third party rights to sue.</td>
</tr>
<tr>
<td></td>
<td>-Lack of control over resource use/depletion path?</td>
<td></td>
</tr>
<tr>
<td>What is the anticipated severity of damage?</td>
<td>-Are dangers acute and severe, or less severe but persistent?</td>
<td>-The more acute the potential damage, the more important a rapid response is needed. This would argue for mandated controls quickly. Even if the initial controls cause some peripheral economic losses, the avoidance of the acute risks (e.g., ecosystem collapse, large and widespread human health damage) makes the choice a prudent one.</td>
</tr>
<tr>
<td></td>
<td>-Are the damages irreversible?</td>
<td></td>
</tr>
<tr>
<td>What does the government hope to accomplish?</td>
<td>-Do emissions need to be reduced or stopped entirely?</td>
<td>-EIs are most appropriate for longer-term, gradual controls for emissions. However, property rights regimes can place quite rapid constraints on the rate of exploitation.</td>
</tr>
<tr>
<td></td>
<td>-Are resource pressures to be reduced quickly or slowly?</td>
<td>-Where non-environmental constraints are substantial, early analysis and stakeholder meetings should provide sufficient attention to this area.</td>
</tr>
<tr>
<td></td>
<td>-What social, political, or economic constraints is the government likely to face in meeting its goals?</td>
<td></td>
</tr>
<tr>
<td>Pollutant characteristics (where control target is pollutant-based)</td>
<td>-Pollutant name, toxicity, dispersion profile (e.g., to air, land, water).</td>
<td>-Highly toxic agents require tighter controls. EIs such as rebates can be used if target wastes are discrete and separable agents. If part of general emissions, CAC approaches such as bans or severe restrictions warranted.</td>
</tr>
<tr>
<td></td>
<td>-Separable from other waste streams (treatment options)?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Measurable? Possible to monitor?</td>
<td></td>
</tr>
</tbody>
</table>
### Issue Clarifying Questions Implications on Policy Choice and Application of Economic Instruments

<table>
<thead>
<tr>
<th>Issue</th>
<th>Clarifying Questions</th>
<th>Implications on Policy Choice and Application of Economic Instruments</th>
</tr>
</thead>
</table>
| - Potential reuse markets?  
- Product markets price sensitive? | - Reuse markets increase the economic viability of recovering and reusing the constituents of concern, and suggest advance deposits or take-back programs could be effective.  
- More price sensitive products (i.e., commodities) will often be unable to pass increased emissions control costs through to customers by raising prices. Political resistance to any controls likely to be higher in these types of product markets. |
| Resources at risk (where control target is resource area) | - What is (are) the resource(s) being exploited?  
- What peripheral natural assets are threatened?  
- Is exploitation threatening a widespread collapse of the ecosystem? Is the potential damage irreversible?  
- Is resource of primary value to the local community or to a more global set of beneficiaries (e.g., biodiversity)?  
- Are resource owners (including the taxpayer) adequately compensated for the current/planned resource exploitation? | - Over-exploitation can often be addressed through the granting/clarification of property rights. Where widespread or irreversible collapse is imminent, extreme action may be needed to curb exploitation immediately (e.g., fishing bans). During interim period, more flexible licensing/permit approaches can be developed.  
- Ecosystem-wide view is generally needed to ensure that the entire basket of resources are appropriately addressed by the policy.  
- Where resources under threat benefit international interests much more than local extractors, financial payments from the beneficiaries to protect the resources are often warranted.  
- Ensuring appropriate pricing of access can have the double benefit of reducing development pressure and raising some revenues to support ongoing management. |

### B. Factional Analysis: Who are the stakeholders, what are their interests?

#### 1. Understanding the Source of the Environmental Threat

| Profile of emissions source (industry/household/government/mobile source) | - Is emissions source comprised of a small number of large firms or is it a cottage industry?  
- Do international firms comprise a large percentage of domestic production?  
- What are the firm's incentives for being in the host |
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Concentrated industries have power to resist wide range of environmental controls. ELs such as marketable permits are one way around this, so long as the government can set a realistic cap on allowable permits.</td>
<td></td>
</tr>
<tr>
<td>Issue</td>
<td>Clarifying Questions</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Country? -How large is the market share of government-owned entities? -What is the ownership structure of mobile source threats (e.g., individual cars vs. fleet-owned trucks)?</td>
<td>-For specialized pollutants with only a handful of sources, direct regulation using a CAC approach may be most beneficial. -Fragmented and/or impoverished sources generally require more outreach and transitional strategies. -International firms are the most sensitive to informational approaches that can harm their brand image globally. However, firm location may be due to lax environmental or fiscal oversight. -Government owned entities are often not subject to strict financial performance. Difficult to modify behavior using EIIs, though political resistance to CACs also likely to be high.</td>
</tr>
<tr>
<td>Cause of overuse of existing resource base</td>
<td>-Is overuse the result of activities by large corporations, or by large numbers of subsistence extractors? -Does public receive market-value for resources extracted/sold? -Are extractive firms financially liable for damages they cause to natural resources in the course of their activities? -Is domestic industry under pressure from unfair competition (subsidized, unregulated) from abroad?</td>
</tr>
<tr>
<td>2. Government Institutions</td>
<td>-Environmental ministries are often in charge of overseeing whatever control method is chosen. -Are international firms from major powers part of the problem? -Are products associated with the resource damage</td>
</tr>
<tr>
<td>Issue</td>
<td>Clarifying Questions</td>
</tr>
<tr>
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<td>----------------------</td>
</tr>
<tr>
<td></td>
<td>exported internationally for hard currency?</td>
</tr>
<tr>
<td></td>
<td>-If there will be revenues raised (through the sale of permits, implementation of pollution taxes, or charges for government-provided goods and services), who will get them?</td>
</tr>
<tr>
<td>Linkage to public infrastructure</td>
<td>Does sector rely on public infrastructure (water, wastewater treatment, electricity, roads)? Which ones, and in what way?</td>
</tr>
<tr>
<td>3. Employees</td>
<td>-Does the affected sector employ large numbers of subsistence workers? Does it produce products on which the poor rely?</td>
</tr>
<tr>
<td></td>
<td>-Are the affected industries unionized?</td>
</tr>
<tr>
<td></td>
<td>-Does the proposed change open up significant new employment opportunities?</td>
</tr>
</tbody>
</table>

### C. Overview of Public Sector Institutions: Structure and Strength

<table>
<thead>
<tr>
<th>1. General. Overview of Government Employees and Ministerial Coordination</th>
<th>Applies to local, regional, or national institutions, depending on problem being addressed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>-Professional civil service? Widespread bribe taking?</td>
<td>-Poorly-trained, corrupt, or fragmented civil service imply that greater reliance on decentralized oversight would be necessary.</td>
</tr>
<tr>
<td>-At what level of government (national, provincial, local) does the operational power reside?</td>
<td>-Conflicts between the government level issuing a</td>
</tr>
</tbody>
</table>
### Issue Clarifying Questions Implications on Policy Choice and Application of Economic Instruments

#### 2. Legal Institutions

**Legal: Rule of Law**
- Does the legal system enforce laws on the books generally?
- Do citizens have legal recourse for damages they incur at the hands of private or municipal corporations?

Without the rule of law generally applied, the chance of succeeding with any type of environmental instrument (EI or CAC) is likely to be small.

**Legal: Scope of Authority**
- What legal platform will support EI programs? Are there any known barriers?
- Is the polluter pays principle or other methods that hold polluters responsible for environmental harm within the existing legal system?

Understanding the scope of legal authority is important in order to make realistic decisions about what types of policy actions will be possible without difficult-to-obtain changes in legal mandates or in the national constitution.

**Legal: Enforcement of Property Rights**
- Does the legal system specifically enforce property rights?

Without property rights, there can be no use of marketable permits, and firms/other entities will have little incentive to invest large sums in pollution-control plant and equipment.

**Legal: Right to sue violators**
- Can third parties (e.g., individuals, environmental groups, other firms) sue companies that are violating environmental laws already on the books?
- Can suits be brought for general damages to natural resources?

Litigation can leverage the oversight power of governments by allowing other parties to take action as well. It can serve as a useful check and balance for other policies to make them more effective, be they CAC or EI.

### 3. Fiscal/Economic Institutions

**Fiscal: Functioning tax and financial reporting/audit system**
- Are general taxes levied by the central authority and paid by the private sector?
- Is there general confidence in the financial representations of private and municipal corporations?
- Are the incentives provided by the current fiscal regime supportive or antagonistic to the new EI instrument?

-If nobody pays regular taxes, there is little chance they will pay environmental taxes.
- Widespread perverse incentives will undermine the effectiveness of many EI (or CAC) approaches.
- If the information presented by firms is inaccurate and subject to no penalties, only very centralized environmental policies would work (e.g., product fees, technology mandates).
<table>
<thead>
<tr>
<th>Issue</th>
<th>Clarifying Questions</th>
<th>Implications on Policy Choice and Application of Economic Instruments</th>
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| Fiscal: Functioning insurance markets | -Can insurance be purchased at reasonable rates for a wide range of common business risks?  
-Is there any environmental risk coverage at all? | Functioning insurance markets can help reduce the need for direct-government oversight. Performance bonds, environmental liability policies, etc., can provide decentralized control methods. |
| Economic: Macroeconomic conditions of concern | -Hyperinflation?  
-High levels of poverty?  
-High unemployment?  
-Resource sales provide critical foreign exchange earnings?  
-High national debt level? | -Any of these factors tend to diminish the relative importance of environmental issues. Because poverty and unemployment may also result from widespread corruption and poor governance, there may be ways to incorporate environmental EIs in a broad-scale reform package.  
-Natural resource sales are often a large source of foreign exchange, and production facilities are often owned by the government. This makes environmental controls of any kind very difficult to institute. |
| 4. Environmental | -Centralized authority with direct power and direct voice to head of government?  
-Are there existing laws on the books? Are these adequately enforced?  
-Is information on ambient environmental conditions, resource consumption, environmental permits, and enterprise emissions generally available to the public?  
-Is there a functioning monitoring and reporting system for measurement of baseline environmental data? | -Fragmentation of oversight amongst multiple agencies (e.g., environmental impact of agriculture, forestry, or mining managed elsewhere) greatly weakens the power to bring about environmental change.  
-Direct voice with the head of state also important to increase leverage to initiate sometimes difficult changes.  
-Where there are extensive existing environmental laws that are not enforced, these same problems with authority are likely to plague any new efforts (whether EI or CAC).  
-Lack of information will impair the ability to implement or oversee a wide range of environmental policies, and will prevent many third-party enforcement approaches. |

Source: Earth Track, Inc.
3.2 Phase 1: Moving from the Template to Draft Policy Options

Based on the information review, policy makers should be able to develop a relatively short list of policy options. This is an important step, but one that our research suggests is often not done in a comprehensive way. For this reason, we have provided a detailed discussion of guidelines that can help policy makers to choose the most appropriate options.  

3.2.1 Recognizing Policy Trade-offs

All policy packages entail trade-offs -- between efficiency and the complexity of implementation given existing conditions and political realities. For example, ease and timeliness of implementation must be balanced against losses in the efficiency of the instrument. Similarly, in order to make packages acceptable by key parties, subsidies are sometimes included, even if not all are targeted to help the most vulnerable population slices during the transitional phase. Describing these trade-offs for your particular situation is useful to ensure full consideration of the implications of a particular decision and the implicit compromises they contain. Similarly, evaluating alternative solutions is important. For example, rather than providing subsidies to affected sectors, a gradual phase-in of policies can also reduce the transition costs.

Environmental effectiveness. While compromises may be necessary, how well the proposal achieves its primary environmental objective should remain at the core when determining which options are acceptable. Periodic reevaluation is needed, as strong lobbying efforts can sometimes quietly supplant secondary or tertiary objectives for the core environmental one, eroding the effectiveness of the policy over time.

Policy windows. Laws and regulations take a long time to implement, and scrapping them entirely will not likely occur. Thus, policy makers should look for ways to apply EIs within the broader existing rules. Environmental authorities must be opportunistic. Payanotou identifies three main windows of opportunity: improving the efficiency and flexibility of existing regulations; improving cost recovery (with associated revenues earmarked for the environmental purposes they were raised from); and addressing problems not covered by existing regulations. While these solutions may be less effective than if policy responses could be designed from scratch, the windows approach reflects political realities and provides a foothold for more effective environmental protection. In many cases, demonstrating success for EIs at the margin can generate the political will to expand their role over time.

Ease of introduction. Even without constraints posed by existing environmental legislation, environmental controls are often broadly opposed by various interest groups. Extensive conflict can greatly water down initiatives and long gestation periods can allow

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16 Many of these come from Panayotou, 102-109.
17 Panayotou, 3.
extensive environmental damage to occur in the interim. In many cases, the opposition interests actually grow more organized and powerful during the delays, stymieing the ability to make meaningful change. Policies that achieve slightly less, but much more quickly, may be beneficial.

ELs have the advantage in that they can be incrementally made more stringent (e.g., in the case of tradable permits, by removing some of the existing permits) over time. One strategy is to have them less stringent initially to reduce opposition, but becoming more stringent automatically over a 35 year period. If this allows the adjustments to begin earlier, the delay could be well worth it. Nearly every case study evaluated here had gestation periods far longer than that, generally due to attempts to resolve political disagreements. Thus, even a 5 year delay may be shorter than the time needed to move through the political process if it is a contentious one. Though many ELs must initially be legislated (for example, to require financial assurance mechanisms or to levy a tax), once in place "they should be more or less self-enforced; otherwise they have not been properly designed."\footnote{Panayotou, 111.}

Acceptability by key parties. Although the exact stakeholders will differ by country and problem area, they will generally involve industry, government, workers, social and environmental welfare organizations, and general citizens as the main interest groups. These groups will need to have some general acceptance of the policy path, though, as noted above, full consensus should not be the goal. Policy solutions should adhere to the polluter pays principle as closely as possible, resisting the inevitable efforts by industry groups to have their entire transition costs shifted to the taxpayer. Acceptability can be enhanced if policies have an easy-to-understand technical basis, and the oversight agency demonstrates adequate capabilities to perform the monitoring and evaluation tasks for which it is responsible. These include:\footnote{Godard, 29, 30.}

- Capability to measure and monitor the physical resource/contaminant.
- Legal capability to facilitate transfers of permits, collections of taxes, etc.
- Credible financial penalties and sanctions.
- Stable and transparent rules for initial rights allocation and subsequent transfers.
- Specify conditions under which "rules of the game" may be changed.

3.2.2 Make realistic assessments of policy limitations

Policy implementation strategies should incorporate realistic assessments of the limitations both of the policy instruments themselves and the institutions that will be overseeing them. The most general application of this principle is to keep the solution as simple as possible: the solution should not be more complex than the problem. If the problem is local, local solutions may be best as well. If the problem involves a handful of industries, establishing a national trading system probably doesn't make sense.
Match policy plans to institutional capabilities. Expectations must match the supporting capabilities of baseline institutions. Overstating these capabilities will simply mean that the new instruments are likely to fail, leaving the underlying environmental problem unsolved. Similarly, assuming extensive changes to the structure or performance of these institutions in the solutions promoted may be unrealistic. A sometimes overlooked element of this issue is following the money to make realistic assessments of institutional reach. If revenues are to be collected, how are fees to be set? Who will collect the money, and do they have appropriate experience? Will the revenues be linked to solving the environmental problem, or simply diverted to the Treasury?

Powerful groups will participate without government effort; weaker groups must nonetheless be central to policy process. Groups that are fragmented and powerless may not be able to play a role in the evolution of the policy package. However, it is critical that the government identifies any highly-impacted sectors up front, and engages them in the decision making process. These sectors may be the poor, who are dislocated through economic change; or population centers (also generally poor) that will face excessive emissions as older plants in particular regions all purchase emissions credits. These impacts can be generally, though not precisely, predicted. Policy responses to them need to be built into the package from the outset via appropriate flanking measures. Examples may include a cap on total emissions, maximum emissions within a region, a limit on the concentration in resource ownership, or support for displaced individuals. While flanking measures may also include modifications to the basic institutions of a country (e.g., legal reform), such broad-based reforms often fail. If they are prerequisites to the EI success, this failure could put the environmental objective at risk as well.

Predictability. Policy proposals should have clear rules for current applications. The goal is to establish a predictable path of controls for market participants and citizens alike. This facilitates long-term planning and investment, increasing the efficiency of the rules. Because knowledge about the environmental and health risks of particular activities will continue to grow, it is important that proposals can be modified to incorporate this new information. However, the process for doing so should be established up-front.

