

OECD DEVELOPMENT CENTRE

POLICY BRIEF No. 2

MANAGING THE ENVIRONMENT IN DEVELOPING COUNTRIES

by

David O'Connor and David Turnham

- Environmental policy should be inspired by the recognition that the environment is everyone's business; all social actors must be involved in environmental management
- Policies that implicitly subsidize a wasteful and environmentally destructive use of resources are pervasive: reforms should command a high priority on economic as well as environmental grounds
- Compared to regulation, market-based instruments are little used but they can be more efficient; they can also produce revenues to finance environmental improvements
- Regulatory effectiveness can be improved by: relying more on preventive measures, including environmental impact assessment; targeting large polluters; strengthening enforcement; and favouring mediation over litigation

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Threats to Sustainable Development

Developing countries face severe environmental degradation which threatens to undermine their long-term development prospects. Natural resources are being used up wastefully and in ways that foreclose options for development in the future. Patterns of income generation — especially in urban areas — rely heavily on inefficient use of energy, water and other resources while industrial and transport-related noxious emissions and effluents, as well as other forms of pollution, go largely unchecked. This too stores up problems that future generations will find costly to resolve.

Meanwhile, there are severe burdens on the current generation in the form of chronic health problems and high death rates, notably among infants and young children, from pollution-related causes. In many countries, rapid and largely unplanned urban growth has resulted in serious overcrowding into slum settlements inadequately supplied with safe drinking water, sanitation and other environmental infrastructure. In rural areas, especially in the poorest countries, large numbers of people are struggling to survive on fragile and often deteriorated land resources. In many countries, there is large-scale exploitation and destruction of renewable resources through inappropriate systems of agriculture, forestry and fishery.

These problems are not unique to developing countries — indeed, finding ways to cope better with many of the same environmental threats has been a major recent policy preoccupation of developed countries. Serious problems remain to be tackled in the OECD Member countries, but a number have made significant progress toward bringing the worst excesses under control (see OECD, 1991b). Among developing countries awareness of environmental problems has grown tremendously in recent years and some have made noteworthy environmental improvements, but most still face formidable political, institutional, and resource constraints to the development of effective systems of environmental management.

Why Is There a Problem?

Explanations of environmental degradation normally invoke one or both of two basic causes: market failure and policy failure. Market and policy failures occur in both developed and developing countries though arguably with greater frequency in the latter. Moreover, developing countries often have severe difficulties in mounting a response to the environmental challenges they face, whatever their origin. First, their resources are far more constrained than those of developed countries; second, they often face problems of weak political commitment and governance.

a. Market Failure

Market failure refers to situations where markets fail to price goods and services at their true costs to society as a whole. Thus, for example, overlogging of timber is common because the price of timber does not take into account the value of forests as carbon sinks, havens of biodiversity, or regulators of water flow. Similarly, the open access to coastal waters leads to the depletion of fish stocks through overfishing. The same open access allows firms and households to dump waste into waterways without bearing the costs inflicted on others — in increased illness, reduced income, etc. Similarly with air pollution, one firm or individual's costless emissions become others' uncompensated costs. All these examples represent cases where environmental "goods" or environmental "bads" go unpriced, resulting in the undersupply of the former and the oversupply of the latter.

One reason why environmental costs are frequently externalised — i.e., shifted from the polluter onto an unwilling victim — is the lack of clearly defined property rights. In some cases, a special effort to agree upon and to define such rights is a first step towards enforcing appropriate environmental behaviour. The right to enjoy pollution-free air is an example. In other cases, a clearer delineation, or possibly a reassignment, of property rights may be needed. For example, in agriculture, insecure land tenure discourages long-term investments in farm improvements and may bias technology choice in favour of short-run output maximisation over sustainable agricultural systems. Where traditional systems of community-sanctioned land use become destabilised, private property rights are not always quick to develop as substitutes. Even where they do, it may be through the dispossession of small cultivators, who are forced onto marginal and often ecologically fragile lands where they possess no security of tenure. Government efforts to assign property rights, as in the case of grants of public land for settlement, can also lead to problems. In the much discussed case of the development of the Brazilian Amazon, the government recognised title in settlement areas only if land was cleared of forest cover, thus intensifying pressures for deforestation.

b. Policy Failure

While government intervention may be needed to correct market failures, government manipulation of market prices may also be a source of problems. Price distortions which often have negative effects on the environment include input subsidies (e.g., to encourage the use of fertilizer or irrigation water), energy subsidies (with predictable wasteful use), and interest rate ceilings and corporate income tax exemptions (which tend to encourage capital-intensive — and often pollution-intensive — industries like electric power generation, chemicals, and ferrous and non-ferrous metals processing). In those countries with large state enterprise sectors, administered (and most often distorted) prices tend to be especially widespread.

The non-market model pursued in (erstwhile) centrally planned economies has created some of the most blatant price distortions, leading to excessive consumption of energy and natural resources per unit of output. In many cases, centrally-administered pricing plus state

subsidies for investment favoured the strong build up of extractive and resource-intensive heavy industries (Wilczynski, 1991). Moreover, enterprises have characteristically been concerned with achieving quantitative production targets, with scant regard for private financial costs let alone true social-cum-environmental costs.

Simply reducing distortions by allowing prices to reflect more closely private costs would be an important first step toward encouraging greater resource conservation and reducing environmental damage. Eventually, prices need to be adjusted further to reflect fully environmental and other social costs.

c. Resource Limitations

Human, technical and financial resources are all tightly constrained and thus severely limit government efforts devoted to environmental management. There are usually urgent short-term preoccupations and competing priorities to contend with, all within what is often an extremely limited administrative capacity. The regulatory approach to environmental management places especially heavy demands on governmental resources. Developed country governments rely extensively on the private sector to help find as well as to finance the solutions to environmental problems, using the “polluter pays” principle. In contrast, in many developing countries the local private sector is ill-equipped to adopt new, cleaner process technology, which is normally bound up with the replacement of old by more modern plant and equipment, even though there may be long-term economic as well as environmental advantage in doing so. There may be even greater reluctance to install “end-of-pipe” clean-up technology, which adds expense without compensating private economic benefits.

In some instances, the solutions to environmental problems are just not available, either in the developed or in the developing countries. Thus in many areas, cultivation has been pushed by a combination of poverty and population pressure into areas for which there are no sustainable systems of cultivation. Lacking alternative methods of livelihood however, it is unlikely that the settler-farmers can be induced to give up on these resource-poor areas.

d. Weak Political Commitment and Governance

The view that environmental protection is a luxury only rich countries can afford is still quite pervasive, not least in powerful finance and planning agencies. The budgetary costs, at least of traditional “command-and-control” approaches to environmental management, are significant and are clearly visible; the larger economic costs of inaction are often more subtle and more difficult to demonstrate and measure. Thus policy makers may fail to appreciate the full magnitude of the costs associated with environmental degradation, which nonetheless must be borne by some members of the society.

Although ignorance may still be a part of the problem, development planners have had a good deal of exposure to sustainable resource use issues. Problems such as land degradation from shifting cultivation, inappropriate cropping patterns, deterioration of irrigation systems due to sedimentation, waterlogging, alkalinity and salinity of soils, and deforestation have been around for a long time. In recent years, the incidence and severity of environmental disasters in many developing countries — floods, landslides, droughts, etc. — have highlighted the need for effective remedial action.

Still, even when a government has come to recognise that need, the incentive to move aggressively on the issue may be blunted by the political calculus of gainers and losers. Those who derive the bulk of the benefits from resource depletion tend to be the rich and the powerful, who are able to shift the costs onto the shoulders of the poor and powerless. In practice, “pollutee suffers” may be as much the operative principle as “polluter pays”. To the extent that environmental management involves a process through which environmental costs are redistributed away from the victims, the question of empowerment is a critical one. Without political power, the protests of the poor, who are often the principal sufferers from environmental degradation, tend to fall on deaf ears.

Setting the Priorities for Action

The magnitude and seriousness of the environmental problems described above varies from country to country. Thus, from the outset the design of a country’s environmental management programme needs to consider the specific balance of problems confronted. For example, if the legal system is not well developed and property rights are ill-defined, there is a case for broad-based use of economic instruments, with a sparing use of regulation focused on a few carefully selected major targets. Similarly, the removal of market distortions is suggested as an early priority where these are widespread. Finally, weak governance and a certain skepticism about the importance of the environment suggest a different approach, emphasising environmental education, both of the governors and the governed, as a precursor to more effective actions.

Technical, financial and human resources are severely limited almost everywhere, so governments need to set very clear priorities as a basis for their efficient allocation. This requires first an appreciation of the dimensions of the environmental problems the country faces, which is normally provided through a country environmental study (as discussed in the following section). Where a number of environmental problems are competing for attention and resources, it may be helpful to have order-of-magnitude estimates of the damage costs associated with each. In addition, government needs to explore ways of supplementing its limited resources by involving the private sector and the broader population in the environmental management effort. Much can be achieved within the government with limited resources through the astute (re-)design of the regulatory framework combined with the selective introduction of economic instruments. Indeed, the latter may serve to bolster the government’s resources (e.g., through pollution taxes and

user charges). Even then, larger resource commitments are needed for long-term capital investments in environmental projects (or environmental components of infrastructure or other projects), for which the support of the international donor and lending communities may need to be enlisted.

a. Country Environmental Studies [CES]

Building up the natural resource and environmental information base and providing a diagnosis of environmental problems for purposes of policy making and planning are the basic functions of the country environmental study (CES). Over 200 CES have been conducted over the last decade in some 110 countries (see CIDE/WRI 1990 for an annotated bibliography of CES). While this is an impressive body of work, much of it has had little or no impact on environmental management because the great bulk of the work was addressed to the diagnosis of problems rather than to treatment and cure. Many studies conducted to date lack in-depth analysis of basic policy issues and options, either because this was not part of their objectives or because policy matters were considered too politically sensitive.

More recent studies however are beginning to change this, as signified by an increasing use of the term environmental action plan. Such plans are generally aimed at achieving the following objectives: (i) to identify and assess fundamental trends in environmental quality and natural resource use; (ii) to formulate plans and policy responses to reverse environmental degradation and mismanagement of resources; (iii) to strengthen public and private institutional capabilities for environmental management and planning; (iv) to increase public awareness of environmental conditions and trends and to build public support for environmental initiatives.

The lessons of experience, based on reviews of the CES work (see Arensberg, 1991), can be summarised as follows:

i) *Setting clear objectives:* Before the formal CES, a preliminary assessment should be undertaken which defines basic policy and institutional parameters and sets the scope of the study. The “scoping” exercise needs to address critical issues like the commitment of funds, technical staff requirements, in-kind services, scheduling and other administrative matters. A CES, beyond characterising environmental problems, needs to outline the links between economic behaviour and government policies on the one hand and patterns of environmental degradation on the other. While the CES must set clear objectives, the scope need not be national and it frequently will not address all types of environmental issues. In Colombia, for example, the CES started in one region, leading later on to a series of regional environmental profiles and the establishment of environmental planning units in several of the regional planning institutions. In this instance, activity at national level has been focussed around the creation of a new national environmental NGO geared to assisting regional governments in environmental planning (Pombo Holguin, 1991).

ii) *Structure and organisation*: Special attention needs to be given to selecting the lead agency for the CES, with a preference for one that has bureaucratic skill and technical expertise to manage the CES process and can act as its advocate both within the government and in the public arena. The advocacy work calls for an agency with sufficient credibility in the public's eyes as well as influence within government policy making circles. A national planning or economic development ministry is a logical candidate; in the event the environmental agency is assigned responsibility, it must be given commensurate authority to elicit other sectoral agencies' co-operation in the exercise. In any event, a multi-sectoral Steering Committee should be established to facilitate co-ordination, with representatives from non-governmental organisations (NGOs) and the private sector as well as relevant government agencies. Wherever feasible, public participation in the study preparation should be directly solicited through community level meetings or meetings with community representatives. Involving NGOs should help strengthen them to play a more effective role in environmental education and action programmes.

iii) *Coverage*: The initial scoping process should help avoid the danger of the CES becoming merely an encyclopaedic inventory of environmental trends and the natural resource base. Central policy and management issues need to be identified at the outset. One common concern is the interrelationships between economic policy and environmental impacts, including macroeconomic and pricing policies whose environmental consequences were only dimly perceived (if at all) at the time of their formulation. The CES should explore the institutional dynamics and decision making processes which shape whether and how effectively environmental policies get implemented. It should also provide the framework for systematic and ongoing information gathering and analysis on environmental and natural resource trends, with the information structured in a format suitable for use by policy makers and managers. The scoping process needs to be seen as an ongoing one: the initial CES should identify critical issues and problem areas on which more focused and detailed research may be needed before a thorough diagnosis can be made.

iv) *Awareness building*: A public education campaign should be considered an explicit element of the CES from the outset; it should occur not only during the process of preparation of the CES but after it has been completed. Where a participatory approach is adopted, the opportunities for public environmental education are that much greater. Training programmes designed for policy-makers should emerge from the exercise; in addition, training needs to be provided to NGO staff and private sector managers, with a view to creating a competent cadre of personnel able to follow through the recommendations contained in the CES. In those countries which are undergoing rapid industrial development, the private sector has come to assume an increasingly important economic role and its environmental responsibilities should increase correspondingly. Special attention may need to be given to engaging the private sector more actively in the environmental management effort.

v) *Follow-up*: From the very beginning an effort should be made to ensure that adequate financial and other resources will be available for follow-up. In the poorer countries, close consultations with the donor community are especially critical to ensuring its commitment to support implementation. Rwanda offers one example of how environmental profiles can be used. The profile of Ruhengeri prefecture provided the scientific data base for natural resource planning and policy making in the region as well as becoming a central element in the government's National Environmental Action Plan (NEAP), being developed in conjunction with the World Bank, the United States Agency for International Development (USAID), and other donor agencies (Ngirabatware, 1991).

b. Engaging the Private Sector and Non-Governmental Organisations [NGOs]

Private companies in the developed countries, particularly the larger and more successful ones, are increasingly found in the forefront of technology development and investment to promote a cleaner environment. There can be little doubt that a combination of government regulation-cum-incentives, NGO pressure, and growing public environmental awareness has catalysed many companies into action. That said, increasingly companies find that the adoption of high internal standards of environmental management can to a large degree “pay for itself” through efficiency gains and reduced waste — e.g., the substantial savings in CFC consumption realised by electronics firms through better housekeeping and engineering controls (O'Connor, 1991). Frequently too, experience suggests that process redesign to reabsorb or convert wastes into useful products turns out to be economically as well as environmentally justified. Innovative companies find they can use their technical capability not only to promote corporate image and goodwill from environmentally-conscious shareholders and customers, but also as a weapon vis-à-vis less competent competitors as the tightening of environmental standards disadvantages industry laggards.

In most developing countries, local private companies with this type of technical competence are still rare. Moreover, until governments undertake the necessary regulatory and policy reforms, there is little reason for firms to expect that they will need to modify their polluting behaviour and improve their own environmental management. A recent OECD (1991c) survey of Member country clean technology exporters finds that, along with inadequate financing, inadequate environmental regulations are the major hindrance to growth in developing country markets for clean technologies. Indeed, it has been argued that lower environmental standards give special advantage to the more pollution-prone types of industry, thus adding to the environmental problems of developing countries through the creation of “pollution havens”. Thus far, there is little measurable evidence of such effects, in the form for example of data on changes in trade or investment patterns (see Tobey, 1990; Grossman and Krueger, 1991); still, enough anecdotal evidence exists to warrant further research. On the other hand, there is some evidence of corporate initiative in the area of environmental standards and practices on the part of the local affiliates of multinational enterprises. Companies are increasingly sensitive to environmental criticism

either from local sources or from informed sources at home. As a result, a growing number of multinationals are adopting common environmental standards worldwide (normally based on those in their home countries) as a matter of policy.