Economic Instruments do not fit all situations. Here are common examples when CAC approaches may be more appropriate, or when EIIs need to be implemented with regulatory safeguards imposed:

- Emergency conditions. When problems have severe implications, emergency conditions arise, and behavior needs to stop immediately, directive bans may be more appropriate. Where some activity, albeit a much lower level, would be acceptable, property rights or licensing approaches could work.
- Excessive monitoring costs. Where monitoring costs are too high, as when there are a large number of very small transactions (e.g., emissions trades), CACs may be a better fit. Similarly, where there are a very small number of homogenous parties, emissions trading would not have an effective market and few efficiency gains would
be achieved through trading. Monitoring and oversight costs would exceed the benefit of EIs.

- **Fragmented oversight authority.** Where authority to set and enforce regulations is highly fragmented across institutions, oversight of market-based instruments might become quite difficult. CACs tailored to the existing oversight authorities might be more efficient, though it is likely that such a policy approach would not be well integrated.

- **Social stigma.** Societal factors can also make market-based approaches more difficult. For example, communal societies may not adapt well to individual members of the society holding particular rights or paying particular fees. In other societies, the activities that would be affected by the EIs may have a close link to social status, generating strong resistance to change. An example is the loss of cattle (and with it prestige) if market-based grazing rights are used. However, in these circumstances, EIs might work when applied at the community level since the communal decision making process can maintain the existing social hierarchy as access rights are granted.

- **Strong opposition.** Where political power and factions remain strong, policy makers need to judge the most prudent course. Political power can be used in EIs to generate loopholes or exemptions, in exactly the same way as this power is applied in CACs. Privatization can be used as a front for corrupt sales to transfer state-owned assets to private parties with no gain to the public.

- **Large level of dislocation.** Where large numbers of people will be displaced or unemployed as a result of EIs, caution is required. Regulatory exemptions, transitional payments, or some other flanking measure is needed to ameliorate potential hardships.

- **No ability to make transitional payments to affected sectors.** From an economic perspective, it is more efficient to remove broad-based subsidies and replace them with direct payments to the poor. The link between subsidy and resource use is removed, and public resources are targeted to the subsector in most need rather than to the entire society. Examples include subsidies to water, energy, foodstuffs. However, in corrupt societies, the transfer payments to the poor are unlikely to actually occur. Thus, prudence may require that some broadbased subsidies remain to avoid widespread hardship or social unrest.

### 3.2.3 Measure, measure, measure

Total quality management expert W. Edward Demming noted that if "we can't measure it, we can't manage it." Measurement is needed to evaluate progress, to determine when policy modifications are needed, and to learn from the existing applications so new applications are easier to accomplish. Both the environmental problem and the baseline conditions change over time; this can change the incentives faced by firms and resource owners. The more complicated a program is to monitor and enforce, the less likely it is to succeed, especially in the developing world. EIs are often easier to measure than CACs, since simple-to-gauge metrics such as price of a pollution...
permit, tax levels, presence of performance bonds, etc., are clearly visible. Policy makers should plan to track relevant parameters over time and to make them public.

OECD has developed useful guidance on evaluative criteria for economic instruments. These include:

- **Environmental effectiveness.** Are emissions levels or resource depletion rates falling? Are ambient concentrations in the surrounding environment declining? These are critical metrics for any environmental policy, though sadly often lacking.
- **Economic efficiency.** Are costs of emissions rights stable or declining? Are they less expensive than projected in advance by government or industry? This would indicate that businesses are finding more efficient abatement methods. Are new abatement technologies entering the market? Are trades being actively used?
- **Administration and compliance costs.** Has the public sector implemented an effective administrative oversight program for the policies? How expensive is this to run relative to the value of trades occurring, emissions reductions realized, or anticipated cost of CAC programs? How expensive are the administrative costs to the private sector relative to those normally incurred under a CAC approach?
- **Revenues.** Are user fees sufficient to cover the full costs of providing particular public services? Are fees appropriately levied on different user groups? Are environmental taxes high enough to trigger appropriate price increases in the products/production processes of concern? Are revenues retained to support additional environmental protection efforts or diverted to the general Treasury?
- **Wider economic effects.** Are there noticeable (positive or negative) effects on employment, trade, competitiveness, growth, or rates of innovation that can be reasonably attributed to the environmental policies being evaluated? Where these impacts are negative, are they transitory or permanent? Can policy modifications mitigate the transitional dislocations?

### 3.3 Phase 2: Engaging Stakeholders

Engaging stakeholders can be a delicate part of the process. It is important to begin a dialogue and gather information from stakeholders early. However, environmental authorities (if any) quite often have less power than many of the affected industries or their political partners. This is particularly true in many developing countries. Transparency in these processes is important, so that stakeholders know they will be heard fairly, as well as that any efforts to influence the process by dishonest means is likely to become public.

Stakeholder engagements can be done through formal meetings, though more frequent, less formal contacts and briefings are important in keeping the process moving.

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forward and facilitating iterative policy refinements. Stakeholder engagements, particularly in LDCs, can be improved through government actions. These can include financing participation in meetings, providing internet facilities to keep parties abreast of decisions and emerging issues, or other methods the ensure the interests of fragmented, less educated, and less powerful parties are adequately evaluated. Though outreach may not result in policy consensus, it can ensure that an informed decision is made about how to proceed.

Consensus building can easily become a tactic for affected parties to delay any action or activity. Thus, a structured process is needed. For example, agencies should request that any data held by stakeholders and relevant for the choice of instruments is provided within a certain time range. Similarly, comments on the suggested instruments could be provided in a second comment window. Data/feedback that comes after that period would be formally ignored. This is the only way to make stakeholders take the timeline seriously. Rather than full consensus, defining zones of agreement between parties, as well as defined trade-off among various options, may be sufficient and quite useful in mapping out the policy framework. Structuring an integrated policy package that takes into account the direct policy instruments to achieve the main environmental goal is important.

Equally important is using feedback from the stakeholder process to design flanking measures as needed. Commonly these will involve exemptions, deferrals, or transitional subsidies to help the poor who may be most adversely affected by a policy change. Issues regarding international competitiveness often come up as well. Rather than exempt large domestic industries from important environmental policies (as is often done), a better solution is to try to establish parity with imported products by ensuring they meets similar standards.

### Phase 3: Policy Implementation and Evaluation

The policy implementation and evaluation phase involves moving from outreach and data gathering to choice of a final policy package. Both the choice of the policy and the steps taken to support the choice help develop allies for the plan and to hold off the vested interests until the policies can take effect. Core elements in this process are listed below:

- **Choice of policy instrument to address core problem** Decision on most appropriate new policy instrument given baseline conditions, problem to be solved, and stakeholder feedback.

- **Flanking measures to mitigate severe effects.** Where analysis policy implementation is anticipated to cause undue hardships on segments of the population, transitional measures need to be built into the initial policy package. Possibilities include phasing in limits more slowly to avoid sudden changes in prices or access rights; exemptions for groups who face high costs but are de minimis contributors to the problem; or transitional subsidies to highly affected groups. Aside
from the reduction in hardship, the flanking measures play an important role in mitigating political opposition to the new policy.

- **Monitoring and enforcement.** The specifics of monitoring and enforcement needs will be influenced by which instruments and flanking measures are chosen. However, these components need to be included in the policy package from the outset. In fact, where data collection does not require new authority, it is useful if the environmental ministries begin collection even before successful policy roll-out. Often, data on the severity of baseline environmental damages or emissions can strengthen the power of the environmental interests to prevent policy derailment. *Transparency is normally a great foe of the vested interests.*

- **Inter-institutional cooperation.** Instrument choice will influence which relationships are most critical to establish/develop. However, there is some strategy here as well. Els that bring in public revenues or solve problems for other ministries as well as protecting the environment offer immediate allies. These links should be reinforced. Where reliance on other ministries (e.g., to collect environmental fees) applies, establishing these links and processes should begin immediately.

- **Marketing.** It is important to explain what policy package is being implemented, why it was chosen, and what steps you took to ensure that this decision makes sense and incorporates the feedback from the various stakeholder groups. The basic explanatory data should be concise, easy to understand, and released at the same time as the policy package choice. Follow-up is also needed to address questions and to provide continued updates of progress or resistance to the policies.

### 3.5 Summary

While there is no single policy solution for every problem, there are better or worse options for particular situations, depending on the problem, the institutional structure and strength, and the factional interests in a particular issue area. Exhibit 2 provides many of the key questions to ask in order to establish a much clearer understanding of the barriers and drivers of policy change. Spending time to evaluate these factors can greatly enhance the quality of the policies developed, as well as their ability to address potential policy impacts on poverty or trade. Strategic use of existing institutional capabilities can establish allies within the government that may be necessary to offset potentially powerful interests of those benefiting from the lack of environmental controls. Careful explanations of the final policy choices, including a clear discussion of the severity of the problems being addressed and the steps take to mitigate adverse impacts on specific groups can further help weaken opposition to policies due to parochial economic interests. Finally, monitoring and enforcement systems need to be established from the outset in order to more clearly demonstrate both the severity of the problem and the potential benefits of the proposed solution.
4.0 Learning from the Efforts of Others: Case Studies of EIs, with an Emphasis on the Developing World

Economic instruments have been applied in a wide range of countries to address an equally wide range of environmental problems. By examining a mix of case studies, we are able to generalize somewhat about what types of instruments have worked effectively to address particular types of environmental problems. The cases are grouped not by the environmental harm addressed (e.g., land degradation from grazing), but rather by the structure of the situation (e.g., controlling demand for use of publicly-owned resources). Factors associated with success, partial success, or failure of these applications are noted. Case study summaries are presented here; more detailed write-ups for some can be found in Annex C.\(^21\) We cull from a range of sources, and the information available on the particular applications varies widely across sources. Using an expanded and more detailed library of case studies in the future could help refine and expand the types of generalizations we are making.

The emphasis of this chapter is on the developing world, though EIs are also beneficial in the developed world. The chosen focus reflects the desire to identify solutions to the severe environmental problems that many of these countries face. Conditions in these regions are difficult indeed. In addition to more severe environmental degradation, there is generally a greater reliance on environmental resources for economic development; less funding; weak institutional capacity; greater risks of public protests (due to subsistence populations) and political resistance (due to unequal wealth concentration); less capacity for environmentally-related research and development; and real concerns that policy dislocations can put people's survival at risk.\(^22\) Although many of these countries do have existing CAC environmental regulations, they are frequently not enforced.

The following sections examine applications of economic instruments from around the world in a number of problem areas. These include: limiting access to publicly-owned resources; recovering reasonable fees from resource users; managing government sales of publicly-owned natural resource assets; reducing pollutant loadings to the environment; and transitioning to more sustainable alternatives. Multiple cases for each area are included where available, with cross-cutting insights highlighted.

\(^{21}\) The template structure differs slightly between Exhibit 2 (in Chapter 3) and Annex C. The structure in Exhibit 2 focuses on gathering information on a structured way, from which to narrow policy options. Because Annex C contains descriptions of policies that have already been implemented, some modifications in structure were needed to integrate what is known about the historical policy drivers, implementation, and effectiveness. Most of the core information in both templates, however, is the same.

\(^{22}\) Based on Rietbergen-McCracken and Abaza, 7.
4.1 Limiting Access to Publicly-Owned Resources

Overuse of natural resources due to many parties having open and unrestricted access is a recurring environmental problem, often referred to as the "tragedy of the commons." The policy challenge is not only to constrain resource use, but to do so in a way that does not require an unreasonable level of government oversight (which is often impossible to provide). When over-exploitation is the result of pressure from subsistence populations, reforms in land tenure have often been a successful solution. When over-exploitation is the result of larger and sometimes more international users more formal property rights approaches, such as tradable permits, have been applied. These approaches have been fairly successful because they give the authorized parties (who now have a direct financial stake in the resource base) a self-interest in sustainable harvest rates as well as in direct monitoring to prevent poaching. When data on the resource base is poor, or there is no power to take action against poachers, the EIs have been less successful.

4.1.1 Tenure Reform, Mankote Mangrove (St. Lucia)\textsuperscript{23}

The Mankote mangrove comprises the largest contiguous tract of mangrove in St. Lucia, and 20\% of the total mangrove area in the country. Widespread and uncontrolled charcoal harvesting from the trees put the mangroves into severe environmental decline. The loss posed a significant threat to the many ecosystem services mangroves provide, including maintaining coastal stability and water quality, serving as a fish breeding and nursery ground, trapping silt, and providing important bird habitat. Most of the charcoal was harvested by subsistence populations. These people were extremely poor and had no legal right to any use of the publicly-owned mangrove resources. They did not have obvious alternative employment should their access to the mangroves be cut off due to resource depletion or degradation.

To address the core problem of protecting the mangrove, the subsistence users were organized into a collective and granted communal tenure rights to charcoal extraction. For the first time, they had a direct stake in the sustainability of the resource base. The group tenure also gave each individual harvester an incentive to monitor his peers to ensure cutting regimes were being properly followed. Technical training in effective ways to manage cuts was provided, as well as periodic monitoring of the overall mangrove health (as measured by tree size and number of new stems). Longer-term efforts to reduce the economic pressure on the mangrove were implemented using job training programs and the development of a hardwood forest outside of the mangrove. This last element has been of limited success. Finally, in addition to securing the tenure of the charcoal harvesters, the program worked to prevent threats to subsistence harvesting from large scale development or fishing by establishing Mankote as a nature reserve.

\textsuperscript{23} See Annex C for a complete write-up of this case study.
By modifying property rights, St. Lucia (in large part due to efforts of the Caribbean Natural Resources Institute, a regional NGO) has been able to protect the Mankote Mangrove and all the ecosystem services it provides. Mangrove depletion has been stopped and tree cover is now increasing, all without displacing jobs. However, the process has been an extremely long one (more than 15 years). In addition, the tenure is granted through a letter from the Deputy Chief Fisheries Officer. Case study materials do not indicate how strong the protection such a letter provides might be, as threats from outside developers remain.

4.1.2 Protecting Fishery Resources Using Transferable Quotas (Multiple Countries)\textsuperscript{24}

Fisheries have long been a commons problem since fish live in unmanaged ecosystems accessible by many countries. Historical controls to address this problem have focused on restricting access. Nationalization of 200 miles of coastline by most countries helped reduce fishing pressure for a while, by curbing access for foreign fleets. However, problems remained even with domestic fleets, and access restrictions to threatened fisheries have been common. Continual technical improvements in fleets made each boat a more effective vessel for harvesting fish. In addition, and massive subsidies to fishing-related capital equipment (e.g., subsidized loans for boats) and operations has created a massive overcapacity of vessels. The World Bank has estimated that during the 1990s, annual subsidies were equal to between 20 and 25 percent of global fishery revenues.\textsuperscript{25} The combination puts many fisheries at substantial risk of depletion.

In recent years, many countries have implemented market-based approaches to ration access to fisheries. Variously called Individual Transferable Quotas (ITQs) or Individual Fishery Quotas (IFQs), the rights allows the holder to catch a specified proportion of the total allowable catch (TAC) each year. The TAC represents the central government's estimate of how many pounds of a particular fish species can be sustainably harvested.

The theory of ITQs is clear. Where there once was unlimited and free access to fish, users must now be licensed. They can space out their catch more regularly (without fearing that others will overuse the resource), enabling them to fish more when prices are high, increasing their profits. The aggregate catch of the vessels is limited, ensuring sufficient fish survive to rebuild stocks. Finally, each license holder has an incentive to ensure other vessels don't fish illegally, since this reduces the available catch for license holders and depresses the value of the licenses on the spot market, which existing quota holders can sell.\textsuperscript{26}

\textsuperscript{24} See Annex C for a complete write-up the Chilean case study.
\textsuperscript{26} Sutinen, 4.
OECD reviewed 31 fisheries using some variant of this approach and concluded that catch levels were maintained at or below catch limits in 24 cases. In 23 cases, the permits also improved the cost-effectiveness of, and profits within, the fishery. However, the success of the programs seems to be in the details.

Information is extremely important; if the TAC values are wrong, transferable permits simply exhaust the resource more efficiently. In Chile, there are significant concerns that TAC figures are not as precise as they need to be. In the Netherlands (sole and placie fisheries) and Norway (cod fishery), ITQs failed to halt the increase in catch because license holders found the state was still shutting entire fisheries down even if individual quota holders hadn't met quotas yet. As a result, quota holders continued to have a "race to fish" to exhaust their catch limits first, and before access was closed off. This seems to be evidence of a basic problem in the way these countries calculated the TAC, but the error has eliminated many of the environmental and ecological benefits of the economic instrument. Errors in TAC values may not all be technical. Regulators in South Africa have been under continued and intense political pressure to increase the TACs (see Annex C), irrespective of the environmental cost of doing so. This pressure likely exists in most countries, and where institutions are weak or corruption rife, limits are likely manipulated for private gain.