In building up environmental management, developing country governments can benefit by co-opting business — foreign and local — and enlisting its resources. In the case of foreign-affiliated firms, the parent company can be encouraged to provide training to local engineers and technicians in technologies and practices of pollution control, waste minimisation, and hazardous waste handling and disposal. Large firms can be required to hire one or more nationally certified environmental specialists. Local firms can be offered incentives to invest in developing and applying low waste technologies. There may be commercial opportunities for local as well as foreign firms in the supply of environmental technologies and services like hazardous waste transport and disposal, off-site waste recycling and material recovery, and water quality management — services which have traditionally been undersupplied by the market. In Thailand, for example, the Department of Industrial Works has launched a pilot centralised hazardous waste treatment facility to serve small dyeing and electroplating industries, which is to be managed and operated by a private firm. Similarly, private firms are being encouraged to invest in facilities for metal recovery from waste water through ion-exchange (Phantumvanit *et al.*, 1990).

Environmental NGOs have been proliferating in the developing world in recent years, with some 600 active in Central America and Panama alone. Environmental NGOs play an important advocacy role, raising public awareness and channeling concern about environmentally damaging projects or supporting specific conservation measures. Although this role frequently brings them into conflict with government, there are instances where governments and environmental NGOs have been able to set aside their differences and establish a co-operative working relationship. Costa Rica provides an interesting case in point. There, a local NGO co-operates with the government in a commission set up to manage a national park and biosphere reserve, with the commission's operating costs met through a "debt-for-nature" swap arranged in 1988 between the Costa Rican government and Conservation International, a North American NGO (Umaña, 1991).

Given the serious human and financial resource limitations of most developing country governments, both international and local NGOs can play important roles as partners with government in the execution and implementation of environmental projects and programmes, assuming relations of mutual trust can be established. At the same time, NGOs must maintain their autonomy if they are to have the freedom to evaluate critically the environmental impacts of government policies and projects. The aim should be to strike a suitable balance between constructive collaboration and constructive criticism. It is very likely that NGOs will come to play an even more prominent role in environmental management and in promoting sustainable development in the future than they have in the past. Their effectiveness will depend on their capacity to grow and mature in terms of membership, financing and administration as well as in their understanding of development processes and their links with the environment.

The international NGOs also have a large potential role in financing and supporting local NGOs active in building grass roots links and empowering communities to address environmental concerns in the context of broader development efforts. They are making headway toward a grass roots orientation, both in the developed and in the developing world, though the preoccupation with middle class members' concerns is still a problem in some instances. Many international NGOs still have far to go in linking more effectively their traditional conservation concerns with issues of equitable and sustainable development. Critical to success will be the forging of ties to broad-based development NGOs which have large numbers of field workers and strong bases in rural and urban poor communities of developing countries. In general, much more needs to be done by developed country NGOs to forge closer ties with those in developing countries, to share lessons and experiences, to co-ordinate strategies, and to work to place the latter's concerns more prominently on the international policy agenda (Sandbrook, 1991).

Reforming the Management System: The Need for a Fresh Start

In setting up an environmental management programme, developing country governments have normally opted for the regulation-based, "command-and-control" (CAC) approach which has traditionally been followed in the industrialised countries. Such systems, however, rely heavily on the availability of technical skills, an effective administrative infrastructure for monitoring and enforcement, and often rather costly "end-of-pipe" abatement technologies. As noted earlier, these may be largely lacking or pose excessive cost burdens in developing countries. Frequently too, regulatory systems have only weak grounding in local legal, institutional, political and social realities. For example, many developing societies are averse to reliance on litigation and the judicial process characteristic of the CAC-based approach, at least as practiced in the United States.

Political and economic structures also contribute to the ineffectiveness of regulations. On the one hand, a few large enterprises frequently account for the bulk of pollution, often untouched by government regulation either because they are state-owned or because they have strong political influence. On the other hand, there are many small-scale, often informal sector polluters which are difficult to regulate and which can cause serious local environmental problems. Examples include leather tanning, textile dyeing, and electroplating. Moreover, central government control over remote communities and enterprises is often tenuous at best, making for weak enforcement of regulations on natural resource extraction (e.g., logging and artisan-mining) and primary processing activities as well as weak control over unsustainable agricultural practices in marginal environments.

Incentive-based Approaches

The limitations and costs of straight command-and-control approaches have encouraged a search for alternatives in both developed and developing countries. In general, the tendency has been to design and employ instruments that rely on altering or generating market signals in order to change polluting behaviour — so-called Market-Based Instruments (MBIs).

a. The Range of Policy Instruments

There is a large and growing tool kit of incentives for better environmental practice. Some operate through existing markets (e.g., product taxes) while others imitate or seek to create markets (e.g., tradable pollution permits). For the major categories of economic instruments, OECD (1991a) outlines in broad terms the appropriate circumstances for their employment. It is worth stressing that in many cases, even without resort to pollution-targeted economic instruments, the mere elimination of environmentally perverse price distortions can result in significant environmental improvements.

The main classes of instruments are summarised here along with examples of each.

i) *Emission charges/user fees*: These are helpful mainly for stationary sources of pollution and where there is variation in marginal abatement costs between polluters, where monitoring of emissions is feasible at reasonable cost, and where there is potential in the short run for a change in behaviour of polluters and in the longer run for technical innovation. Examples include: effluent and emission charges (e.g., for water, air and noise pollution); user charges/access fees (e.g., for roads/parks); presumptive charges (e.g., for hazardous waste).

ii) *Product charges*: These are applicable in cases where products are used in large quantities or volumes, are easily identifiable, have high demand elasticity and strong substitution possibilities, and where there is a need to control diffuse sources. Examples include: resource pricing (e.g, tropical timber pricing, water pricing, fishing license fees); product pricing (e.g., energy, gasoline, fertiliser, pesticides); and input taxes (e.g., CFCs).

iii) *Deposit-refund systems*: These usually reflect serious environmental problems associated with waste disposal or with the by-products of resource extraction. They work where recycling and reuse are feasible and profitable; they also may require a suitable distribution system and co-operative behaviour on the part of producers, retailers, and users. Examples include: deposit/refund/recycling systems (e.g., for car batteries, beverage cans, glass, CFCs, etc.); performance bonds (e.g., for forest management, mine site restoration, oil spill clean-up).

iv) *Marketable permits*: These can be employed in situations where there is a need for binding maximum ambient pollutant standards; where there are differences in marginal compliance costs between regulated target groups; where the number of sources is large

enough to establish a well functioning market; and where there is potential for technological innovation. Examples include: tradable quotas (e.g., individual transferable quotas in fisheries); tradable pollution permits (e.g., air pollutant emissions, greenhouse gases). (There are as yet few instances where these are employed in developing countries.)

v) *Other instruments:* Among instruments that do not fit neatly into any single one of the above categories are: concession bidding (e.g., logging concessions, national park concessions); tax concessions (e.g., duty free importation of pollution abatement equipment, tax rebates for reforestation); locational incentives for polluting industries; and liability insurance.

There are two basic institutional prerequisites for ensuring that economic instruments generate the intended incentives for behavioural change in the targeted groups: these are the delineation of property rights (e.g., land titles, water rights) and the specification of use rights (e.g., communal land rights and territorial use rights in fisheries). The initial assignment of those rights is an equity issue more than an efficiency issue.

b. Advantages of Market-Based Instruments vis-à-vis Command-And-Control

Economic instruments generally work through market mechanisms to create incentives for less environmentally damaging behaviour. Among the supposed benefits of MBIs are the following:

MBIs allow firms to choose their own approach to compliance so as to minimise their compliance costs. In this sense they are far more flexible than CAC standards, which often dictate technology choice to firms. Both pollution charges and tradable permits give firms the option of reducing their pollution or paying a fee for the “right to pollute.” Thus, abatement will occur most in those firms for whom it is the most cost effective option.

Since they constitute continuing penalties for pollution or excessive resource use, MBIs like taxes and user charges provide a constant stimulus to the search for less polluting and less resource-intensive technologies. In the case of CAC, once firms have adopted the required standards they have little incentive to search for technologies offering lower emissions or generating less waste. (Governments can however create such incentives with CAC by pre-announcing tighter future emission standards which can only be met through technological innovation.)

Taxes and user charges can make environmental management self-financing (and possibly even generate a fiscal surplus) rather than posing a continual drain on the government’s limited resources.

Like regulation, economic instruments conform to the polluter-pays principle, in the sense that they force polluters to account for the environmental costs of their activities. Unlike regulation however, MBIs are intended to minimise the combined administrative and abatement costs of achieving a desired standard of environmental quality.

c. The OECD Experience with MBIs

Despite the apparent advantages of the MBI approach, OECD governments and industrialists were at first very reluctant to endorse it. Governments have traditionally seen regulations as a safer way of ensuring a given environmental outcome: they carry with them the means of their enforcement — viz., plant closure or the suspension of operations — even if such measures are rarely employed. “Regulations carry a big stick...while economic incentives provide for a daily diet of small carrots” (Panayotou, 1991). Public opinion in the past has also tended to favour regulation, as polluters were often viewed as outlaws who could not be trusted to police themselves and human health as too valuable to be entrusted to incentives of uncertain impact. Taxes and charges leave more to chance: whether they consistently achieve the desired results depends on how sensitive polluters are to the level of charges set and to changes in price/cost structures. Hence, as market prices of the firm’s inputs and outputs change, so the the level of the pollution charge needed to achieve any given result (in terms of pollution averted) will have to change too.

Industry has been highly ambivalent towards pollution taxes and user charges. The tentativeness with which such measures have been introduced to date does not instill confidence that they will be sufficiently durable to warrant behavioral changes and long-term investments in abatement technology. On the other hand, taxes and charges, even if set at a low initial level, can be raised later should greater pollution abatement prove desirable. Indeed, such fine-tuning is likely to be needed, a prospect which introduces additional uncertainty into corporate planning. Moreover, whereas regulations only penalise emissions exceeding legal standards, taxes and charges apply to all emissions. With “best available technology,” often the industry can effectively dictate the standard to the government on the basis of its special insider knowledge of the technical options and likely trends. Finally, taxes and charges, while potentially fiscally neutral, may be welcomed by governments as an additional revenue source, even if a transient one. Indeed, an OECD (1989a) review of the experience with MBIs concluded: “Economic incentives have proved useful in raising revenues but in most cases have not been successful in changing behaviour or stimulating innovation.”

Nevertheless, thinking has evolved greatly on these matters in OECD countries, within government and industry as well as among the public at large. There is now much greater receptivity to the use of MBIs, partly because the costs of regulation have been more thoroughly documented, partly because those costs could be expected to escalate further as environmental controls are strengthened in many OECD countries. Faced with the prospect of climbing regulatory costs, governments and industry are eager to find lower cost approaches. The OECD’s Environment Directorate has been a strong advocate of greater reliance on economic instruments. Its efforts have borne fruit most recently in the December 1990 European Commission (EC) guidelines on the use of economic instruments; in 1991 the OECD issued its own set of guidelines (see OECD, 1991a).

As experience with MBIs has begun to accumulate in OECD countries, initial concerns about the difficulties of applying them have proven largely unfounded (Pearce, 1991). At the same time, their application has not been without its own costs and demands upon the monitoring and enforcement capacities of governments. Systems of tradable emission permits, for example, rely upon a relatively sophisticated administrative apparatus — for approving trades, tracking who possesses what rights, and ensuring that those not in possession of permits do not pollute. Where permit markets are superimposed on highly regulated product (e.g., electricity) markets, there is some concern that costs could be even higher than under a strict CAC approach. Moreover, ensuring compliance may be more complicated than with some technology-based standards (Bernstein, 1991). Thus, even OECD governments have generally been slow to introduce tradable permit systems. Still, a few countries (notably the USA in its recently amended Clean Air Act) have begun to employ emission trading on a large scale and others are studying its feasibility. In managing resource use, tradable permits are more widely employed. For example, tradable use permits have been adopted by several countries to deal with problems of overfishing.

In many practical situations, hybrid systems of regulation-cum-incentives may well be the most cost-effective in meeting environmental targets. The regulatory component reduces the degree (and associated costs) of uncertainty, while the incentive component allows for flexibility in responding to regulatory pressures. In the United States, tradable emission permits have grown up on the back of an elaborate CAC regime. In cases where the government seeks to enforce an absolute ban or very strict controls on the use of toxic substances, there may be little scope for economic instruments. Even where the government has a clear preference for employing economic instruments, environmental standards still occupy a central place. In Turkey, the relative success with the application of economic instruments has been attributed (Kosmo, 1989) to government's ability to monitor and enforce pollution standards. What differs from the strict CAC approach are the types of standards employed, with economic instruments normally targeted at achieving an ambient environmental quality standard rather than a uniform effluent or emission level, level of waste treatment, or adoption of a particular pollution-abatement technology.

d. Applying MBIs in Developing Countries

A well-designed policy package based on economic incentives would strengthen the link between resource prices and their scarcity, between the incremental costs of environmental services and their incremental benefits to society. Judicious use of economic instruments could be expected to stimulate: resource conservation, improved efficiency and substitution away from scarce resources; recycling, exploration, development of substitutes; structural change in the direction of wholly different patterns of resource use consistent with sustainable development. Structural changes in the economy take time, and existing investments may have been made under conditions where pollution was not factored into costs. To ease adjustment to the new policy environment, economic

instruments need to be phased in gradually, according to a pre-announced time schedule. This allows time for amortisation of existing investments while sending signals to future investors to search for less polluting technologies.

Experience with the use of economic instruments in developing countries is still limited but rapidly accumulating. A few noteworthy examples of their application are described below. The first two involve the pricing of resources which in many developing countries are still treated as public goods, despite worsening congestion and scarcity. The third and fourth illustrate how innovative project design can serve to internalise environmental externalities by effectively combining incentives with regulation and decentralising control over environmental resources.

i) *Coping with urban congestion and pollution.* Urban traffic congestion and air pollution are reaching critical levels in many Third World cities, from Bangkok to Santiago. In most cities, access to inner city roads is still considered a “free good.” Traffic congestion can reach levels which discourage further driving, but often that level is very high indeed. This form of rationing is very inefficient, involving such costs as: loss of productive time; increased use of fossil fuels; increased air pollution with associated health problems, medical bills and cleaning costs; increased noise pollution. A rough calculation for Bangkok is that lost time and increased gasoline consumption alone represent an annual cost of US\$1 billion.

Singapore has adopted a novel approach to coping with traffic congestion and motor vehicle pollution. In an effort to reduce central city traffic by 25-30% during peak hours, the government has instituted a system of charges for access to specific zones at specific times of day. The area pricing scheme, introduced in 1975, requires vehicles travelling through the city centre at peak hours to purchase a daily or monthly license and raises daytime parking fees within the restricted area. Cars with more than four passengers as well as buses and cycles are exempted. At the same time, the government has instituted a park-and-ride service to facilitate non-car commuting. Furthermore, it has imposed heavy taxes on the import, purchase, and registration of cars. A number of other measures — e.g., improved automobile inspection and repair, better industrial pollution monitoring and control, and tax incentives to replace old cars — have also been taken.