The Chilean case illustrates many of the political complexities of policy implementation. The country has three main fishery interest groups: northern fishermen, southern fishermen, and artisanal fishermen (who use small boats and stay close to shore). Political maneuvering of the northern and southern fishery corporations focused on access to the initial fishing rights, and ways to use this property for competitive advantage. The ultimate decision to auction long-term fishing rights helped ensure more open access to outside parties. The artisanal interests have opposed the ITQs with the argument that the small boats, and the communities they support, would be frozen out of their livelihood. As a result, fisheries covered by the ITQs still allow open access for artisanal interests. This free access to fisheries may be one reason that the number of artisanal vessels has grown 27% between 1994 and 1998. Efforts to set up a separate class of ITQs for the artisanal fishermen is now under consideration.

Growth in the use of the ITQs within Chile has been small, with applications to only four fisheries covering roughly one percent of total landings today. The rest remains under a complicated and not particularly effective system of access controls, fleet limits, and equipment restrictions. Ownership of ITQs is highly concentrated (two groups control 75-90% of the northern harvest), and there have never been fines levied for infractions of the ITQ rules. There has also been some evidence of pricing collusion. These factors underscore the need for credible monitoring and enforcement even for EIIs, as well as for baseline issues such as market power to be addressed. Nonetheless, the program does incorporate a number of useful elements, such as caps on ITQ ownership by any single party and a 10% annual depreciation of quotas, ensuring there will be regular auctioning and pricing of the rights. Some fisheries have undergone stock

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27 OECD Survey, 94.
28 Sutinen, 3.
recoveries, and many fishing operators say they have been able to improve the quality of their final products, plan more effectively to meet higher price demand periods, and reduce social conflict with their workers.

4.1.3 Summary

Licensing and property rights reforms are powerful tools to curb overutilization of natural resources. However, careful attention to program structure is needed in a number of areas. Setting appropriate parameters for the EIs being used requires that accurate and timely information on the overall health of the ecosystem being protected is available. These figures are subject to intense political pressure, so ensuring the source of the data are insulated from political influence is important as well. Monitoring of compliance can be done in part by utilizing the interest that existing rights holders have to curb cheating. However, as the fisheries example illustrates, when the geography of the resource is widely dispersed, supplemental monitoring is needed. Monitoring of trades is also needed in order to create an efficient market for exchange of rights and to remind existing rights holders how much their licenses are worth.

Overutilization of resources by subsistence groups around the world can be addressed through modifications in tenure rights (individual or group). However, this approach is not without risks: "many local communities will choose the immediate return of exploitation before long-term sustainability."29 Careful attention to the range of rights being granted is necessary.

4.2 Recovering Reasonable Fees from Resource Users

The public sector invests hundreds of millions of dollars to bring services to the populace of many developing countries. Services such as electricity, drinking water, and wastewater treatment are examples of this. Similarly, government-owned natural resources comprise an asset of the state, owned by its citizens. Providing access to those resources, whether consumptive (e.g., harvesting firewood, grazing) or non-consumptive (e.g., recreation), there are strong arguments to be made supporting cost recovery from beneficiaries. Full scale asset sales of non-renewable resources (be they oil reserves or government-owned enterprises) create a unique set of problems and are addressed in a later section.

Because both the services and the resources have measurable economic value, and can be expensive to provide, pricing access through the use of EIs is a common solution. Not only does cost recovery brings in revenues that can allow the government to continue to provide the services or to manage the asset base, but it also sends more accurate price signals to users, encouraging more appropriate resource consumption. Despite the logic behind cost recovery, there is a widely-held belief that many of these services should be free, and implementing charge systems is often politically difficult.

29 DFID, 22.
The goal of these EIs should be to recover appropriate fees from the beneficiaries, providing subsidies only to the poor; to charge higher amounts to users who force the system to incur higher costs; and to recover sufficient revenues from all paying customers to ensure the sustainability of the enterprise.

4.2.1 Management of Forest Reserves in Botswana

Alarming deforestation rates were evident in some parts of the forest reserves in Botswana, owned commonly by the State. Existing CAC approaches, including restrictions on any cutting in forest reserves without prior permission, the use of local boards to develop conservation-minded use plans, and the ability of the Ministry of Agriculture to declare regions "planning areas," thereby instituting cutting restrictions as well, were not working. A payment scheme, including payment of fees and royalties, was also of limited success. Fees were set at a flat rate, regardless of diameter of the trunk (i.e., no linkage to value or board feet). This encouraged harvesting of the oldest trees first, removing many of the large anchor trees that help maintain biodiversity and wildlife habitat, and that should normally be left even after cutting. Trees less than 35 centimeters in diameter had no royalties at all, also contributing to excessive removal. Royalties were paid only on the tree trunk.

Widespread over-harvesting has led to increased tree litter and fire risks. The tree litter problem is compounded by the high damage rates and inefficient processing associated with inexpensive stumpage (overall yield is only 18%). Finally, some forests, such as the Chobe, have the added problem of trees knocked down by elephants adding to the fire risk. With prime wood so inexpensive, there was little incentive to spend time on salvage.

Fee reforms have been proposed to address most of these problems. Fees are to be higher, recovering a fuller set of the costs associated with timber activities, including government oversight and fire suppression/prevention. The royalty rate for damaged stock is lower, to encourage salvage harvests, though it is not clear from existing data how the government will ensure honest reporting on this issue. In addition, the royalty rate will cover the entire tree, not just the trunk, to encourage better usage. Finally, to curb problems of trying to oversee many small cutters, concessions have been limited to large firms. (Abaza/McCracken) While the reforms make sense, available information does not provide details on whether even the new, higher fees are sufficient; and how the government will enforce the new charges.

4.2.2 Grassland Pricing Reform (Philippines)\footnote{A detailed write-up of this case study can be found in Annex C.}

Pasture Lease Agreements (PLAs) for ranchers to graze cattle on public lands have existed for decades in the Philippines. The lease terms last 25 years, and are
renewable for another 25. Prices for these rights have been extremely low (roughly $0.30/hectare/year). As a result, a relatively small group of people has gained control over much of the public grasslands for the 50-year lease period. The ability to shift cattle to new pastures they control has also reduced the incentive for sound management of the pastureland, and led to land degradation in many parts of the country. Although existing rules require ranches to file annual operating plans as well as a management plan every eight years, there is virtually no government follow-up to ensure plans are actually being implemented. This is the result of insufficient funding as well as difficult terrain to oversee.

To improve land management, the Department of Environment and Natural Resources (DENR) has been working for years to raise the fee to a more reasonable level. The target fees were estimated based on a study of the market value of grazing rights, and finally implemented in 2001. The target fees were set in three tiers, reflecting differing grassland quality, with the lowest being 24 times the current fee. Despite some evidence that even this fee was too low, and the fact that 80% of the increase could be used to correct degradation on the leases, the ranchers have fiercely resisted the increase. A number have refused to pay the higher rates, and DENR was unprepared to deal with such a situation. As a result, fee collection has stopped entirely on these parcels. Also, a top government official, without any advance consultation with the DENR, pledged to cut the grazing fees sharply during a visit to the region. Collection of the fee has been suspended awaiting clarification from the DENR.

Though the rationale for charging market rates for grazing makes a great deal of economic and environmental sense, DENR has been unable to overcome local political opposition. As a result, the grasslands remain under great threat, and additional resources that the higher fees would have brought in are not available to stem the damage. Existing ranching practices are unsustainable, and current regulations on management reporting and planning by ranchers are not enforced.

4.2.3 Water Charge for River Basin Access (Brazil)

A number of Brazilian rivers were facing increased degradation. The rivers cross both state and international borders, so solutions required a coordinated response across many government agencies. In addition, there were hundreds of affected users who needed to be brought into any environmental management system created. River Basin Committees formed the local management units responsible for protecting the rivers, but had little power to actually do so. Subsequent legislative changes broadened the mandate of the committees to more explicitly address river recovery; most of the recovery plans included water user fees which varied depending on the amount used and pollution content of the activity.

The evolution of these charges came with little consultation with affected parties. The lack of consultation has been suggested as a major factor in the delay of fee implementation, though economic objectives to avoid the charge would seem another
obvious factor. Regardless of the source, however, political pressure from water users soon began to weaken the fee structure. First, charge levels were reduced to exclude resource consumption charges, recovering only administrative and monitoring costs. Over the longer-term, officials hope charges can be increased enough to affect the consumption and pollution patterns of resource users. Second, challenges to the fee setting authority have been launched. Obtaining the national authority to set water charges came only in 1997, after seven years of effort. This authority was to be exercised by a new independent and powerful authority to set and oversee water charges at the river basin level. Some politicians viewed this authority as a threat to their own power base and balked at moving forward. Thus, the new authorities have not been created, and river basin charges (except as passed on a state-by-state basis) have not been implemented. In addition, even if these barriers are addressed, the charge structure itself does little to curb particular discharges, and the system for monitoring usage is not clearly defined.

In the face of resistance by users, the state and federal authorities are considering a much weaker approach: the introduction of experimental river basin charges on a pilot basis, subject to agreement and consensus among users. Such an outcome would neither raise revenues nor conserve resources in the ways needed to protect river basin health over the long term.

4.2.4 Summary

The logic of charging users for what they consume is hard to challenge. However, as these cases illustrate, implementing these systems is virtually always difficult. Existing charges, if there are any, tend to be very low and often do not rise with inflation. This provides existing parties with windfall gains from their access to cheap resources. It also means that they will fight strongly to block or delay any efforts to institute more rationale charge structures. Engaging stakeholders early, as well as clearly explaining why the charges are needed and what they are for, may help in some cases. However, auctioning licenses may be even more effective. Not only does it avoid having to guess at what the appropriate fee might be, but it quickly removes the government as the main point of conflict. Rather than complaining about fees that must be paid, the auction winner has a right which does not necessarily require any additional payments to the government for exercising (though does encourage conservation due to its resale value). Overcoming political resistance remains the largest factor to consider when planning a cost recovery charge-scheme.

4.3 Managing Government Sales of Publicly-Owned Natural Resource Assets

Small scale harvesting of natural resources can often be addressed using fee structures, once the political hurdles to implementation are addressed. Large scale asset sales are a very different situation, raising two critical problems: ensuring assets are sold at a fair price, and protecting windfalls from being squandered by public officials. The most common examples of this are large timber, mining, or energy concessions; or
privatization of government-owned enterprises or infrastructure such as nationalized oil companies or electrical generating stations. The market value of the assets is so large that there are often attempts to divert these resources to public officials or their supporters through graft and corruption. These problems are most severe in resource rich countries with weak central governments and an absence of fiscal transparency.

4.3.1 Receiving Fair Value on Asset Sales

Examples from three Asian countries are illustrative. In one, much or most of the potential revenues from logging concessions went to corrupt government ministers. In the second, almost all forests are public land. Under the dictatorial regime, forest concessions were commonly used as patronage, rewarding political allies. Even after the fall of the dictator, however, elected legislators have often blocked efforts to ban logging in particular areas or to increase logging fees. Though the types of corrupt behavior that used to prevail appear to be gone, proper pricing and management of timber resources remains a problem. Within the third country, forest concessions have long been used as patronage as well. Concessions are long-term (roughly 20 years), and highly concentrated within a few hands. High profits from concessions allowed owners to build expansive empires in other areas of the economy. In turn, the power and funding that these empires have created has enabled their owners to further coopt and manipulate the public sector oversight mechanisms that should be protecting the general interest of the public.

Addressing these types of corrupt deals is not easy, and the corruption does not necessarily go away with the coming of democracy: after all, patronage is common in many democracies as well. However, market-based approaches -- primarily auctions and stock market flotation -- are a viable solution. Furthermore, data compiled by Transparency International suggests that countries with high levels of globalization tend to be the least corrupt. Oil and gas lease auctions in the United States provide one model for ensuring competitive sales. To be competitive, auctions must have a sufficient number of bidders, bidders must be unable to collude, and government officials must not be corrupt (in that they actually award the lease to the highest bidder). Finally, there must be an independent authority to collect bid-related payments and royalties. These conditions can be most easily met in conditions of transparency: sales are publicly announced and described; are open to domestic and foreign bidders alike; and have the winning bids published. Tracking of funds flow through independent auditing agencies is also necessary to prevent diversion of resources.

34 A recently founded non-governmental organization found by George Soros aims to track payments associated with natural resource sales from around the world in the hopes of making corruption more difficult and protecting the important environmental resources that subsidized access to resources causes. See www.publishwhatyoupay.org.
Stock market flotation on an established Western market (i.e., the US or Europe) can control fraud through the listing requirements firms must meet before being allowed to sell shares in these markets. These entail disclosure of all kinds of information on assets owned, management structure, sales, compensation of officers, etc. In contrast, private sales within a country or stock flotation on markets without strict oversight and accounting requirements are both at much higher risk for fraudulent diversion of assets to interested and politically-connected parties.

4.3.2 Protecting Gains for the Long-term: The Alaska Permanent Fund

An equally challenging aspect of these large asset sales is ensuring that the resulting proceeds are not squandered. Even if not diverted to corrupt officials, the funds are all too often used to prop up the government budget, leaving the general populace with little to show for the tens of billions of dollars in wealth extracted from their land. A notable exception is the US state of Alaska. Concerned with just this outcome, the state instituted a Permanent Fund in 1976. Established by a state Constitutional amendment, the fund is fairly well protected from political machinations.

The Fund receives at least 25 percent of all mineral lease rentals, royalties, royalty sale proceeds, federal mineral sharing payments, and bonuses received by the State. The amendment also created an independent corporation (the Alaska Permanent Fund Corporation) to oversee the Fund, independent auditors, and strict investment and fund disbursement guidelines. Investments are widely diversified, and only interest (not principal) may be paid out. Essentially, this is a State endowment fund, but one that has been very successful in converting non-renewable oil wealth into a permanent, diversified income stream for the state and its citizens. The Fund provides a powerful model for resource-rich states or countries around the world.

4.4 Reducing Pollutant Loadings to the Environment

Although pollution to air, water, and land occurs in many industries, pollution intensity (emissions per unit produced, or per dollar of sales) vary widely. Even within an industry, there is generally widely varying emissions levels depending on the technology employed and the sophistication of management. Command and control regulations are commonly employed to bring emissions down, but tend to be fairly rigid, setting maximum loadings or stipulating the installation of specific capital equipment. CAC approaches often allow industries to pollute for free below the statutory limit. Economic instruments such as emissions fees and pollution permits can achieve many of these same objectives more effectively. They can also work in parallel with CACs, helping to allocate the abatement needed to meet the CAC target more efficiently. As with the other EIs, instrument design is important. For example, maximum loadings (set by regulation) may be established on a regional basis, with trading constraints or zones

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35 Information obtained from the Alaska Permanent Fund website (www.apfc.org) in September 2002.
set up to ensure that no population group receives dangerously high emissions as a result of trading.

4.4.1 Nutrient Trading at Sewage Treatment Plants (New South Wales)

When nutrients are discharged en masse to waterways, they generate algae blooms which, in turn, use up all of the oxygen in the water killing other life. As a result, treatment of nutrients is a central job of sewage treatment plants before the wastewater can be released to the surrounding environment.

Beginning in 1996, three sewage treatment plants owned by the Sydney Water Corporation in the South Creek area of the Hawkesbury-Nepean River initiated a nutrient trading system. Under the regime, the three plants are allowed to trade portions of their nutrient discharge allocations, so long as the aggregate loading limit is not exceeded. The process of intra-firm trading within a set geographic area is called a "bubble," since a single limit or bubble applies to the river, rather than to a single plant.

The trading scheme set target reductions by 2004 of 83% of the phosphorous and 50% of the nitrogen. Oversight is provided by the local regulatory body. The program is generally considered a success. After three years, there were substantial reductions in nutrient loadings, at a much lower cost. The cost savings, estimated at 37% as compared to each plant meeting uniform requirements, come primarily through capital cost savings. Capital investments to curb nutrients can be concentrated in one or two plants, versus all three; and upgrades can be more closely timed with normal capital replacement than would have been possible under a uniform standards approach. Monitoring data was not complete in the review, and the overall impact of the program on environmental quality in the receiving waters was not available. This is an important data gap since detrimental effects of excessive loadings can be localized within receiving waters (causing "hot spots" of environmental damage). Applications of tradeable permits of any type need to evaluate the likelihood and impacts of such hot spots up front in order to be sure the overall environmental objectives of the program are met. In addition, plans to expand the trading system to more parties, and to non-point sources of nutrients as well, have been under discussion for some time, but have not been implemented yet.