The effects have been quite dramatic. Traffic in restricted zones initially fell by 71% during peak periods; while it soon began to rise once more, seven years later private car traffic was still 64% lower than prior to the licensing scheme. Car pools have increased from 10% to 40% of all traffic, while 13% of car commuters into the zones have switched to public transport and about the same number have switched their commuting times to off-peak hours. All but one-tenth of “through zone” travellers have changed either travel time or route to avoid license fees. The budgetary costs of the scheme were quickly recovered out of licence fees. From an environmental perspective the scheme also appears to have been effective. There has been a substantial improvement in air quality, with declines in smoke levels, total acidity, nitric oxide and nitrogen dioxide.

ii) *Coping with water scarcity*. Irrigation water is very widely subsidised in developing countries, irrespective of its scarcity; in many cases it is provided free of charge. Overuse of water has often led to serious problems of salinization and waterlogging - problems that are compounded by inadequate drainage infrastructure. As a result, the economic productivity of investments in irrigation systems is undermined. Moreover, the absence of cost recovery in many irrigation schemes deprives them of funds for operating and maintenance expenses.

China, like many other developing countries, suffers from serious water shortages as the result of a combination of factors: wasteful use, droughts, and pollution. In 1985 the central government instituted reforms in agricultural policy which vested greater financial and managerial autonomy in provincial water management agencies. Agency budgets now derive from irrigation service fees paid by user associations and from income generating agency projects such as fisheries and livestock production. The fees are set at levels to cover operation, maintenance and amortisation of capital costs of irrigation systems.

To a degree, water user charges in China are indexed to the value of crops, with wheat farmers charged at cost and cash crop farmers at slightly above. Charges may also vary according to season, and in very dry areas progressive water pricing is used to reflect scarcity and steeply increasing marginal costs. As a result, irrigation water is now priced closer to actual cost and water use per hectare has declined. Decentralisation of management has contributed to improved efficiency in distribution through such means as allocating water according to land area, charging on a volumetric basis rather than at a flat rate, and preparing distribution plans in advance and with a more intimate knowledge of local needs. In some cases a local agency purchases water in bulk and then resells it to local water user associations responsible for distribution to farmers. These associations are in a good position to monitor water use and collect fees from members. The measures do not appear to have adversely affected crop yields.

There is no reason why other users of water should not be subject to a similar pricing scheme; in particular, both equity and efficiency objectives could be served by progressive water charges that reflect long-run supply costs. Large users are often wealthy businesses and individuals who are implicitly subsidised for their wasteful water use (for golf courses, lawns and gardens, luxury hotels) by the general taxpayer. A progressive water pricing scheme would fall most heavily on them.

Water is not only a natural resource but also a waste repository. In most developing countries the use of water for waste disposal is free by default. Efficiency demands that water prices reflect also the costs of waste disposal (or treatment). Since however not all water users dump the same volume or quality of waste, treatment charges must be graduated in accordance with type of use. Industrial users (and specific classes of industries) can be expected to create more costly treatment problems than the average household. Where hazardous waste is involved, there is need for supplementary measures (whether mandatory

water treatment prior to discharge or presumptive charges); some city authorities, e.g. Istanbul and Izmir in Turkey, have opted for graduated charges that vary with the quality of the effluent discharged.

iii) *Internalising environmental benefits: conserving a watershed and biodiversity.* Indonesia provides an interesting example of how economic utilisation of a resource can be made compatible with its conservation as well as of how economic incentives can be made to work hand-in-hand with regulation. In 1980, the government established the Dumoga-Bone National Park in Sulawesi as part of a much larger World Bank-financed irrigation project. The park serves the dual purpose of protecting a valuable watershed area used for downstream irrigation and conserving biodiversity. The establishment of the park is an extreme form of land use control (i.e., regulation) involving a ban on development. Once secured, there are different ways of ensuring its conservation and maintenance. In this case, water fees are collected from irrigation water users to finance both “services” that the park provides. Public provision of these services has proven indispensable, since watershed protection and biological conservation are both public goods which the market would have undersupplied due to problems of free riding.

iv) *Decentralising control over environmental resources.* A related example is the establishment of nature and game reserves in the Kafue Flats area of Zambia. The Kafue Flats are an area characterised by rich biodiversity, especially of bird species but also of mammals. Overexploitation has led to a steep decline in species populations. For the most part, wildlife is now confined to two national parks in the area, but poaching has threatened even these reserves. In 1986 the World Wide Fund for Nature (WWF) and the Zambian government initiated a project to address conservation needs. The sustainable utilisation of wildlife for safari hunting has been identified as an income generating development option for local communities. The realisation of this depends on controlling illegal poaching and organising legal hunting properly. It also requires a transfer of management responsibilities and benefits from the central government to local communities. The project has institutionalised the decentralisation of management responsibilities through the establishment of community development units (CDUs) consisting of roughly 20 villagers from a particular chiefdom. By conforming to rather than circumventing the local chief-dominated authority structure, the CDUs were able to enlist the co-operation of the powers that be. The project terms also ensure that more than 50% of the financial benefits from wildlife management accrue to local communities for employment, including training of villagers as anti-poaching “scouts”, and community development projects which are to be decided upon by the communities themselves through the CDUs. With this guarantee, the image of the poacher has changed: not only does he steal from the state but he steals from the community as well. The project suggests that a crucial element in designing an effective and durable incentive package is establishing a direct linkage between privileged access to resources (in this case, wildlife) on the one hand and the responsibility to manage them sustainably on the other. (Drijver and Zuiderwijk, 1991).

Towards More Effective Regulation

Although regulatory systems have not worked well in the past in developing countries, there are several reasons why they will continue to have an important place in the overall scheme of environmental management and why, therefore, there is a need to make regulation work better in the future:

While economic instruments could well be more effective in addressing many environmental problems, developing countries will continue to rely on a regulatory regime to “backstop” any incentive system; at the very least, regulation is often required to ensure that minimum acceptable standards of environmental performance are met.

Though sometimes portrayed as diametrically opposed to command-and-control methods, market-based instruments generally presuppose and build upon a basic regulatory framework so that, in practice, policies and programmes frequently combine elements of regulation with incentives.

Even in the developed countries, a track record of effective use of economic instruments is still to be built up and, thus far, CAC-type regulations remain the major approach. Moreover, in this setting, the CAC approach has been relatively effective in raising levels of environmental quality and stimulating innovation and investment in the development of less polluting technologies. Moreover, it is clear that a poorly designed incentive system can turn out to be a costly “policy failure” just as can an inappropriate regulation.

One reason regulations have so often “failed” is that they have been expected to correct problems for which other remedies are more appropriate. A properly devised environmental strategy must place regulatory measures in a broader context, including economic instruments, environmental education and social measures. In this way governments can avoid unrealistic expectations about what regulation alone can accomplish. Some lessons can be drawn from experience in seeking to upgrade and reform the regulatory apparatus.

a. Setting Realistic Objectives

Poor institutional design and weak institutional capacity are major hindrances to environmental management in developing countries. Both stem in large part from unrealistic objectives and expectations. Programmes should be structured to achieve some early successes, however modest, that serve to build confidence and that can be replicated. For example, it may be useful to design an ad hoc core programme targeted initially on one or two large and highly visible polluters — a chemical factory, a power plant, a pulp and paper mill, a waste water treatment facility. Interventions aimed at such “targets of opportunity” are also likely to result in the largest net environmental payoffs for a given level of regulatory effort. In Indonesia for example, it was discovered that four large industrial

polluters accounted for 77 percent of the pollution load to the Surabaya River. By targeting those four, the government forced reductions of roughly 80 percent in their pollution loads from 1985 to 1988 (ADB, 1990).

Even though governments may not like to admit that they are only able to tackle one or two problems at a time, it would be better to tackle those effectively than to be ineffective across the board. Setting overly ambitious environmental goals can result in regulatory paralysis. Regulatory systems need to be progressively built up based on an understanding of the broad social, economic, and political context as well as of the government structures within which they must operate. The approach via building up national regulatory institutions with broad authority, along the lines of OECD environmental agencies, before some initial experience and success with an ad hoc core programme, usually fails.

b. Working Methods: Co-operation and Consensus

The consultative approach seems especially well suited to developing country contexts. First, many countries have cultural traditions which emphasise consensus building and compromise over confrontation. Second, where government resources are limited, other parties may be able to contribute valuable technical inputs into the formulation of regulations, though the technical limitations of private industry in many developing countries also need to be recognised. Third, limited enforcement capabilities in many developing countries make it desirable to obtain as much voluntary compliance as possible. Of course, it would be unreasonable to expect firms to welcome regulations which raise their costs, but effective consultation and co-operation with industry can reduce the probability of widespread non-compliance.

Environmental authorities frequently must resign themselves to limited power within the government bureaucracy and therefore to the need to negotiate and compromise with other government agencies as well as with the private sector and the general public. In the Philippines for example, jurisdiction over various environmental media and ecological systems is dispersed among a variety of government agencies. Similarly, principal authority for granting licenses/approvals to major investment projects, with potentially large environmental impacts, resides outside the environmental agency. Nevertheless, agreement has been reached with the national economic planning agency that endorsement for financing of major projects should be conditional on their sponsors' first obtaining the required Environmental Clearance Certificate. Working closely with the planning agency increases the likelihood that environmental criteria will be addressed at the project design stage, before large investments have been made.

Similarly, the formulation of detailed requirements for environmental practice on the part of regulated parties is a complex task which can severely strain government resources. Moreover, there is a real danger that regulations, however impressive on paper, may be beyond the capacities of government to enforce and polluters to meet. To minimise this risk it is important for government to consult closely with those to be regulated in the early stages

of standard formulation. Consultations should be aimed at building the widest possible consensus among those to be regulated that the measures intended are necessary, reasonable, equitable, and affordable. A regulatory roundtable can provide a venue for constructive dialogue and negotiation leading to promulgation of new regulatory requirements. Ultimately, if the roundtable participants are unable to reach an acceptable compromise, the government has the option of setting (and trying to enforce) whatever rules, regulations and standards it considers necessary.

One example of this consultative approach in practice was the response by tanneries and the local government in Vaniambaddi, near Madras in India, to new central and state government regulations on emissions. The affected parties and local government representatives formed a committee which agreed to establish a central waste treatment facility for a few dozen tanneries, with the firms paying 75% of costs and the government the other 25%. Such collective treatment of specialised industry wastes may present advantages via scale economies, but it also usually requires zoning restrictions and possibly some relocation of existing industry to be viable. Firms may be persuaded to act collectively in dealing with common pollution problems, but enforcement and penalties for non-compliance also need to be credible.

To compensate in part for its own weak monitoring capacity, the government can require self-monitoring on the part of regulated firms, combined with “spot checks” by government regulators and stiff penalties for inaccurate reporting. Monitoring procedures need to be transparent so as to minimise the frequency of disputes over compliance. By involving firms themselves in the monitoring process, governments can avail of the former’s in-house technical expertise. Self-regulation is most likely to succeed where it is the collective undertaking of a group of firms in an industry, e.g., through an industry association, so that moral suasion can be brought to bear by the environmentally responsible members to coax others into compliance. Another (probably more costly) option, where qualified personnel are scarce and where low pay makes monitoring officers susceptible to accepting payoffs, is to rely on automatic (tamper-proof) on-site monitoring equipment.

Establishing links to communities affected by pollution or to concerned NGOs is often crucial to ensuring an informed, organised and politically influential constituency for the enforcement of stricter environmental standards. Moreover, citizens and NGOs can be mobilised to aid in environmental intelligence gathering and monitoring of compliance. They are often able to provide valuable information which might elude outside experts brought in to investigate local problems. In the Philippines, some affected communities have been organised and trained to participate in monitoring of polluting activities. Involving communities and NGOs in the monitoring process can help relieve the burden on the regulatory agency. There is the risk however that the devolution of monitoring responsibility to affected communities could lead on the one hand to heated confrontation between polluters and victims or, on the other, to “regulatory capture” where a community’s livelihood depends on the presence and financial well-being of a large polluter.

c. Promoting an Awareness of the Problems

Environmental agencies can perform a valuable function in raising awareness among the public and within other government branches of the economic costs of weak environmental management. For this purpose, reliable information needs to be compiled on the human health and other impacts of pollution. At the very least, comparative risk analysis should be employed to provide a basis for setting priorities; such a procedure ranks environmental problems according to the probability, magnitude and severity of their impacts (see USAID, 1990, for an application to Thailand). It may also be useful to estimate the economic losses (expressed in monetary terms) associated with specific environmental problems (see OECD, 1989b, for a discussion of monetary valuation techniques). *Triage* procedure can help identify not only the largest and most serious pollution problems but the ones that the government has a reasonable prospect of addressing effectively in the short to medium term. Relevant considerations are the cost and technical feasibility of control, institutional capabilities, and public perceptions.

d. Establishing the Regulatory Framework

There are several issues the regulatory authority needs to address in constructing a basic regulatory framework:

i) *Environmental quality standards*. These standards, which are based on health and environmental criteria, establish acceptable baseline limits for pollutant concentrations in specific environmental media. Some standards may be generic (i.e., not discriminating among uses of the environmental resource) while others may be differentiated. For example, higher water quality standards would be more appropriate for drinking water than for water for industrial use. Even comparatively low standards may be beyond the capacities of many countries to attain in the near term. In such cases it is better to work with realistic interim goals than with either no standards at all or with ones that are realisable only in a long run context.

ii) *Selecting the method of regulation*. Maximum permissible emission or effluent levels for specific sources or categories of sources are at the heart of most government environmental regulatory programmes. These are frequently expressed in terms of emissions per unit of output or input. Minimising the costs of introducing such regulations is apt to require: (a) imposing regulations on large polluters first, since they are better able to achieve economies of scale and to afford the financial expenses of pollution control; (b) introducing stricter standards earlier for new facilities than for existing ones (“grandfathering”), since designing those standards into the facilities from the outset is more cost effective than retrofitting existing plant and equipment. “Grandfathering” needs to be used sparingly, for it can discourage the entry of new firms with cleaner technologies. Newly industrialising countries with high investment rates stand to benefit most from pollution control technologies built into new plant and equipment, which are generally more cost effective than “end-of-pipe” solutions.

A polluting facility should ideally be viewed as an integrated unit and regulated as such. This “bubble” concept permits certain trade-offs to be made within the facility; if reducing pollution from one process is especially difficult, reductions elsewhere may be able to compensate. This approach is relatively new in the United States and other developed countries (which have traditionally regulated emissions from specific points or specific types of equipment within a facility). This is not a reason for developing countries not to adopt it since there are clearly efficiency gains, though monitoring of compliance may be somewhat more complicated.

Regulation by geographic area has proven to be a useful approach in cleaning up specific water bodies or protecting specific watershed or airshed areas. This is facilitated through the use of an integrated management approach introducing a measure of local decision making and implementation authority. For example, one recent Indonesian proposal would establish a river basin authority charged with environmental management of the Brantas River Basin in East Java. Financed from water user fees, the authority would be responsible, among other things, for the enforcement of water allocation licensing agreements (another instance of a hybrid regulation-cum-incentives approach).

iii) *Environmental Impact Assessment and Cost-Benefit Analysis*: If cost minimisation is to be achieved, then strong emphasis needs to be given to pollution prevention measures which ensure that less polluting technologies are designed into new projects. One of the best developed preventive tools is the Environmental Impact Assessment (EIA), which is normally applied to major investment projects with potentially significant environmental impacts. For this system to be effective, it must be possible to specify not just which activities are “environmentally critical” and therefore require an EIA but which prospective sites for the location of an activity may be critical. This involves “ecoprofiling,” a type of land use planning and zoning sensitive to various ecological parameters.