4.4.2 Lead Trading in the USA


During the 1980s, restrictions to the use of lead additives in petrol were set up in the US, with the ultimate aim of phasing out use of leaded petrol entirely. To ease the process of adjusting to the more stringent standards, especially for smaller suppliers, a lead trading system was instituted in 1983. It was slated to operate during the transition period to the new lower limit of 0.1 grams per gallon, and allowed refiners and importers to trade lead reduction credits in order to meet limits for the lead content of petrol. The lead reduction credits were to be created when suppliers of leaded petrol achieved lead levels lower than those required by the new limits. The system allowed for both internal "trading" (i.e. flexibility) for an individual supplier, as well as external trading between suppliers. Beginning in 1985, refineries were allowed to "bank" lead credits for use in future years.

The general consensus is that this program has performed successfully, reducing costs by approximately $250 million per year, though use patterns of leaded petrol may have been altered somewhat. Among the factors to which its success has been credited are: a clear definition of rights and obligations; a predefined time over which the program would operate; a homogeneous product with a clear definition for all market participants; and low transaction costs in implementing trades.

4.4.3 Emission Fees in China

The example of emission fees in China provides relevant illustrations of perverse incentives that were created because of an imperfect design. In an attempt to curb pollution from factories, the government set up an emissions fee. As is true in most countries, these fees constituted business expenses, and were deductible from taxes. Given common Chinese corporate tax rates of 33%, this means that for each dollar in fees, roughly one-third remained in the firm as a tax-shield, reducing taxes that would have been paid on other net income. In an effort to accelerate installation of pollution controls, the Chinese set up a rebate system, whereby 80% of the fee collected would be returned to the enterprise for investment in pollution controls. Thus, from this original dollar in fees, 33 cents comes back through reduced tax burden and 80 cents comes back in an (ostensibly tax-free) rebate, for a total of $1.13. Thus, paying the pollution fees offered a net gain of roughly 13%.

This perverse incentive made firms not wish to invest in pollution controls, lest they lose the privilege of paying emissions fees to earn a quick 13% return on their money. The ability to do so was the result of a lack of political will or capability to ensure rebated fees were invested in pollution controls as required rather than spent elsewhere in the business. The government replaced fee rebates with loans in an attempt to solve the problem; however, enforcement has been weak. In addition, the funds from the 20% of

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fees not returned to the enterprise goes to the local environmental authorities, and this has supposedly given them an interest in maintaining funding through maintaining emissions. Were rebates actually put to use in upgrading pollution controls, this may not have been such a bad policy. It underscores once again the importance of matching policy designs with institutional capabilities.

4.4.4 Summary

Economic instruments such as emissions charges, trading, and permits have a solid track record around the world for reducing the costs of compliance. The most extensive trials have involved air pollution. Trials in the water area are also common, though often with a smaller number of parties. Measurement of markets and trades, and enforcement all remained important supporting elements to the program. Furthermore, as illustrated in the China example, program design, including subsidies, need to be carefully matched against the monitoring and enforcement capabilities in order to create the desired incentives for industry.

4.5 Transitioning to More Sustainable Alternatives

Encouraging environmentally sustainable practices and technologies through government subsidies is commonly raised as a suggestion. There are many options for how subsidies can be provided, ranging from direct grants to low interest loans, government indemnification to tax subsidies. The instrument that is chosen, as well as the behaviors for which the subsidy is earned, have important implications for the types of behavior that is encouraged. The more efficient subsidy programs provide no support for private activity unless it is successful in achieving the desired end-goal. For example, the United States used to provide investment tax credits (allowing firms to reduce $1 of taxes owed for each $1 invested in the desired industry) for new investments in renewable energy. These subsidies flowed even if the investments failed and never produced a single bit of electricity. Current forms of this subsidy provide tax breaks on a per unit of electricity produced only. No plant, no power. Thus, while encouraging wind power, for example, the government has not taken on any of the technological or market risks of the new power sources. The case studies below illustrate other complexities associated with trying to accelerate transition to environmentally-preferable alternatives.

4.5.1 Timber Discounts for Reforestation

In an effort to encourage proper reforestation, timber policies in Colombia, Brazil, and Venezuela all charge a tax on wood consumption, except when the harvesting is offset by equivalent reforestation. (In contrast, timber policies in the United States, while they are subsidized, aim for forest users to pay for the timber and for reforestation). Recognizing that there are insufficient resources to oversee reforestation directly, these countries have chosen to forego revenues from timber sales so long as the cuts are properly replanted. The programs have generally failed due to fees that are very low and
poorly enforced. Especially in frontier regions, monitoring is difficult. A lack of institutional capacity and/or will yields a situation where neither the environmental or the fiscal goals are being met. Forestry fees that were historically collected in Brazil were often completely used up to finance administrative overhead in the oversight agencies rather than the environmental purposes for which they had originally been intended.

4.5.2 Leveraging Existing Subsidies for Environmental Protection: Soil Conservation in the Dominican Republic

In the El Naranjal watershed in the Dominican Republic, US AID funds provided subsidized credit to participating farmers adopting soil conservation measures. Initial adoption rates were quite high (90% in 1985), yet by 1990, only half of the farms continued to practice the conservation measures, as the subsidies had stopped. Where further subsidies are expected, farmers may actually delay rational conservation measures in order to wait for the payment to do the change. The follow-on project of US AID recognized that the farms were already receiving tremendous benefits in the form of subsidized irrigation water. This second project tied continued access to this water to proper adoption of soil conservation measures. This has generated substantial use of conservation without additional direct subsidies.

Even where existing subsidies can't be removed due to political constraints, they can be leveraged to ensure adoption of more sustainable practices. There are likely many applications of this principle throughout the developed world. For example, aggregate subsidies to the agricultural sector within the OECD alone are $362 billion per year. Were access to these programs restricted only to farms practicing environmentally-sound growing techniques, the environmental benefits would be enormous.

39 Seroa da Motta, p. 7.
40 Seroa da Motta and Reis, 1994.
41 Lutz et al, 291.
4.5.3 **Seed Capital: Externally Financed Development of Premium Bulb Markets in Turkey**

Transitional subsidies work best when the need really is short-term, and the newer approaches are quickly shown to be viable in the marketplace. Indigenous propagation of threatened Turkish bulbs provides one such example. To offset an accelerating loss in national wild stocks, the World Wildlife Fund decided to fund demonstration projects on the propagation of domestic bulbs as a substitute. The WWF project also benefited immensely from the fact that domestic bulbs were also increasingly being specified in international trade contracts as the knowledge about dwindling wild stocks grew. Using contracts with growers, plus capitalization funding to finance the initial purchases of plant for the participating families, the Fund was able to jump-start a more sustainable domestic industry. In this situation, project returns were sufficient to make the enterprises viable. In addition, adoption of the new approach was widespread because it required little change in existing routines of participating families and increased their economic gains.

4.5.4 **Summary**

Subsidies to "good practices" can help realign research and market forces in ways that accelerate the transition to improved products or production methods. These approaches are especially important where parties causing the damage have very little purchasing power of their own (as in subsistence farmers) or where the environmental benefits accrue primarily to parties very different from those bearing the direct costs of behavior change (as with many biodiversity-related issues). However, the provision of subsidies in no way assures that the desired environmental end-goals will be obtained. Because the political interest in obtaining public subsidies is always large, careful evaluation of proposals are needed. Can markets produce the changes without new subsidies? Can existing subsidies to detrimental practices be removed, or made conditional on adoption of sustainable practices? How can any payments be limited in scope and reach only the population sector that needs it, and only for a transitional period of time?

Transitional payments to dislocated groups should be managed in the same way as any other dislocated worker if possible (e.g., such as by using unemployment insurance). Even where transfer payments may make sense, such as with biodiversity, unless these payments are carefully structured and monitored there is a real risk that some in the local community will take the transfer payments and continue to poach the resources that threaten the long-term viability of the resource trying to be protected.

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4.6 Conclusions

There are a number of common elements across all of these problem areas. First, policies must be developed holistically, with careful attention paid to exactly what behaviors are being rewarded. Without supporting monitoring and enforcement, the effectiveness of many EIs can be eroded. An additional common element is that political considerations remain at the core of many of the policies implemented, even to the detriment of the environment.

The case studies demonstrate as well that when policy design does incorporate these elements, EIs have performed well in practice in a variety of resource areas. Not only can EIs facilitate cost-effective reductions in emissions or resource use, but they can also help ensure adequate returns on resource sales to third parties and the protection of those returns for the use of future generations.
5.0 Lessons Learned and Opportunities for Further Research

Economic instruments have been applied in a variety of circumstances with some success. These success stories include many applications in the developing world. A number of lessons from these applications are useful for policy makers going forward.

- **Baseline conditions are critical.** Spend the necessary time up front defining the problem you are trying to solve, identifying factional interests, and evaluating past attempts within the country to apply EIs.
  - This approach should include rapid assembly of existing information base into a structured template (see Exhibit 2) in order to develop initial set of policy options. This should be followed by a process of stakeholder involvement and feedback to gather additional information and revise the assessment of the problem and the potential range of solutions, as appropriate, based on this additional data. However, care is needed to avoid seizure of process by vested interests.
  - Don't overreach current institutional or economic capabilities of your country. Improving baseline conditions concurrently with trying to address environmental problems greatly increases the risks of failure. However, where baseline capacities are inadequate and the environmental problem sufficiently severe, there may be no alternative to capacity building.\(^{44}\)
  - Don't overdesign solutions relative to the problem being solved.
  - Consider alternative measures critically: CACs may have the same problems as the EIs due to gaps in baseline institutions. In such circumstances, because EIs can operate at a more decentralized level, they may be preferable.

- **Political agreements hard to reach.** Don't underestimate the political difficulties in reaching agreements among parties; gestation periods can be more than a decade, sometimes with an unsatisfactory end result.
  - Stakeholder involvement is important to understand the terrain, but should not be used with the expectation that it will lead to consensus.
  - Clear definition of timelines and structuring of the stakeholder process can speed development of policies.

- **Setting up EIs can be difficult as well.** While establishing appropriate tax/charge levels can be challenging, the ability to modify levels over time based on observed market reactions is of great benefit. Perhaps more difficult are the political challenges to realistic fee levels that often arise from existing resource users of polluters. In addition, creating and supporting new markets can also be quite

\(^{44}\) Where institutional gaps exist, it is important to clearly identify these gaps, and to prioritize which are most important for addressing pressing environmental problems. Support (both financial and technical) is often available from international agencies to support this process.
challenging, especially where there is not a history of strong markets in other commodity areas.

- **Implementation is the beginning of the game.** Monitoring and enforcement are the lynchpin of achieving environmental progress. Expectations regarding how seriously to take the limits/permits/taxes will be set early, so policy makers need to set the tone properly. Instituting the ability for third parties to bring suit can offset institutional weaknesses within the government environmental enforcement capabilities, though can potentially create some downsides through increased litigiousness in the society.

- Disclosure and transparency are necessary tools to ensure the EI is working, and to help offset continual pressure from affected economic entities to water down or coopt the policies. Provision of key information on environmental quality and existing subsidies should begin as soon as possible, even well before the new environmental policies take effect.

- Despite these caveats, EIs can help (and have helped) solve many critical resource use problems even in countries with high poverty and ineffective supporting institutions.

- Subsidies to transitional behaviors/sustainable practices should be used sparingly since they create distortions of their own and are often very difficult to end once they are implemented. However, any change must protect the poorest sectors of society, but must do so in an efficient way.
  
  - Focus payments on poverty alleviation; transitional payments (e.g., the introduction of environmentally-sound technologies); and situations where social benefits greatly exceed private benefits (often where existence and bequest values of a resource are high and flow to more technically-advanced societies).
  
  - Transitional payments should be decoupled from any activities causing environmental damage, and should be time limited.
  
  - Support for subsistence sectors should also be decoupled from environmentally-damaging production if at all possible and shifted to subsistence consumption.
  
  - Where central governments can not be relied upon to provide direct subsidies to the poor, pricing mechanisms (increasing block rates, subsidies flowing only to basic subsistence foodstuffs) should be used instead.

### 5.1 Generalized Solutions

There are a number of generalized solutions that emerge from the case analysis regarding which EIs to use when. These are highlighted below:

- **Overuse of natural resources by local users.** Rights-oriented approaches can work well in these situations, protecting jobs while providing direct incentives to manage the resource for the long-term. Where subsistence use patterns have been long-lived, modifying land tenure to formalize rights can help achieve this balance. If
consumption must be curbed, buy-out or phase-out of the existing de facto rights is a possibility.

- **Industrial pollution, disparate technologies.** Where emissions result from many different sources, there are likely to be widely varying costs to abate the pollution, with large efficiency gains from pollution taxes, fees, or tradable permits.

- **Industrial pollution, standard technology, few producers.** Few producers and similar technologies suggest minor gains from trading with potentially large oversight costs to create a market. In this situation, CAC regulatory approaches may be the more efficient option.

- **Known damage thresholds.** Where regulators have a good sense of the point at which emissions cause health problems or ecosystems begin to fray, tradable permits are often the best choice. Caps can be set in advance, either based on absolute values (e.g., tons of salmon that can be caught) or on relative values (e.g., percent of total allowable catch), allowing markets to allocate the rights efficiently.

- **Government-owned enterprises.** The objective with these institutions is to institute pricing that achieves full recovery of costs through user fees, but with a rate design that protects the poor for subsistence consumption needs. Attempts to cover the costs of the enterprises often brings to light their inefficiencies, increasing pressure for improved management and governance structures as well. The combination of revenue collection and increased organizational efficiency can be a powerful benefit to governments.

- **Government owned enterprises in highly politicized environment with substantial rent diversion.** Government-owned enterprises in natural resource areas face difficult challenges in preventing corruption (large cash flows, often poor transparency) and in instituting appropriate environmental controls (government litigation against itself is uncommon). In such cases, both the fiscal and environmental well-being of the country can be served through privatizing the enterprise. This can be done either through a direct sale, or by floating a portion of the company on the stock market in the developed world (as China Petroleum has done). The listing requirements provide important leverage to facilitate disclosure and transparency.

- **Long-term program support should come from within.** External resources (e.g., from NGOs or international agencies) can support initial research or training. However, they should not be relied on to operate the program, as the entire effort will be at risk when funding priorities change. Ideally, user fees should support ongoing program management, though care is needed to ensure fee levels do not cause undue hardships on the poor.
5.2 Next Steps

This report provides a starting point for evaluating better ways to identify and apply economic instruments to environmental problems, especially in the developing world. Additional learning in a number of core areas would make these systems even more effective:

- **EIs and Poverty Amelioration.** How might EIs be applied to existing situations in order to protect the environment more efficiently while also alleviating poverty? There seems to be a high correlation between poor governance, high poverty, and low environmental quality; thus, the opportunities for policy confluence may be substantial.

- **Barriers to increased transparency** in government interventions affecting environmental quality. Improved information on fiscal and subsidy policies would undoubtedly yield many options for saving money and improving the environment. A better understanding of what the barriers to achieving that increased transparency are might help them be removed.

- **Institution building.** What are the opportunities for improving the core baseline conditions in countries with critical global natural resources? Biodiversity hot spots are one clear example. In such situations, building institutions that can effectively carry out environmental protection regimes, including those incorporating EIs, is imperative.
Annex A: Detailed Listing of Economic Instruments

1) Establishing Property rights; clarifying or improving existing ones
   a) Variations:
      i) Initial allocation. Rights can be given for free or auctioned; auctions raise 
         revenues and provide better price signals. Often, the aggregate rights 
         available are capped at a particular level to protect the resource.
      ii) Ownership. Rights can be owned by individuals, firms, or communally. 
          Communal rights can be a good solution for subsistence communities.
      iii) Resale. Rights can be tradable or not. Tradable rights provide better price 
           signals and stronger incentives for improvement, but can also marginalize 
           small producers. Even where not marketable to third parties, policies may 
           allow averaging of emissions across a plant or company, a process that can 
           also generate substantial efficiencies.
      iv) Duration. Rights can be in perpetuity (ownership rights) or for a limited 
           period of time (use rights). Development rights, such as patents and 
           prospecting rights, can last for a decade or more, but are not permanent. 
           Some permit regimes have rights expire to provide increased pressure on 
           holder for innovation, and to ensure there is an active market in the rights to 
           create more accurate prices for them. Longer durations are generally more 
           valuable to the owner, but provide less flexibility to the public to modify the 
           terms by which public resources are used.
      v) Temporal flexibility. Rights can sometimes be used over multiple years, 
         rather than being restricted to a single year. Banking involves receiving credit 
         for going below ones annual allotment in early years, then using or selling 
         credits above your allotment in later years. Borrowing (?) is the reverse, 
         where emissions or extraction is higher than allowed in early years, but lower 
         in future years.
   b) Examples:
      i) Market creation:
         (1) Tradable emission/effluent permits
         (2) Tradable catch quotas
         (3) Tradable development quotas or rights (location stays the same, developer 
             changes)
         (4) Transferable development rights (location shifted to less environmentally 
             sensitive area; developer can stay the same or change).
         (5) Tradable water shares
         (6) Tradable resource shares
         (7) Tradable land permits
         (8) Tradable offsets/credits
      ii) Clarification of basic property rights
         (1) Ownership rights: land titles, water rights, mining rights
         (2) Use rights: licensing, fisheries, use concessions
         (3) Development rights: patents, prospecting rights
      iii) Property rights protection
(1) Contract law; right to sue is contracts not followed.