Another potentially useful tool for weighing the environmental impacts of public investment projects is environmental cost-benefit analysis (CBA). This involves the estimation of the environmental costs and benefits associated with a given investment project and their explicit incorporation in an expanded CBA. In the case of a hydroelectric dam for example, numerous potential environmental costs and benefits need to be estimated in monetary terms, including the probable impacts on human health, communities in the reservoir area, downstream agricultural productivity, fisheries, and biodiversity. Clearly, in using CBA the choice of discount rate affects significantly the results. Those who favour use of a low discount rate argue that too high a rate would lead to the rejection of environmental projects whose benefits take a long time to materialise. To this others respond that lowering discount rates could end up favouring projects with negative environmental consequences over projects that are more environmentally sound (e.g., hydroelectric power over gas-fired combined cycle stations) (Winpenny, 1991).

While there is undoubted value in seeking to monetise environmental costs and benefits for project appraisal purposes, complex environmental interactions cannot easily be reduced to scalar measures. For many purposes, an EIA may better capture the multiple,

qualitative dimensions of a project's environmental consequences. Moreover, even without calculating monetary values there are still useful ways of ranking environmental risks. In any event, the EIA and environmental CBA are not alternatives but complementary exercises; the latter relies on basic environmental and epidemiological data supplied by the former (OECD, 1989b).

e. Enforcing the Regulations

Developing country regulators most often falter when it comes to effective enforcement. The following points need to be considered in seeking to improve performance in this area:

i) *Research and monitoring.* The absence of good baseline data and a research and monitoring capacity does not necessarily negate the usefulness of regulation. Still, without adequate resources for monitoring (e.g., equipment and testing facilities and trained personnel), regulatory effectiveness is diminished. In the Philippines for instance, only half of the fourteen regional environmental offices have established laboratories capable of even basic testing. Often, reports on polluters are based on visual observation, which is inadmissible evidence in a court of law. Moreover, problems may become visible long after they have become serious (Ganapin, 1991).

ii) *Compliance.* In the best of circumstances, voluntary compliance is unlikely ever to be total, so the government will have to resort to some means of enforcement. Most often this involves a combination of administrative and legal measures; e.g., a fine levied on a firm found in violation of emission standards (or perhaps closure for repeated violations), with the possibility of the firm's challenging the ruling in court. Cases involving the assignment of liability and the payment of compensation for health and other damages from environmental discharges are generally more complex to resolve. Judges and jurists normally lack the specialised expertise needed to weigh scientific evidence regarding the link between environmental cause and health effects. If it is to rely on the legal system, a country must possess a well-functioning set of legal institutions, including well-defined property rights and enforceable contracts. Even then, the legal route may be an ineffective one, either because it rules out many legitimate cases because of its strict rules of evidence or because it allocates the entire burden of damage compensation to sources responsible for only a small portion of the damage (Menell, 1991).

Government may well lose the first few cases prosecuted, but if it has a consistent record of losses the threat of prosecution has little deterrent value. Prosecuting cases to their conclusion can be time consuming and costly for all parties, so many cases are likely to end in negotiated settlements. These need to be accompanied by precise and legally enforceable commitments on the part of the defendants, which may go beyond the case at hand to include broader pollution prevention measures.

Alternatives to litigation include arbitration and environmental mediation. Where a case is submitted to an arbitrator, the decision reached may be either a recommendation or a binding opinion, depending on the terms of arbitration. In the case of mediation, the purpose is to help the two parties reach a common ground for resolving their differences. In the Philippines, the resolution of environmental disputes has traditionally been left to court litigation, but due to excessive backlogs more attention has been focused recently on these alternative mechanisms.

iii) *Dealing with sins of the past.* One difficult issue when stricter regulations are introduced is how firms operating before the regulations went into force should be treated, including those that were not even in compliance with the weaker regulations. The costs of compliance with the new ones are apt to be substantial but adjustment can be eased for existing firms through “grandfathering” as noted above. If the government were to impose penalties retroactively for non-compliance with the old regulations, this would pose an additional cost burden and encourage continued regulatory evasion. In the Philippines, the government is considering an amnesty programme for past pollution offenders in exchange for their commitment to invest in new pollution control facilities (Ganapin, 1991).

Ensuring the Sustainability of Environmental Management

Given the resource demands of effective environmental management, the government needs to consider both the most effective way of mobilising resources and the most efficient way of utilising them. The resource requirements of environmental management are themselves variable, depending primarily on how far the government delegates investment decision making and financial responsibilities to the private sector. Such delegation would be especially significant where market-based instruments (MBIs) are widely employed; however, even in this case, government still needs to assume responsibility for setting environmental standards and monitoring their observance, as well as for the overall direction of environmental policy.

Where the government does rely heavily on MBIs, they can be sources of revenue (e.g., pollution taxes and user charges) out of which environmental management costs can be financed. In the case of pollution taxes however, the revenue stream continues only so long as the pollution persists. Thus, if continuity in the government’s capacity to formulate and administer environmental policy is to be ensured, financing cannot depend solely on pollution-linked taxes (Anderson, 1991).

a. Raising Revenues

Ideally, policies aimed at solving an environmental problem should simultaneously generate economic payoffs to society and financial returns to government. Perhaps the clearest case of a policy which achieves all three objectives is urban congestion pricing. (The Singapore experience was described above.) An access fee to congested motor routes or

central city districts should serve simultaneously to reduce the time lost in traffic jams and the emissions from motor vehicles. At the same time, it should generate a financial surplus which the government can use for a variety of purposes, from providing tax relief elsewhere to investment in public transport.

Vehicle and industrial emission charges are other “self-financing” anti-pollution measures, though their revenue effect (with the exception of carbon taxes) is apt to be smaller and of shorter duration than congestion pricing. Efforts to deal with the problem of global warming have generated a lively debate on the desirability of introducing carbon taxes. While objections can legitimately be raised to carbon taxes on equity grounds (see Poterba, 1991, for example), such taxes have certain desirable properties from the perspective of revenue generation and economic efficiency. Given the long lead times required to refine low carbon technologies and then to build new power generating capacity, taxes would continue to generate revenues for years to come. Moreover, since energy demand is relatively price inelastic, energy consumption is a good candidate for indirect taxation on efficiency grounds. Meanwhile, the tax would serve as a strong incentive to conservation as well as to private investment in the development of renewable energy sources, in which certain developing countries may enjoy a comparative advantage.

Developing country governments have long resorted to subsidising not only investment but also operating and maintenance costs of water, sewerage and waste disposal. Yet, cost-based prices would leave governments better able to expand supplies of these socially and environmentally important services, including to low income areas. Excessive water use and waste generation would be discouraged. Moreover, governments could improve their fiscal position through savings on subsidies. The extraction of resource rents through more effective taxation — from forest, fishery, and other valuable but increasingly scarce resources — can also yield sizeable government revenues while encouraging more sustainable resource use.

b. Financing Environmental Investments

Environmental investments will frequently require up-front outlays from the public sector with cost recovery at later stages, and some investments are not likely to be self-financing. The protection of forest and wildlife reserves as well as soil conservation programmes, for example, may require sizeable government investments which are not easily recoverable through user charges or taxes (though the Dumoga-Bone and Kafue Flats examples above suggest at least partial cost recovery may be possible). It is therefore all the more important that other environmental measures generate surplus revenues which can be used to finance those non-recoverable investments.

More than two decades of experience with the formulation of national environmental policy in Latin America have taught at least one important lesson: policy initiatives must be accompanied by measures designed to provide the necessary financing for their proper implementation. This recognition is reflected in the ongoing collaborative effort of the

Organisation of American States (OAS) and the government of Uruguay. The aim is to develop a broad environmental policy framework and concrete measures for implementation, while at the same time formulating environmental investment project proposals with a view to securing bank financing. The projects are designed to address problems like air and water pollution, solid waste disposal, and watershed management. The outcome of the exercise will be not merely an environmental policy but a national environmental investment portfolio. The fact that a number of the proposed projects appear economically feasible runs counter to a commonly held perception that “environmental projects” are generally unbankable (Rodgers, 1991). More such projects would look economically and financially attractive if major price distortions were first removed; e.g., water treatment/recycling projects could pay if water prices were not heavily subsidised.

c. Co-ordination and Planning

As emphasized on several occasions in this policy brief, effective environmental management requires an appropriate institutional framework. If a specialised environmental agency is to play an effective role, it must seek to influence and to co-ordinate effectively with other government agencies and public and private sector institutions. Co-ordination can take a variety of forms but success often seems to depend on taking into account (and compensating for) the costs to agencies of co-operation, both in terms of staff time and other resources. This seems to be particularly important at the regional and local levels, where much of the action takes place and where, in practice, co-ordination and effective management is often weakest. On the other hand, such co-ordination can work very well when designed into the system. Nowhere is the need for such co-ordination more apparent than in integrated area (e.g., river basin) development planning.