2) Revenue recovery on the provision of public goods and services
   a) Variables
      i) Rate structures are commonly adjusted so that the poor receive inexpensive (or free) access to a subsistence quantity of the resource (water, energy). Increasing block rate structures accomplish this same goal by providing the first units of consumption to all customers inexpensively, then increasing the unit cost substantially for higher usage rates. Special higher rates are often applied to customers (such as industries) who require more expensive and specialized services.
      ii) Recovery rate. Depending on the political circumstances, revenue requirements can include recovery of public sector administrative overhead, and a fair cost of capital/rate of return on invested public funds.
      iii) Phase-in. Where users haven't historically paid anything for the public services provided, rates may be phased in over a period of time to reduce the transitional hardships.
   b) Examples:
      i) Charges for services provided directly to consumer
         (1) User fees for municipal water, wastewater treatment, energy.
         (2) Collection charges for solid waste pickup.
         (3) Tolls on public roads.
         (4) Access fees (e.g., for recreational access)
      ii) Charges for impacts new demand will put on existing infrastructure
         (1) Impact fees
      iii) Charges to recover the public sector overhead associated with providing goods and services to users
         (1) Administrative charges
         (2) Regulatory oversight charges
         (3) Enforcement action surcharges

3) Ensuring fair market value is received when selling publicly-owned natural resource assets
   a) Variables
      i) Auction method. There are a variety of different auction techniques, depending on what type of resource is being sold, and whether there is only one auction winner or multiple ones.
      ii) Eligible bidders. Generally, the more bidders, the more competitive the auctions. Opening bidding to international firms, and to groups (e.g., environmental NGOs) who might retire rather than exploit the rights, can increase the returns to the taxpayer. However, countries need to be sure they can take effective enforcement actions against multinationals if there is a problem.
      iii) Payment structure. Depending on the certainty of asset value and the goals of the government, sales can have different mixes between cash bonus payments,
rental payments (for the right to hold access to resources within a particular year), and contingent payments such as royalties.

b) Examples
i) Competitive auctions for resource rights or access.
ii) Full privatization of stand-alone enterprises (so long as the bidding process is open and competitive).
iii) Partial privatization of stand-alone enterprises through initial public offerings of stock, and the associated adoption of required oversight and accounting procedures.
iv) Institute payment of natural resource royalties.
v) Institute payment of excise taxes on natural resource removal.

4) Environmental Externalities/Financial Assurance
a) Variables
i) Time: some EIs spur reductions in the environmental risks associated with current activities; others attempt to recover costs of past damages; and still others help mitigate future environmental risks.
ii) Phase-in. As with most EIs, instruments can be phased in over time to reduce the transitional dislocations.
iii) Polluter pays principle. There are degrees to how closely the entity paying is the one who polluted. It can be the firm, the industry, the region, or all taxpayers. The closer the payments are to the ones causing the problem, the better the price signals will be.
iv) Degree of risk control. Protection against future risks is often done through insurance. Governments can make this tool more effective by allowing only financially strong insurers into the market, and by instituting reinsurance requirements where appropriate. Reinsurers absorb a portion of the potential risks associated with a policy, establishing increased diversification for the insurance market.
v) Border adjustments. Surcharges can be added to competing products coming into the country to offset any competitive disadvantage due to environmental regulation.

b) Examples
i) Addressing risks of current activities:
   (1) Pollution taxes/permits
ii) Recovering damages associated with past activities:
   (1) Civil and criminal penalties for natural resource damages.
iii) Addressing risks of future activities:
   (1) Required liability or environmental insurance
   (2) Performance bonds for proper site remediation/closure. Bonds can be issued for environmental performance, land reclamation bonds, waste delivery bonds, environmental accident bonds, forest management bonds.
   (3) Deposit/refund systems for proper product returns

5) Subsidizing transition to cleaner alternatives
a) Variables:
i) **Point of support.** Subsidies can support activities linked to desired practices (research into wind power), or they can be paid only when the desired practices are actually applied in the market place (tax credit for each delivered kWh of wind power). Rewarding only successful innovation is generally much more cost efficient and productive.

ii) **Magnitude of support.** Subsidy levels can range from 100% (grants) to much smaller levels associated with EIs such as revolving funds (small interest rate subsidies).

b) **Examples**

i) **Grant-based subsidies:** soft loans, direct funding, provision of hard currency at below market rates.

ii) **Financing-based subsidies:** Soft loans, revolving funds, sectoral funds, green funds, public interest rate subsidies or loan guarantees.

iii) **Tax-based subsidies:** tax credits, tax breaks, tax exemptions, tax differentiation, accelerated write-offs.
Annex B: Global Metrics of Environmental and Government Performance

Local policy makers face a sensitive political situation when trying to judge assess -- even qualitatively -- the capabilities and levels of corruption in the institutions of which they are a part, or with which they must work. Luckily, a number of efforts are underway to develop indices and cross-country rankings for these sensitive measures. While the indices do entail judgments and approximations, they also provide an important outside source to help both assess domestic conditions and to justify evaluations that civil servants make. This Annex presents a number of promising metrics, but is not intended to be an exhaustive listing.

B.1 Environmental Sustainability Index

The Environmental Sustainability Index (ESI) is an initiative of the Global Leaders of Tomorrow Task Force of the World Economic Forum. The index measures overall progress towards environmental sustainability for 142 countries. There are five core components evaluated: environmental systems, reducing stresses, reducing human vulnerability, social and institutional capacity, and global stewardship. There are 68 underlying variables which combine measures "of current conditions, pressures on those conditions, human impacts, and social responses."


B.2 Corruption Perceptions Index

The Corruption Perceptions Index (CPI) is compiled by Transparency International. It is a "poll of polls", drawing on 14 surveys from seven institutions regarding perceptions about corruption levels in the government. Polled individuals include business people, academics, and country analysts. Only countries with at least three surveys are included, which means some high-corruption nations are left off the listing.


B.3 World Bank Efforts

The World Bank has been working on aggregate governance indices since 1997. Using 194 data measures from 17 data sources compiled by 15 separate organizations, the Bank integrates them into six aggregate index areas. Rule of Law is used as a proxy for the baseline legal institutions within a country. Voice and Accountability can serve as a
proxy for the strength of the political institutions. The Bank also tracks the work of others and maintains a fairly extensive listing of these ongoing efforts.

### Annex C: Detailed Analysis of Case Study Applications of Economic Instruments

<table>
<thead>
<tr>
<th>Title</th>
<th>Individual Tradable Quota (ITQ) for Fisheries Resources in South Africa</th>
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<tr>
<th>Country</th>
<th>South Africa</th>
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<tr>
<th>Problem Definition</th>
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<tbody>
<tr>
<td><strong>Environmental Impacts</strong></td>
<td>Overfishing leading to increasing decline in fish catches and sustainability of the fisheries. Some shortages evident in the 1960s, as key stocks faced sharp declines. By mid-1970s, declines in hake, pilchards, and anchovy were evident. This was the result of overfishing by both domestic and international fleets.</td>
</tr>
<tr>
<td><strong>Social Impacts</strong></td>
<td>Fisheries in question comprise 1% of GDP, provide 35,000 direct jobs and 100,000 indirect ones. Fishing rights (as of 1996) were 90% allocated to large commercial companies; black fishing communities had less than 1% of the total allowable catch (TAC).</td>
</tr>
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</table>

| Solution Implemented | Since 1997, country has moved towards use of ITQs under the Marine Living Resources Bill of 1997. A portion of the ITQs are withheld to support black-owned businesses and coastal communities, to offset the heavy concentration of fishing rights in white-only businesses that has previously existed. Access control supplements the ITQs: total and seasonal closures protect specific fishery areas; strict monitoring of 200 mile exclusion zones prevents poaching of stocks by foreign vessels. |

| Summary Analysis | There is no detailed assessment of the success of the ITQ yet. Quota revenues, rather than being used to support resource management, are directed to the general treasury. There is a small levy that goes to the Seas Fisheries Fund to support research. The approach does seem to increased market share for domestic fleets relative to foreign, and to small communities and black-owned businesses, relative to white-only businesses. Although ITQs improve the efficiency of TAC allocation, intense political pressure to increase the TACs themselves remain. This pressure has also been exhibited through efforts to reduce the monitoring and enforcement capability of the country, critical program elements if the ITQs are to be effective. Evidence suggests that illegal fishing by those without a quota remains a problem. |

| Rationale for Success/Failure | +Strong success models from adoption of ITQs in other countries greatly increased likelihood of implementation. -Inadequate monitoring and enforcement risks all potential gains from the ITQ approach. -Diversion of quota revenues to the general Treasury weakens the ability of the Environment Ministry to build a strong program. +However, transfer of authority to the Environment Ministry from the Industry Ministry in the early 1980s helped shift the overall policy focus from resource extraction to resource management. |

| Unanswered Questions | -Is there a strong technical basis for setting quota limits today? -Has there been an increase in the mutual monitoring of fleets by permit holders? |

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<thead>
<tr>
<th>Institutional Baseline Conditions in Country</th>
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<tr>
<td><strong>Legal</strong></td>
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<tr>
<td><strong>Fiscal</strong></td>
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<tr>
<td>Government Institutions</td>
<td>2001 Corruption Perceptions Index (38 of 91)</td>
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<tr>
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<td>--------------------------------------------</td>
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<tr>
<td>Environmental</td>
<td>2002 ESI: 48.7 (rank 77 of 142)</td>
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<tr>
<td></td>
<td>Relevant component rankings: Environmental Governance (33 of 142); Reducing Ecosystem Stress (47 of 142); Environmental Systems (91 of 142)</td>
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</table>

### Detail on Policy Process

#### History of response
Early control efforts focused on reducing access to fisheries by implementation of a 200 nautical mile fishing zone to keep out foreign fleets and increasing the minimum required mesh size in nets to reduce depletion of immature fish. Catch limits, in the form of a Total Allowable Catch, was set for at least some fish species (e.g., hake) beginning in the late 1970s. This was supplemented by efforts to reduce the number of vessels and the closure of critical areas (mainly where pelagic fish are targeted). Exclusion of foreign commercial vessels was implemented in 1983, along with a conservative management strategy. Research has also been conducted to identify the benefits of long-lining rather than netting on the overall health of the hake fishery.

Quotas to allocate the TAC were set initially set by the Minister of Economic Affairs, Industries, and Agriculture, upon advice from officials in the capital. In 1983, general management of the Sea Fisheries Act was transferred to the Ministry of Environment Affairs. Criticisms of the Minister-allocated quota system led to a transfer of quota setting authority to a statutory board in 1986, a more formal Quota Board in 1988 (which became effective only in 1990). During the 1990s, political considerations led to efforts to increase the quotas flowing to black communities and companies. Foreign-owned vessels still have very limited access to key fisheries. Since 1997, reliance on the market to allocate TACs, through the ITQs, has grown.

#### Evaluation of past success/failure
CAC approaches did contribute to some recovery of catch rates, such as in the core hake fishery.

#### Rationale for using EI
Fishery depletion remained a concern, and created a strong need for information to support a more scientific basis for fisheries and catch management. ITQs would provide a more flexible and less biased mechanism to allocate TAC than would the Quota boards, and provide individual fishermen with a more direct stake in effective long term fisheries management.

#### Legal Basis for EI

#### Stakeholder Involvement
Extensive public consultations, including much education on the application of ITQs in other parts of the world. Local communities, scientists, and other resource users are organized and actively involved in the management of ocean resources.

#### Lead Agencies
Ministry of Environment Affairs

#### Key barriers addressed

### Detail on Policy Response

#### Allocation of Initial Rights
Information reviewed suggested that ITQs were initially allocated for free, and somewhat arbitrarily.

#### On-going monitoring process
Appears to be weak and underfunded. Influenced by political lobbying to increase overall TAC and to reduce the capability of the State to curb illegal fishing.

#### Current Successes

#### Remaining Gaps/Risks
Proposed reforms attempt to replace giving away fishing rights with auctions, and earmarking fees/royalties from these rights back to the fishery oversight function.

### Source(s)

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Page C-2 - Version Date: September 2002
<table>
<thead>
<tr>
<th>Title</th>
<th>Grassland Pricing Reform</th>
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<tbody>
<tr>
<td>Country</td>
<td>Philippines</td>
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<tr>
<td><strong>Problem Definition</strong></td>
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<tr>
<td>Environmental Impacts</td>
<td>Ranchers are provided with 25 year Pasture Lease Agreements (PLA), renewable for another 25 years, at very low grazing fees (approximately US $0.30/hectare/year). As a result, a relatively small group of people has gained control over much of the public grasslands for the 50-year leases. The ability to shift cattle to new pastures they control has also reduced the incentive for sound management of the pastureland, and led to resource degradation in many parts of the country.</td>
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<tr>
<td>Social Impacts</td>
<td>Policies seem likely to result in overconcentration in access to grazing rights. However, they probably do encourage human settlement in some more remote, less hospitable areas.</td>
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<tr>
<td><strong>Solution Implemented</strong></td>
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<td>Existing grazing fees were increased from PhP15 per hectare/year to PhP200/ha/yr. Original efforts to have higher fees on better land classes were shelved. While more than 10 times higher than the prior charge, the rates are still believed to be only slightly more than half the lowest economically-justifiable rent on the land. In addition, the charge had a five-year phase-in period. To support the transition, the policy included increased technical assistance as well as fee reductions for sound land management.</td>
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<tr>
<td><strong>Summary Analysis</strong></td>
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<tr>
<td>Efficacy of Existing Policy at Solving Problem</td>
<td>Although there is clear agreement that more accurate pricing, coupled with enforcement of operating and management plans, would greatly improve both access to and management of public grasslands, political reality has precluded this solution. As a result, ranchers continue to have low cost, long-term access to public grazing lands with little incentive for proper land management. DENR continues to have poor ability to enforce management standards, ERDB has increased responsibilities for technical outreach, but no effective plan on how to do so yet. To obtain reduced grazing fees associated with sound land management, ranchers must initiate review by DENR for and have pasture management plans approved. With cost savings so large, there is a potential of corruption that is of concern. A number of ranchers have refused to pay the higher fee. As a result, DENR ends up collecting nothing from them and has little capability to do full enforcement. Furthermore, during a trip to the region in early 2002, a top government official promised to reduce the fee substantially (to PhP40 from PhP200) &quot;to encourage breeding and create 60,000 jobs&quot; (Luzon Bulletin, 1/6/02). This statement undermined current efforts to collect the higher fees, and led DENR to suspend its collection pending formal clarification on how to proceed. Personnel pointed out that decades of grazing fees at 15 PhP did not spur investment in the cattle industry, so were not clear on how one could conclude that PhP 40 would do so.</td>
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<tr>
<td>Rationale for Success/Failure</td>
<td>-Fees remain too low, and politically difficult to adjust. Ranching interests remain extremely strong and oppose any shifts to more market-oriented rates. Groups who may be negatively affected by the current leasing arrangements do not seem mobilized. -Fees that are collected are remitted to the Treasury rather than retained to support the land management program. -Lease terms remain very long and holding costs very low, allowing high concentration of access to pasturelands to continue. -Political resistance prevented the use of market auctions to allocate grazing rights, an approach that could have removed the government from the role of having to set grazing rates. -While DENR has sometimes revoked leases, this has normally been done due to abandonment or use for non-grazing purposes. There is little evidence of revocation due to improper or destructive grazing practices.</td>
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<tr>
<td><strong>Unanswered Questions</strong></td>
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<tr>
<td><strong>Institutional Baseline Conditions in Country</strong></td>
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<td><strong>Legal</strong></td>
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<td><strong>Fiscal</strong></td>
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<td>The Philippines already has an infrastructure in place for collecting fees from ranchers.</td>
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<td><strong>Government Institutions</strong></td>
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<tr>
<td><strong>Environmental</strong></td>
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<tr>
<td>DENR has lacked resources to oversee management plans. Internationally-funded efforts going back to 1990 have attempted to build capacity within DENR related to natural resource accounting, technical standards, and grasslands pricing reforms.</td>
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<tr>
<td><strong>Detail on Policy Process</strong></td>
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<tr>
<td><strong>History of response</strong></td>
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<tr>
<td>PLAs have been used since the 1950s. Fees were first imposed in 1961 at an average rate of less than US $0.01/hectare per year. Fees were not increased until 20 years later, reaching only US $0.02/hectare per year; then again in 1991 to the current rate of US $0.30. Compliance with the fees has generally been quite high, not surprising given the very low rate.</td>
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<td>To exert some control over grazing processes, the Department of Environment and Natural Resources (DENR) requires annual operating plans, and a management plan every eighth year. However, there is virtually no follow-up monitoring to ensure plans are actually being implemented. This is the result of insufficient funding as well as difficult terrain to oversee.</td>
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<tr>
<td>There is common recognition that fees are too low. To address the problem, DENR's Ecosystems Research Development Board evaluated what the true economic rent should be, the cost of various measures to rehabilitate existing damages, and the economics of alternative land uses. They did not evaluate options for auctioning, rather than giving grazing rights to the ranchers. The economic rents were determined to be far higher than the current levels, though the ERDB proposed allowing 80% of the incremental payment be used to fix damage on the existing grasslands.</td>
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<tr>
<td><strong>Evaluation of past success/failure</strong></td>
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<tr>
<td>Past efforts to charge for access and to ensure appropriate land management on existing leases have been plagued by the exact same problems that have prevented the most recent effort from obtaining more reasonable lease rates.</td>
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<tr>
<td><strong>Rationale for using EI</strong></td>
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<tr>
<td>ELs, through user fees, have been in effect for nearly 50 years. While collection levels were high, fee rates were far too low to cover either program costs or provide proper incentives for sound land management. Fee reforms were chosen over lease auctions due to political resistance.</td>
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<tr>
<td><strong>Legal Basis for EI</strong></td>
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<tr>
<td>Original basis for grazing fees was through Administrative Order 08 in 1961. The initial fee increase was authorized in the Forest Land Grazing Lease Agreement of 1982. The most current fee adjustment was authorized by Department Administrative Order 2001-05, which took effect in August 2001.</td>
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<tr>
<td><strong>Stakeholder Involvement</strong></td>
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<tr>
<td>There have been a series of public hearings run by ERDB to discuss existing and proposed grazing fees. Ranchers were already well organized as a stakeholder group, and strongly opposed rate increases. They argued that the government should view their presence on the land as a benefit in that it curbed squatting by migrants. They also mobilized strong political actions against the ERDB and DENR to oppose the rate increases.</td>
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<tr>
<td><strong>Lead Agencies</strong></td>
<td></td>
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<tr>
<td>Ecosystems Research Development Board (ERDB) and the Department of Environment and Natural Resources</td>
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<tr>
<td><strong>Key barriers addressed</strong></td>
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<tr>
<td>Key barriers have not successfully been addressed: existing damage is not being addressed by the current policy, nor are grazing rights at levels that would encourage more appropriate resource use.</td>
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<tr>
<td><strong>Detail on Policy Response</strong></td>
<td></td>
</tr>
<tr>
<td>Allocation of Initial Rights</td>
<td>There has been no effort to auction grazing rights. Rights have continued with existing holders, with the price of those rights (through an annual rental fee) set by statute. The price of the rights does not adjust automatically for inflation, and is far below appropriate market levels. Government assessments suggest grazing rights should be divided into three classes, with annual rentals ranging from PhP358 to PhP542, between 24 and 36 times the current levels.</td>
</tr>
<tr>
<td>On-going monitoring process</td>
<td>DENR has not been able to generate an effective monitoring and enforcement process.</td>
</tr>
<tr>
<td>Current Successes</td>
<td>Grazing fees have risen somewhat, but still remain far below market. Public research efforts have yielded useful results on economic fee rates and costs to recover damaged lands.</td>
</tr>
<tr>
<td>Remaining Gaps/Risks</td>
<td>There has been strong political resistance to market-based grazing fees. Current rates are not set in a dynamic, market-oriented way, and remain very much subject to political pressures. The regulating agency has not been able to supplement its fiscal policies with credible monitoring oversight to prevent land degradation.</td>
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<tr>
<td>Source(s)</td>
<td>Case study compiled by Herminia Francisco. Additional sources include: Luzon Bulletin, January 6, 2002.</td>
</tr>
<tr>
<td>Title</td>
<td>Water Charge for River Basin Access</td>
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<tr>
<td>Country</td>
<td>Brazil</td>
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<tr>
<td><strong>Problem Definition</strong></td>
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<tr>
<td>Environmental Impacts</td>
<td>Increasing degradation in a number of Brazilian rivers led to a desire for action to protect them. The rivers cross both state and international borders, so solutions require a coordinated response across many government agencies. In addition, there are hundreds of affected users who must be brought into any environmental management system that is created.</td>
</tr>
<tr>
<td>Social Impacts</td>
<td>Large industries? small industries? subsistence communities who are threatened by the environmental impacts of current discharges?</td>
</tr>
<tr>
<td><strong>Solution Implemented</strong></td>
<td>Based on input from empowered River Basin sub-committees, it was decided to implement a system of water user fees, varying depending on the amount used and pollution content of the activity. Political pressure led the charge levels to be based on recovering administrative and monitoring costs only. Over the longer-term, officials hope charges can be increased enough to affect the consumption and pollution patterns of resource users.</td>
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<td>[The write-up indicates that the charges have already been implemented in some states, but we're delayed somewhat the Federal bill. Is the federal charge system now in place? Did the federal bill need to pass in order for the states to actually implement charges? If state charges are in effect, how are they working?]</td>
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<td>In the face of resistance by users, the state and federal authorities are considering the introduction of experimental river basin charges on a pilot basis, subject to agreement and consensus among users.</td>
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<tr>
<td><strong>Summary Analysis</strong></td>
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<tr>
<td>Efficacy of Existing Policy at Solving Problem</td>
<td>Establishing the legal authority to implement charges of any kind has been a very long process. At the end of it, it appears at though charges are too low, and are voluntary. This is unlikely to address the core problems driving river basin degradation. Furthermore, we do not have enough information on proposed feed structures to evaluate whether there are substantial cross-subsidies in the rate design. Industry groups, for example, have expressed concerned that households and farms will be exempt from the charges, putting all the burden on them.</td>
</tr>
<tr>
<td>Rationale for Success/Failure</td>
<td>-Greater involvement of affected groups early-on, as well as more technical analysis of the likely benefits of charges on water quantity and quality, would both of have helped achieve a positive result much sooner.</td>
</tr>
<tr>
<td>Unanswered Questions</td>
<td>-What (if any) fees are currently being charged? -How are these fees currently (or will in the future be) collected?</td>
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<tr>
<td><strong>Institutional Baseline Conditions in Country</strong></td>
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<td>Legal</td>
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<tr>
<td>Fiscal</td>
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<tr>
<td>Government Institutions</td>
<td>There is a general feeling [among the water users only, or the gov't people too?] that the country lacks the institutional capacity to deal with and effectively use the innovative river-basin-based management system. The result would be an additional layer of ineffective government and bureaucratic costs.</td>
</tr>
<tr>
<td>Environmental</td>
<td>[Write-ups indicate that state-level environmental institutions have been an important factor in the pace of progress; is this true?] Environmental agencies have focused on</td>
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how to reconcile the current standards for water management with fines for non-compliance and legal penalties. [Does this mean that they also oppose the new system, or just haven't focused on it yet?]

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<thead>
<tr>
<th>Detail on Policy Process</th>
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<tr>
<td><strong>History of response</strong></td>
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<tr>
<td>Efforts to improve river management date back at least to 1978, when the Committee on Joint Studies on River Basins was set up. The Committee comprised all of the agencies related to water services in Brazil. Specific executive commissions were set up to address concerns within particular river basins.</td>
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<tr>
<td>In 1989, an attempt was made to establish a National System of Water Resource Management. In 1993, a much reformulated proposal was resubmitted to Congress. This legislation, based on the French model of water management, proposed a series of water charges based on quality and quantity. This included fees both on use and discharge. The system is to be secured by 6% of operational fees that are contributed by hydroelectric companies.</td>
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<thead>
<tr>
<th>Evaluation of past success/failure</th>
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<tr>
<td>The River Basin committee formulated management plans, but had neither the general mandate nor the financial resources to be able to implement its plans. Analysts also expressed concern that the committee did not adequately integrate public good aspects of water basin investment projects [not clear on implications] or the impact of transboundary pollutants entering from tributary rivers. (Seroa and Reis, 1994)</td>
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<thead>
<tr>
<th>Rationale for using EI</th>
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<tr>
<td>Despite the existence of River Basin Committee, it became clear that the Committee did not have sufficient authority to actually address the problem of river degradation. In the 1988 Constitution, the mandate of the Committee was broadened, and each basin committee formulated a recovery plan. Most of the plans involved introducing water charges based on the use and pollution content of the activities.</td>
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<thead>
<tr>
<th>Legal Basis for EI</th>
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<tr>
<td>Legal basis for implementing water charges has been resisted by the same user groups who have opposed the water charges in general. Legal basis for the charges has evolved somewhat piece-meal, state-by-state. More developed states with more active environmental agencies generally already had authorizing legislation in place. However, the full legal basis for the charges nationally did not arrive until January 1997 with the passage of the Bill on New Water Management System. The legislative process had taken nearly seven years.</td>
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<thead>
<tr>
<th>Stakeholder Involvement</th>
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<tr>
<td>There is general agreement that the water charges in Brazil did not progress as they should have because of the absence of participatory consultations with the various sectors. Despite not being included in official meetings, the industrial water users were very well organized and vocal.</td>
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<tr>
<th>Lead Agencies</th>
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<tbody>
<tr>
<td>The proposed solution would involve creating a new independent and powerful agency to set and oversee the collection of water charges at the river basin level. Politicians have expressed concerns about this new entity, and possible conflicts with existing state and municipal jurisdictions. The implementation scheme is being designed by the National Water Agency and the Secretariat of Water Resources, both under the Ministry of Environment.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key barriers addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation of Initial Rights</td>
</tr>
<tr>
<td>There appears to have been no new restrictions on use or discharge of water associated with the river basin charge plan. Any user willing to pay could continue as before.</td>
</tr>
</tbody>
</table>

| On-going monitoring process |
| None indicated. Oversight seems to go to the river basin commissions, but it is not clear that these have been set up or funded yet. |

<table>
<thead>
<tr>
<th>Current Successes</th>
</tr>
</thead>
</table>

| Remaining Gaps/Risks |
| Implementation, rate structure, and monitoring are all major gaps in the current effort that will ultimately determine whether this program will solve the problem it was intended to solve or not. |
Source(s)

<table>
<thead>
<tr>
<th>Title</th>
<th>Strengthening User Rights for Biodiversity Conservation and Sustainable Use: Mankote Mangrove</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>St. Lucia</td>
</tr>
<tr>
<td>Problem Definition</td>
<td></td>
</tr>
<tr>
<td>Environmental Impacts</td>
<td>The Mankote mangrove comprises the largest contiguous tract of mangrove in St. Lucia, and 20% of the total mangrove area in the country. Widespread and uncontrolled charcoal harvesting from the trees put the mangroves into severe environmental decline. The loss posed a significant threat to the many ecosystem services mangroves provide, including maintaining coastal stability and water quality, serving as a fish breeding and nursery ground, trapping silt, and providing important bird habitat.</td>
</tr>
<tr>
<td>Social Impacts</td>
<td>Charcoal was harvested by local subsistence populations. These people were extremely poor and had no legal right to any use of the publicly-owned mangrove resources. They did not have obvious alternative employment should their access to the mangroves be cut off due to resource depletion or degradation.</td>
</tr>
<tr>
<td>Solution Implemented</td>
<td>Subsistence users were organized into an informal cooperative and given communal legal and exclusive rights to harvest the charcoal. They became involved with a joint monitoring program with a regional NGO, the Caribbean Natural Resources Institute, to obtain accurate and timely information on the overall health of the mangrove resource. Flanking measures to increase the supply of wood outside of the mangrove reserves, and to create alternative job options for charcoal harvesters were also implemented. Tourism has been one important alternative.</td>
</tr>
<tr>
<td>Summary Analysis</td>
<td></td>
</tr>
<tr>
<td>Efficacy of Existing Policy at Solving Problem</td>
<td>The program has halted and reversed the decline in the Mankote mangroves. The density and size of trees have both increased. Charcoal harvests have been more or less maintained, and the range of employment options for this population subgroup have increased somewhat.</td>
</tr>
</tbody>
</table>
| Rationale for Success/Failure | -Early tacit approval by government for CANARI to work with the charcoal extractors in an innovative and then-controversial endeavor.  
  -Formal recognition of property rights for subsistence charcoal extractors was a key element in ensuring commitment to, and ability to enforce, sustainable harvest practices. Long delays in this recognition made the effort somewhat less effective than it could have been.  
  -Provision of group tenure, encouraging integrated management of the entire resource base and monitoring of cutting patterns by other members of the cooperative.  
  -Establishment of cooperatives for the extractors, to provide a management unit for organizing and overseeing cutting rights; and formalization of rules of extraction that help protect resource base.  
  -Strong and continuous assessment program to evaluate overall health of the resource base.  
  -Protections against other threats to mangrove health, such as development, and least for now. |
| Unanswered Questions | -Quality of continued management.  
  -Degree to which development and remains a long-term threat, as well as increased pressure from crabbing and fishing within Mankote.  
  -Are the exclusive cutting rights, granted by a letter from the Deputy Chief Fisheries Officer, supportable should there be legal action at some future date?  
  -Ability of existing members of cooperatives to sell rights to others, and implications of this on long-term viability of the approach. |
| Institutional Baseline Conditions in Country | |
| Legal | Widespread self-monitoring of cutting by different members of the cooperative (each |
protecting their individual interests) has made enforcement of the agreement both easier and less expensive.

<table>
<thead>
<tr>
<th>Fiscal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government Institutions</td>
</tr>
<tr>
<td>Environmental</td>
</tr>
<tr>
<td>St. Lucia's natural resource management agencies are perpetually underfunded. Involvement of CANARI made the change in resource management possible.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Detail on Policy Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of response</td>
</tr>
<tr>
<td>St. Lucia's Forest, Soil and Water Conservation Ordinance of 1946 and its Wildlife Production Act of 1980 both gave the government a legal framework for regulating harvesting activities on public lands. However, little was actually done to regulate or control the harvesting of charcoal using mangrove wood.</td>
</tr>
<tr>
<td>In 1986, the area was declared a marine reserve, helping to reduce the risk of the grove being developed.</td>
</tr>
<tr>
<td>Subsistence charcoal producers did implement a number of positive practices on their own. They cut on a rotational basis, allowing time for the trees to regenerate before returning. Species that did not make good charcoal were also left to provide cover and impede evaporation of the swamp.</td>
</tr>
<tr>
<td>Following the formation of ACAPG, the group committed to a set of rules for sustainable use of the mangrove. These included a ban on cutting any trees that lined the waterways, the preservation of large trees, and cutting on a slant to preserve the tree's stump. Cutting rights were also organized, with each charcoal producer getting access to one area for a season, and rotating to a different area the next season. Cutting areas are well known to avoid conflicts between cutters and encourage monitoring of compliance behavior by other members of the cooperative. However, these rules were not formalized until 1996, when ACAPG was granted exclusive rights to the timber in the Mankote reserve.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation of past success/failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to the establishment of ACAPG and institution of joint monitoring of the resource base, there was no effective control at all on charcoal production, leading to widespread degradation of the resource base.</td>
</tr>
</tbody>
</table>

| Rationale for using EI |
| This is a property rights approach that clarifies use rights in the form of charcoal harvesting rights. The approach made sense because the subsistence harvesters were the primary cause of the problem. Yet, with no formal rights to the resource, they had little incentive to invest in longer-term resource management. |

| Legal Basis for EI |
| Development activity in Mankote was prevented through the 1986 designation of the land as a marine reserve. In 1996, the Department of Fisheries, which oversees the reserve, formalized the long-standing de facto agreement under which ACAPG member got exclusive rights to the use of timber resources from within the grove. |

| Stakeholder Involvement |
| Extensive involvement with ACAPG, the charcoal producers cooperative. |

| Lead Agencies |
| Caribbean Natural Resources Institute (CANARI, a regional NGO); Aupicon Charcoal and Agricultural Producers Group (ACAPG), the cooperative of charcoal producers established during this initiative. |

<table>
<thead>
<tr>
<th>Key barriers addressed</th>
</tr>
</thead>
</table>

| Detail on Policy Response |
| Allocation of Initial Rights |
| Initial rights were given for free to members of ACAPG, the charcoal harvesters cooperative. They are subsistence harvesters, and securing their tenure increased their interest in sustainable management of the resource. It is not clear from available sources how these rights are transferred among parties. |

| On-going monitoring process |
| Regular monitoring of the mangrove resource remains an important activity. We have no information on how frequently it is being done, or who pays for it. |

| Current Successes |
| By most metrics, including forest health, diversification of job base, and earnings of subsistence population, the policy response has been successful. |
| Remaining Gaps/Risks | Mankote and surrounding land remains a target for large-scale development, especially for resort and golf courses. Continued vigilance is needed to protect the mangrove from these threats.

Efforts to shift from mangrove to hardwood from plantations near Mankote have had limited success. This is in part due to the lack of experience the producers have with agriculture and marketing. |
| Source(s) | Case material compiled by Markus Lehmann based on the following sources:


<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th>Fishery ITQs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Country</strong></td>
<td>Chile</td>
</tr>
</tbody>
</table>

**Problem Definition**
- **Environmental Impacts**: Fish stocks were increasingly depleted under the increasing privatization of the fishing industry that has occurred since 1973. Increasing fishing pressures especially on the pelagic fisheries drove catches higher, until they peaked in 1986.

- **Social Impacts**: Two concerns dominated the initial implementation of ITQs. The first involved artisanal fishermen. The concern was that under an ITQ system, they would be excluded from the market and lose their livelihoods. As a result, they continue to fish without an ITQ system. The second involved competition between northern and southern fishery corporations, with each trying to influence the allocation and bidding structures to their advantages, rather than to the advantage of long-term fisheries management.

**Solution Implemented**
- The regulatory solution has varied depending on the type of fishery. For fisheries with low exploitation and primarily caught by artisanal fishermen (who use small boats and tend to stay close to shore), an open access system remains in effect.

- ITQs have been implemented for standard fisheries, with separate subclasses for fisheries in recovery and emerging fisheries (defined as less than 10% of Total Allowable Catch, or TAC, is being utilized). The application is limited to industrial/commercial fishers, and only for mono/single species case. Efforts to incorporate artisanal fishermen into the ITQ approach will likely add a fourth category of ITQs. Artisanal fishermen use small boats, take short trips, and stay close to shore.

- For standard fisheries, 100% of the TAC is auctioned in the first year the fishery goes into the ITQ system. 10% of the purchased license divests each year, hindering long-term control of the catch rights and facilitating more frequent market repricing of the rights. Single owners can not purchase more than 50% of the TAC either, to control market concentration. Owners can reassign portions of their quota they are not using for a particular year, also through the auction system. While international fishery interests may bid on ITQs, fish can only be landed by Chilean vessels. This effectively restricts market access to domestic fleets.

- Total TAC for fisheries under full exploitation is divided into long-term and annual licenses. The long-term licenses comprise 50% of TAC, last ten years, and were initially auctioned to the highest eligible bidder. Licenses depreciate 10% per year, with the capacity being reauctioned on an annual basis. This helps ensure long-term licenses expire gradually each year, and allows regular repricing. Single-year licenses comprise the remaining 50%, and are renewable, but only to established fisheries and to new comers. Public auctions of ITQs are limited to 5% of the TAC for that year. No single party can own more than 50% of the TAC.

- ITQ holders must accept the presence of scientific observers, and processing plants must provide information about the catch. In addition, all industrial fishing vessels regulated under any of the regimes must have a satellite global positioning system on board to allow the government to track vessel location.

- The ITQ usage remains experimental. More than 90% of the catch remains under the “Full Exploitation System,” governed by standard command and control techniques. These include restricting access to fisheries to new agents, prohibitions on adding new fishing capacity, temporary or permanent closure of fishing areas, pre-set minimum sizes and...
weights for fish species, and gear restrictions. Catch quotas are also set for each vessel based on a percentage of historical catch levels. These are not transferable or divisible, and viewed as a transitory control mechanism until ITQs can be applied more broadly. Despite their usage for most of the annual catch, there is some evidence (Pena-Torres, 273) that they are ineffective.

**Summary Analysis**

<table>
<thead>
<tr>
<th>Efficacy of Existing Policy at Solving Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success of the program is not clear. Current applications combined (black hake, orange roughy, squat lobster, and yellow prawn) make up only 1% of the total Chilean landings. While useful as a test of the ITQs, the affected sectors are far too small to affect overall fishery health at this point.</td>
</tr>
<tr>
<td>Final structuring of the ITQ policy seems to have protected Northern fishing interests, but reduced the potential benefits of the market-based quotas. For example, ITQs have thus far been applied to shrimp and cod fisheries, but not to the more heavily exploited pelagic fisheries more often under the full exploitation status.</td>
</tr>
<tr>
<td>There have been some indications, especially in the hake fishery, of collusion among ITQ holders, as well as of weak monitoring and enforcement of the species. In the black hake fishery, quota prices are low and there is suspicion that weak enforcement (allowing unregulated fishing) is the reason.</td>
</tr>
<tr>
<td>Enforcement remains a concern, though the number of violations has supposedly declined since ships were required to put GPS systems on vessels in 1999. However, use of an ITQ approach requires accurate and regularly-updated information on fishery health in order to accurately set TAC. Information in Chile is not considered reliable. On-board inspections are extremely limited.</td>
</tr>
<tr>
<td>Funds collected are remitted to the Treasury. While there is some indication this has increased funding support for fisheries oversight somewhat, this is not necessarily a permanent situation.</td>
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<table>
<thead>
<tr>
<th>Rationale for Success/Failure</th>
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<tbody>
<tr>
<td>Where ITQ are applied, fisheries do seem to have an improved incentive to manage fisheries for the long-term. Better management, and ability to time catch to highest market values, has increased returns to the fishermen.</td>
</tr>
<tr>
<td>Confidence in the efficacy is undermined somewhat by concerns that the TAC limits are not scientifically based and need improvement.</td>
</tr>
<tr>
<td>However, the small percentage of total catch currently covered suggests the ITQs are not yet addressing the broader goal of protecting Chilean fisheries. Exemptions for artisanal fishermen also need to be addressed. Open access to this sector may be one reason for an explosion in the number of vessels, with the sector growing 27% between 1994 and 1998. (Borregaard et al, 13).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unanswered Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact of high market concentration on the ability of the ITQs to work.</td>
</tr>
<tr>
<td>Have the ITQs led to removal of capacity in the fishing fleet?</td>
</tr>
<tr>
<td>Cost of oversight is unknown.</td>
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</table>

**Institutional Baseline Conditions in Country**

<table>
<thead>
<tr>
<th>Legal</th>
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<tbody>
<tr>
<td>Constitution includes an article on the right of citizens to live in a clean environment, and this has been used to support many environmental law suits. The Environmental Framework Law also establishes a framework for responsibility for environmental damage (with burden of proof on the damaged).</td>
</tr>
<tr>
<td>Property rights are enforced by the Constitution as well.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Fiscal and Economic</th>
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</thead>
<tbody>
<tr>
<td>Chile has functioning and generally observed tax, financial reporting/auditing, and insurance markets. There is even an insurance system that provides coverage for many environmental risks.</td>
</tr>
<tr>
<td>Prices are relatively stable, and the level of taxation relatively low (10-40% for individuals, 30-40% for companies). Efforts are made to keep the tax system simple.</td>
</tr>
<tr>
<td><strong>Government Institutions</strong></td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
</tr>
</tbody>
</table>

### Detail on Policy Process

#### History of response

Limited access to fisheries was first established in the 1960s in an effort to control the total allowable catch. In the 1970s, these policies came under criticism for preventing competition between potential investor groups during an era of high growth and widespread privatization. Law 2442 resulted, allowing free access to fisheries and accepting all fishing permit applications. Prior to the late 1980s, fishery laws were loosely defined and rarely enforced.

In the late 1980s, a series of legal reforms were initiated to enforce more stringent quota policies for common-pool fish stocks. Authority for quotas fell under the regulatory body of SUBPESCA, and monitoring was assigned to SERNAP. However, these reforms failed due to insufficient information on the fisheries, and to conflict between affected groups and lobbying pressure from organized interest groups. Both regulatory instruments and fish stock monitoring were applied inconsistently. Furthermore, not enough was known about the behavior of the fish stocks of concern to establish an appropriate TAC.

The Merino Law of 1989 defined fisheries in full exploitation (e.g., the Northern and Southern Pelagic fisheries) from remaining ones with continuing free access. The Law sought to use transferable quotas as a replacement of to freezing a fleet's haul capacity as the method of choice to control catch. Challenged by Northern fishing firms concerned that the initial allocation of quotas would disadvantage them, portions of the Law were declared unconstitutional.

The lack of standardized application of regulations frustrated private firms, and led to the establishment of seasonal closures (which were easy to apply to everybody) became the primary mechanism of fish stock regulation. Northern fishing companies lobbied successfully against subsequent efforts to enforce TACs, and each time succeeded in raising annual quotas, despite the lack of technical basis for what these quotas should be.

The 1991 General Law of Fisheries and Aquaculture (FAGA) finally brought a stronger framework for curbing fish depletion. FAGA contained a mechanism to protect endangered fisheries by closing them entirely, for promoting underutilized fisheries, and for using ITQs as an allocation mechanism for fishing rights.

| **Evaluation of past success/failure** | Regulatory efforts were applied inconsistently. Catch limits did not have a technical basis, and were successively increased due to industry lobbying alone. Enforcement was extremely weak, with not a single violator fined between 1982 and 1986. |
| **Rationale for using EI** | The failure of regulatory approaches to protect the fisheries spurred interest in economic instruments. There was no discussion of which instrument to choose: ITQs were chosen from the outset. The goal was to control access and overfishing by establishing transferable private fishing rights. |
| **Legal Basis for EI** | The current ITQ policy is the result of the 1991 fisheries law. That law was a compromise between an earlier law under the military government based only on ITQs, and a more mixed approach (mix of instruments, differentiation of various social and cultural aspects of sub-populations, incorporate reality of weak enforcement capability) advocated by the democratic government. |
Zonal Fisheries Councils have some regulatory power under the Fisheries Law of 1991. However, the councils are comprised of representatives from different interest groups involved in the fishing industry (as opposed to environmental interests). Thus, the Council’s objectives may not match the societal optimum.

**Stakeholder Involvement**

There has not been wide support for, or consensus regarding, the introduction of ITQs. NGOs and the academic sector were mostly absent from the political debate around the fishery law in 1991. Lobbying efforts delayed the passage of the Merino law based on challenging the government’s authority to limit access and sell property rights to fish stock. Explaining the benefits of the ITQ approach to various stakeholders has been a difficult and continuous process. Artisanal fishermen (small boats) opposed ITQs in general, fearing they would be outbid for rights by commercial enterprises and locked out of their profession.

**Lead Agencies**

Subsecretary of Fishery (SUBPESCA) was a main party in developing the ITQs, defines broader fishery policies, and issues the annual catch quotas or calls for auction for ITQs. SERNAP (National Fishery Service) is the controlling authority, responsible for collecting data on the catches, landings, and boat registries. SERNAP is also in charge of enforcing national fishing regulations and inspecting fish quality and processing installations. The Chilean Navy monitors GPS data on vessel location. The National Commission of Environment has played virtually no role in the development or implementation of the fishery regulations, and is not represented on the fishery boards where decisions about catch quotas, resource policy, and regulations are made.

**Key barriers addressed**

**Detail on Policy Response**

**Allocation of Initial Rights**

The initial distribution of ITQs in the Pelagic fisheries was to be based on individual firms’ percentage share of global catches in the previous three years. This created conflicts between the northern and southern fishing fleets, as it made it more difficult for the northern fishing industry to migrate southward. Finally, an allocation based on auctions was used.

**On-going monitoring process**

Monitoring and enforcement of SUBPECA and SERNAP have some additional funding and improved processes in recent years. However, sources suggest that the monitoring remains limited, making it difficult to confirm actual compliance with the quotas. Enforcement remains weak as well. Under the ITQ program, there have been only 100 infractions reported, and not a single resultant fine or conviction. Market monitoring is also weak: there is no central, transparent and efficient working public registry of transactions and their prices. This normally increases the risk of fraud.

**Current Successes**

Some of the affected fisheries have undergone stock recoveries since the ITQs were implemented. Operators also say that they have been able to significantly improve the quality of their final products, and by better planning and operations, to re-build markets and diminish social conflict with their workers.

**Remaining Gaps/Risks**

Fisheries, especially in the North, remain highly concentrated: the largest group controls 55-65% of the total northern harvest, with the second group controlling 20-25%. This creates severe risks for lobbying and political interference that promotes the fishing interests over the long-term protection of the fisheries. In all markets, there are a relatively limited number of market participants. In the case of black hake, there have been no new entrants in over 8 years.

**Source(s)**

<table>
<thead>
<tr>
<th>Title</th>
<th>Trade Liberalization and Environmental Quality in Rubber and Cocoa Plantations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Nigeria</td>
</tr>
<tr>
<td><strong>Problem Definition</strong></td>
<td></td>
</tr>
<tr>
<td>Environmental Impacts</td>
<td>Production of rubber and cocoa tends to occur in large plantations. Land is converted from diverse habitat to monoculture cropping.</td>
</tr>
<tr>
<td>Social Impacts</td>
<td>Free trade was anticipated to increase the employment opportunities for domestic farmers, due to increased export-driven demand for their products. This was to provide a beneficial boost to the country as a whole by helping to diversify the employment base.</td>
</tr>
<tr>
<td><strong>Solution Implemented</strong></td>
<td></td>
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<tr>
<td></td>
<td>Trade liberalization was implemented broadly to help Nigeria increase the quality and responsiveness of its industrial sectors and to diversify the economic base. Trade policies were supported by successive devaluations of the Nigerian currency (making their exports more competitive in the world market) and some technical training.</td>
</tr>
<tr>
<td><strong>Summary Analysis</strong></td>
<td></td>
</tr>
<tr>
<td>Efficacy of Existing Policy at Solving Problem</td>
<td>Trade liberalization does seem to have boosted exports in both the rubber and cocoa sectors, at least in the short term. The cocoa sector had many abandoned farms, so increased supply through farm rehabilitation rather than through new land conversions. This minimized the environmental impact of the change.</td>
</tr>
<tr>
<td></td>
<td>In the case of rubber, two environmental problems arose. First, substantial new area was planted, with a net reduction in biodiversity. Second, farmers attempted to meet export demand by overtapping (slaughter tapping) the rubber trees. Many of these trees died, and caused soil erosion problems as well.</td>
</tr>
<tr>
<td></td>
<td>During the structural adjustment period, usage of chemical fertilizers and fungicides rose sharply as well, contributing to environmental degradation. Usage dropped after the end of the structural adjustment period. This was due to falling prices for exports (as they had to be sold at true world prices), and to rising prices for the chemicals (as the Nigerian currency continued to devalue).</td>
</tr>
<tr>
<td>Rationale for Success/Failure</td>
<td>-Liberalization did seem to increase demand for Nigerian crops, though the longer-term benefit on farm incomes was not discussed.</td>
</tr>
<tr>
<td></td>
<td>-While we don't have details on the elements of the structural adjustment policy, there are some indications that unrealistic crop prices during this period may have encouraged overcapacity during the transitional phases, as well as overreliance on chemical inputs.</td>
</tr>
<tr>
<td></td>
<td>-While the case study sources do not attribute any environmental harm to rehabilitation of existing cocoa farms, one could argue that a transition back to wild ecosystems was reversed, and there was in fact losses here.</td>
</tr>
<tr>
<td></td>
<td>-Sustainable management of the rubber sector did not arise.</td>
</tr>
<tr>
<td>Unanswered Questions</td>
<td>-Were the anticipated benefits in rising farm incomes realized?</td>
</tr>
<tr>
<td></td>
<td>-Normally, farmers would not introduce slaughter harvesting of their productive tree crops. Were there other government policies, either by subsidizing the planting of new rubber trees, or through unclear tenurial regimes, that contributed to this outcome?</td>
</tr>
<tr>
<td></td>
<td>-Would the environmental outcomes been more favorable had a different structural adjustment process been implemented?</td>
</tr>
<tr>
<td><strong>Institutional Baseline Conditions in Country</strong></td>
<td></td>
</tr>
<tr>
<td>Legal</td>
<td>Initial focus on the environment by the federal government came in the third National Development Plan of 1975-1980. The national framework law on environment in Nigeria came through the Federal Protection Decree No. 58 in 1988. This was amended by decree 59 in 1992 and further</td>
</tr>
</tbody>
</table>
emphasized in the 1999 constitution. The law provides for the protection of Nigeria's environment and conservation of natural resources within the country, as well as making institutional and financial arrangements to support this goal. The law also provides both civil and criminal penalties for violators, and makes the offender liable for the cost of removal, reparation, restoration, restitution, and compensation.

**Fiscal**

Although there is wide latitude to implement a range of EIs (including pollution charges, marketable permits, subsidies, deposit systems, and enforcement incentives), the institutional base has generally not been strong enough to implement such policies. The exceptions are in some oil producing areas of Southern Nigeria.

**Government Institutions**

The Federal Environmental Protection Agency (FEPA) was established in 1988. A Federal Ministry of the Environment was established by the civilian government in 1999 to police, coordinate, and collect data on environmental matters. The FEPA comprises the main part of this Ministry. There are 36 state-level environmental agencies. In addition, there are local authorities that address mainly urban waste collection and disposal. Most power resides at the federal level. Although FEPA must cooperate with lower levels of government, these lower levels do not have a clear mandate.

**Environmental**

As noted above, FEPA controls much of the environmental authority at the federal level, and the federal institutions drive environmental policy for the states and cities. FEPA was established in response to widespread dumping of radioactive wastes at Koko Port in Southern Nigeria in 1988. However, the agency policies do not cover many important environmental areas, such as agriculture and the use of agrochemical.

### Detail on Policy Process

**History of response**

Trade liberalization was done quickly, with a structural adjustment period to cushion the shock of the changes.

**Evaluation of past success/failure**

Although the existing regulation seeks to discourage firms and individuals from causing pollution otherwise damaging the environment, it has had limited success. Environmental laws are not widely circulated; few of the populace of the will or the skills to bring suit for environmental damages; fines levied for environmental damages tend to be low; and government institutions lack skilled staff.

**Rationale for using EI**

No information

**Legal Basis for EI**

Existing provisions of the environmental decree provide adequate legal basis for implementing a range of economic instruments.

**Stakeholder Involvement**

There was insufficient involvement and education of key stakeholders on the environmental impacts/issues associated with trade liberalization. The Licensed Buying Agents and the farmers both thought continuing with their existing farming practices would not be a problem.

**Lead Agencies**

While a range of ministries (e.g., environment, agriculture, commerce) could play a role in training or enforcement, little has been done.

**Key barriers addressed**

Key barriers relating to education, technology transfer, and adoption of the polluter pays principle by key agencies remain mostly unaddressed.

### Detail on Policy Response

**Allocation of Initial Rights**

Markets were left to determine how much new supply to bring into the market and where this supply should be located.

**On-going monitoring process**

Low-level monitoring is taking place in the rural sector through tracking the usage of farm chemicals in crop production. Much more is needed.

**Current Successes**

Economic objectives of increased farm incomes and improved social welfare for farms were met in the export crop sector. However, as observed in the case of rubber, this progress was achieved at a high environmental cost.

**Remaining Gaps/Risks**

Export-led growth in the natural resource sectors is likely to lead to increase land conversion, with concomitant environmental impacts. Countering this is the possibility that stabilizing farm incomes reduces urbanization pressures and enables workers to stop haphazard stripping of resources in an effort to survive.

**Source(s)**

<table>
<thead>
<tr>
<th><strong>Title</strong></th>
<th><strong>Watershed Protection Fee for the Mt. Makiling Watershed</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Country</strong></td>
<td>Philippines</td>
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### Problem Definition

#### Environmental Impacts

The Mt. Makiling Forest Reserve (MMFR) is a 4244 hectare forest reserve, owned by the government. It was placed under management control of the University of the Philippines Los Banos, to serve as a forest research laboratory to University students. Increasing in-migration for extractive use and habitation was posing and increasing threat to the reserve ecosystems and threatening the long-term health of the watershed. More than 300 households were occupied within the reserve, with more than 1,000 farmer claimants (including resident and non-resident).

#### Social Impacts

Subsistence populations were treating the reserve as open access and seeking livelihood from the reserve's natural resources. Most were poor, and unlikely to move willingly.

### Solution Implemented

The University has proceeded on two fronts. The first is to establish the claimants as a more stable group trained in sustainable practices. In addition to ensuring a longer-term interest in the reserve, the University hoped to use this group to help enforce sustainable behavior and control additional settlement throughout the reserve. Efforts at formal accreditation have stalled due to opposition from one of the two main farming groups. This accreditation is viewed as granting secure property rights to existing farmers within the reserve, and hence has been a major stumbling block for the farmers.

The second part of their strategy involves establishing fees to help protect the reserve. Unlike other reserves, MMFR receives no state funding, though it has received some funding from UNEP to structure the watershed pricing instrument. A recreational fee is already in place. New efforts to add a watershed protection fee are now underway; this fee would be levied on offsite users of MMFR resources, including residential, commercial, and institutional users. Fees will be added to water bills, or collected by the local government units (LGUs) for facilities not on the water grid. This fee has not been implemented due to a lack of legal basis at the current time. A third fee, essentially a rental payment by claimant farmers for using MMFR land, is also planned. The fee would provide credits for sustainable practices and increased penalties for damages. However, this fee has been deferred until a farmer accreditation program is in place.

### Summary Analysis

#### Efficacy of Existing Policy at Solving Problem

Fee structure and enforcement will be important factors in whether the charge provides adequate funding for watershed management and rehabilitation, and provides proper incentives to users for sustainable behavior.

While legal barriers have impeded adoption of any fee in the MMFR, other watersheds do have this authority if they are protected areas under the National Integrated Protected Areas act. Some of these are evaluating the use of watershed protection fees as well, and may face fewer barriers.

The desire to charge farmers for using the land is logical. However, the current delay of all watershed protection activities for this group until they are given formal property rights is likely to greatly impede appropriate behavior by this group. They may delay resolution of the accreditation issue in order to avoid the costs they will incur subsequently.

#### Rationale for Success/Failure

-Lack of legal authority on collecting funds, coupled with an absence of a clear mandate from university management and the fact that other university staff need to figure out the implementation plan in their spare time have all delayed the implementation of an important EI to protect the watershed. This greatly reduces the University's bargaining power to achieve a
sustainable solution in a reasonable time frame.
-The provision of many services and benefits to the claimants is likely to increase migration into the reserve, the opposite of what the University hopes will occur. Furthermore, the University does not seem to have used its power of eviction to ensure that existing claimants utilize sustainable practices even before a formal accreditation program has been implemented.
-Proposed charges for off-site users appear to be a flat rate, and quite low. This may not accurately reflect the actual costs these users put on the watershed.

**Unanswered Questions**
- Fee levels and cost sharing between the University, the National Water Resources Board and the local government have yet to be worked out.
- Fee structure, levels, and differentiation by user class are not clear, but can have important incentive effects on various groups.
- Why has the university management not taken a more active role? Are there political considerations not being addressed that may undermine the charge scheme at a later point?
- Even with sustainable management of the resources, to what extent will use of the land for agriculture compromise site biodiversity?

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### Institutional Baseline Conditions in Country

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<th>Government Institutions</th>
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<th>Environmental</th>
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### Detail on Policy Process

**History of response**
Influx of residents into the MMFR has been a recurring problem for decades. In the 1970s, the University's approach was simply to evict them. Current efforts focus on co-partnership with the residents to protect the forest. The university has a special unit addressing community issues, including technical assistance in agroforestry systems, limited distribution of fruit seedlings, some vocational scholarships for children of the farmers, and provision of some health care services. There has also been an effort to develop an accreditation program for farmers regarding the sustainability of their practices.

University policy towards the settlers has been ad hoc; no formal positions by top management have been established. This vacuum has led farmer groups to be more active in making demands on the university, an initiative supported by an external NGO.

**Evaluation of past success/failure**
Eviction policies did not work, since people (whether the same or different) kept coming back. The situation appears still to be one of open access, though there may be de facto claims in place by the existing population that helps to curtail new intrusions.

Some cooperative approach was clearly needed in order to achieve sustainable management of the reserve with little or no budget. However, the establishment and enforcement of these management norms has been very slow in coming, and some farm and industry groups may benefit financially from further delays.

**Rationale for using EI**
UNEP coordination with University staff led to the conclusion that some type of EI made sense, since funds were needed to run the reserve and many parties were benefiting from its services. The research group focused on each resource area: farmers, outside beneficiaries, recreational users, and hikers, and came up with a charge for each. No alternative instruments were discussed.

**Legal Basis for EI**
The University has a clear legal basis to manage the resource and impose fees for accessing the resources within MMFR. Charging a watershed protection fee to facilities outside the reserve is not as clear cut. In addition, the collection mechanism for the fee is the facility's water bill, creating the impression that MMFR is charging for water itself. The rationale is that the forest reserve and integrated watershed are a core input to the provision of high quality water to off-site users. However, confusion remains, and a clear legal basis does not yet exist. The University is working with the National Water Resources Board and local water districts to develop a memorandum of understanding, as these institutions have the legal mandate to collect any
payments that may be established.

While most of the water districts have signaled their willingness to reach some agreement like this, University officials recognize that the ultimate agreements may be weak and not all districts will be willing to collect and share these revenues with them.

### Stakeholder Involvement

Public meetings were held to discuss the proposed fee and its rationale. These were initiated and led by the university. These involved resort owners, water district representatives, and institutional water consumers. Meetings with individual groups of water users were also held at the University.

Resort owners are organized and expressed general support to the watershed protection project. They are willing to contribute in-kind by employing members of the upland community in their resorts, viewing them as a substitute for cash outlays.

Farming communities are organized into two main groups, which are now federated. They were notified that they would be expected to contribute to watershed protection, but that this contribution would be in-kind. In-kind contributions discussed included participation in forest protection initiatives and/or adoption of sustainable farming practices. Essentially, they are being required to adopt more sustainable practices in order to retain their access to subsidized resources. These discussions were suspended until an accreditation scheme is in place, allowing existing practices to continue until a future date.

### Lead Agencies

University, National Water Resources Board, local water districts.

### Key barriers addressed

### Detail on Policy Response

**Allocation of Initial Rights**

Rights to forest services were granted to the University, but have heavily utilized by farmers and others moving into the reserve. Water users outside the reserve also benefit from the water purification services that the watershed provides.

To more equitably distribute the costs of providing these services, the College of Forestry and Natural Resources evaluated appropriate charge schemes. They calculated a simple average cost of providing water to users by dividing the cost of watershed protection by the cubic meters of water consumed by each group. Initial fees are set at about PhP15.60/month for an average household. This is in line with survey results on how much these citizens are willing to pay (about PhP 36/month per household).

**On-going monitoring process**

Property rights regimes have not been finalized. Water charges will be linked to water consumption with, for most users, is already metered. Not clear how monitoring of sustainable practices of farmers will be evaluated.

**Current Successes**

Philosophical agreement with the approach by most parties.

**Remaining Gaps/Risks**

- Actually setting and implementing the charges has yet to occur.
- Clear and accurate valuation process for in-kind contributors remains to be developed.

### Source(s)

Compiled by Herminia Francisco.
<table>
<thead>
<tr>
<th>Title</th>
<th>Trade Liberalization, Bananas, and Environmental Quality</th>
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<tbody>
<tr>
<td>Country</td>
<td>Ecuador</td>
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<tr>
<td>Problem Definition</td>
<td></td>
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<tr>
<td>Environmental Impacts</td>
<td>Banana production provides jobs and export earnings, but land conversion to increase banana production affected soil health and biodiversity. Pesticide use also caused health problems for workers.</td>
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<tr>
<td>Social Impacts</td>
<td>Social impacts from trade liberalization included the potential increase in jobs in the sector, the displacement of people from subsistence agriculture, and the conversion of manual-intensive to technology-intensive production in the farm sector, potentially yielding job loss and increased chemical exposure.</td>
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<tr>
<td>Solution Implemented</td>
<td>Trade liberalization was undertaken concurrently with currency devaluations to promote agricultural exports. Export price guarantees and credit subsidies further promoted increased production. Only much later were regulatory controls introduced to curb environmental and worker health problems associated with the rapid growth in banana production.</td>
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<tr>
<td>Summary Analysis</td>
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<tr>
<td>Efficacy of Existing Policy at Solving Problem</td>
<td>The policy packages did a good job increasing banana production. Yield, area under production, and total production all grew rapidly during the period. Environmental considerations were secondary, and not integrated into the planning process from the outset. While regulatory controls during the 1990s have slowed expansion and reduced chemical exposure for workers, these policies could have been implemented at the outset of the export promotion plan. In addition, government efforts at trade liberalization were supported by domestic credit subsidies and price guarantees, creating an artificially buoyant spur to increase production, bringing with it a host of environmental problems.</td>
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<td>Rationale for Success/Failure</td>
<td>The program was perhaps an export success, but more careful attention to the environmental and human health aspects of rapid growth in agricultural exports could have generated more sustainable (both environmentally and economically) job growth.</td>
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<td>Unanswered Questions</td>
<td>-As banana production has come under more free trade, how has the sector fared? -How effective have the regulatory efforts to protect human health and the environment been? -Did the government ever consider restricting access to price guarantees and credit subsidies only to farms who used sustainable production techniques?</td>
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<td>Institutional Baseline Conditions in Country</td>
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<td>Environmental</td>
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<td>Detail on Policy Process</td>
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<td>History of response</td>
<td>During 1980-89, periodic (though small) devaluation of the Ecuadorian currency, coupled with periodic adjustments to the exchange rate, made the country's exports more cost effective. Coupled with generally falling interest rates, rationalization of credit to productive industry, and direct credit subsidies to the agricultural sector, domestic production and export of bananas increased. It is not clear from available information whether the devaluations were an integral part of an export promotion plan, or due to other macroeconomic forces. While the impact of these policies on deforestation can't be estimated with precision, it is clearly a significant factor. Since the mid-1980s, timber extraction and the unrestricted...</td>
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planting of agricultural products (including bananas) has been the largest source of deforestation in the country.

Attempts to introduce new varieties of bananas in the 1980s to increase land productivity (and reduce the hectares needed under production) did not work out as planned. Rather, the returns to banana producers increased during the period due to guaranteed minimum export prices. Rapidly rising costs of inputs to banana production eroded most of the profit, however, and many small producers often ran losses.

During 1990-1994, import restrictions were replaced by import duties, allowing more cost efficient importation of productivity-enhancing capital equipment. This led to a growth in banana plantations at an average rate of 18%, much higher than in the previous decade. Losses in habitat and biodiversity were substantial. This was encouraged through continued protection for growers from world prices, through required minimum prices to producers set by the government. Fixed band exchange rates also buffered declines in the value of domestic currency, preventing price spikes in imported equipment.

During 1995-1999, fiscal and monetary reforms were introduced. A number of trade agreements were also made, improving market access for banana exports. Between 1994 and 1999, regulatory programs to address environmental, worker health, and crop diversification issues in the banana sector were addressed, slowing the expansion of area under banana cultivation. Banana yields have risen due to application of technology and better plantation management. Despite price guarantees for banana sales, profits rose only for larger, more technically-advanced plantations (with lower costs). Small and medium producers remained unprofitable. Environmental performance has generally been better at the larger, more technically-advanced farms.

### Evaluation of past success/failure

Policies have been fairly consistent during the period: cheap credit and price guarantees, along with efforts to increase access to export markets. The failure of these approaches from an environmental perspective is visible through the enactment of the Environmental Security Regulations for the Banana Sector, the Plant Quarantine Handbook and the Export Facilitation Law, all in 1994. These addressed norms for pest control, packaging, and re-conversion of plantations. In 1995, norms regarding crop diversification were passed. It was not until 1998 that the Plant Health Regulations were passed, and 1999 that brought the Environmental Management Law. These lagged the introduction of export promotion activities by almost 20 years.

### Rationale for using EI

Trade liberalization was a broad scale way to boost sales of Ecuadorian products abroad. This objective was pursued using economic subsidy policies, though with little regard to impacts of this growth on worker health or safety.

### Legal Basis for EI

Not known.

### Stakeholder Involvement

Not known.

### Lead Agencies

Not known.

### Key barriers addressed

Not known.

### Detail on Policy Response

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<tr>
<th>Allocation of Initial Rights</th>
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<tr>
<td>On-going monitoring process</td>
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<tr>
<td>Current Successes</td>
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<tr>
<td>Remaining Gaps/Risks</td>
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### Source(s)

Acronym Guide/Glossary

**artisanal** - generally applied to smaller, non-industrial fishermen. Artisanal groups are often given exemptions or special conditions under fisheries regulation.

**CAC** - Command and control approach.

**de minimis exemptions** - Regulatory exemptions for firms or individuals that contribute only a very small amount to a particular environmental problem.

**EI** - Economic instrument.

**ITQ or IFQ** - Individual transferable quota or individual fishery quota, a right assigned to or bought by, a firm or individual to use a particular resource. Most commonly used in reference to fisheries.

**LDC** - Less developed country

**LGU** - local government unit.

**NGO** - non-governmental organization.

**PLA** - pasture lease agreements, giving owners long-term grazing rights to particular pastures in the Philippines.

**TAC** - Total allowable catch. The total tonnage of a particular fish species that is deemed sustainably harvestable based on monitoring of fishery health. The TAC is used to convert rights to harvest a set percentage of the annual catch via ITQs or IFQs into allowable tonnage.
References


Lipper, Leslie. FAO, personal communication, 3/9/02.


OECD, 2002. *Implementing Domestic Tradeable Permits: Recent Developments and Future Challenges.*