One institutional set-up which seems to have worked especially well is the designation of a regional development corporation as the agency responsible for both formulation and implementation of an integrated plan. In Venezuela for example, the Zulia Regional Development Corporation, which is responsible for the major oil-producing region, commissioned the preparation of a natural resources development plan in 1972-75 and then ensured the implementation of its recommendations. Environmental experts need to be involved in the planning exercise from the outset to ensure that renewable resources are exploited at sustainable rates and that vital ecosystems are protected. In cases where such corporations do not already exist, the government may appoint a study team to prepare a plan with a proviso that it could evolve into the nucleus of a newly established development corporation upon completion. This has occurred, for example, in the case of the Naino-Putumayo regional study in Colombia.

Where the planning includes the formulation of fundable investment projects, the injection of financial resources can itself provide the basis for institutional strengthening in the regional development context. Eco-tourism projects can generate financing for local environmental management efforts as well as providing broader economic benefits to local

communities. Ideally, regional development agencies should derive a substantial portion of their budgets for environmental management from the revenues generated by the natural resources within their jurisdiction. In this way there is a built-in incentive to manage those resources sustainably.

Environmental Management and Development Assistance

The spectrum of opportunities for the developed countries to assist in the strengthening of environmental management systems in developing countries is broad indeed. It includes capital financing or project aid for: civil works and equipment for water and hazardous waste treatment and air pollution control, soil and watershed conservation, reforestation, the preservation of ecosystems and species in the interests of biodiversity, and monitoring and other scientific equipment. Technical support is also urgently needed in the areas of: system establishment and reform, the use of MBIs and price reforms generally, and staff training for environmental administrators, technicians, lawyers, and mediators. The developed countries can also help through the support of the NGO community, through the exchange of information, and through the encouragement and provision of incentives to their business communities to extend their expertise and technical know-how to meet what is a worldwide challenge. The co-operative effort of developed country governments and businesses to transfer CFC-free technologies to developing countries under the terms of the Montreal Protocol illustrates well the possibilities.

Despite an upsurge of interest and activity in recent years, there is — as this brief attests — still a vast amount to be done. In some respects, the effort is most advanced where the traditional project mode of support works best — e.g., in financing physical infrastructure investments. Of course, much more could be done through imaginative designs and new types of projects. Still, within current constraints and competing demands on resources potentially available for aid, the environment has already established itself as an important priority. This has occurred not least through the improved environmental standards (e.g., EIAs) required of many traditional investment projects. More effort is needed in strengthening the institutional and policy making infrastructure, which involves the sharing of information and experience in policy formulation and in the use of various policy instruments. This could be facilitated through improved government-to-government information diffusion of the sort that regularly occurs within the OECD.

a. The Bilateral Aid Agencies

Partly at the prodding of their domestic “green lobbies,” most bilateral agencies have become far more sensitive in recent years to environmental concerns, beefing up the quantity and quality of the environmental tools at their disposal. The majority already have formal procedures for assessing the environmental aspects of their development assistance policies and programmes. The OECD Development Assistance Committee (DAC) has prepared a

document summarising “Good Practices for Environmental Impact Assessment of Development Projects” to guide bilateral donors’ project preparation efforts. A number of bilaterals are beginning to experiment with natural resource accounting and environmental cost/benefit analysis.

Bilateral sponsorship of country environmental studies (CES) is now commonplace. These plus World Bank-style national environment action plans (NEAPs) have come to serve as a focus for efforts of various donor agencies to co-ordinate their investment programmes with a view to complementing one another’s environmental initiatives. They have facilitated dialogue between donors and governments on environmental issues, and they have provided the occasion for the examination of environmental impacts of ongoing development assistance projects. The DAC of the OECD has recently issued guidelines on “Good Practices for Country Environmental Surveys and Strategies” which reflect the current consensus in this field. Bilateral aid agencies are also providing support for the development of environmental regulatory institutions. Together with foundations and developed country NGOs, they are involved in staff training and other technical support to developing country NGOs to strengthen their managerial capabilities and organisational effectiveness. More needs to be done in this area however.

b. Multilateral Development Banks [MDBs]

Policy and practice among the MDBs have also made large strides in recent years. One noteworthy change has been the shift from a project-by-project approach to environmental concerns to a policy-oriented approach emphasizing broader issues of environmental management (see Turnham, 1991). Perhaps the most ambitious exercise of this kind to date is the Asian Development Bank’s multi-country study on *Economic Policies for Sustainable Development* (1990).

The multilaterals have also greatly strengthened their organisational capabilities to deal with environmental issues: in the case of the World Bank for example, staffing increased from a five-person Environment Unit in the mid-1980s to 80 full-time staff and consultants dealing with environment by 1990. The “environmental loan” portfolios (broadly defined) of the multilateral banks have also been expanding rapidly, with the World Bank listing 107 loans in fiscal year 1990 (48% of new loans) as containing environmental components (World Bank, 1990). The Inter-American Development Bank’s Environment Committee currently has some US\$1 billion worth of environmental projects in preparation, ranging from watershed management to decontamination of water supplies to coastal management to the establishment of an environmental fund in Brazil for on-lending to NGOs and grassroots organisations. The multilaterals have been placing much stronger emphasis than previously on the involvement of NGOs in environment-related projects. The IADB, for example, has pledged not only to integrate environmental considerations at all levels of

decision making, but to involve local NGOs and popular organisations in the planning and execution of its projects. This involves, among others, periodic consultations with environmental NGOs in North America and Europe.

The multilaterals continue to face daunting challenges in their environmental work. The IADB experience may not be wholly representative but it is at least suggestive. While three-fourths of its loans now require environmental impact assessments, the quality of the EIAs is variable but generally not high. Few countries in Latin America have their own laws regarding EIAs, so local personnel qualified to undertake them are scarce. Procedures and practices are still weak for performing EIAs in the context of sectoral or global lending activities. Moreover, while there is interest among governments in environmental projects, the quality of the proposals they put forward tends to be low, with the result that the IADB must generate its own project ideas, raising sensitivities that it is imposing its views and priorities on borrowers. Finally, environmental institutions (both public and private sector) in many countries are extremely weak, making project implementation difficult. Institution building may therefore need to be the first priority for environmental financing, involving a strong element of technical assistance.

One problem faced uniquely by the multilateral banks is that their developing country board members do not necessarily share the priorities of developed country members, arguing at times that “green conditionality” is being forced on borrower countries to appease environmental lobbies in lender countries. Within the borrower countries, environmental agencies are usually quite powerless to shape major decisions affecting the allocation of financial resources and the determination of tax, price and fiscal policies. Even within the multilateral themselves, and despite the growing resource commitments to environmental concerns, environmental units still often have limited influence in setting broad policy direction and shaping lending priorities.

c. The International Policy Agenda

Environmental issues have moved to the top of the international policy agenda, in part due to critical concern over global issues like climate change and ozone depletion. What distinguishes the current situation is the growing recognition in all quarters of the inextricable link between environmental and development concerns. The Earth Summit of the UN Conference on Environment and Development (UNCED) scheduled for Brazil in June 1992 will lend further emphasis to these common concerns and will seek to promote further co-operative action at the highest political level. The developing countries recognise that global environmental problems give them a perhaps unprecedented degree of leverage to negotiate with industrialised countries a *quid pro quo* for their participation in any international conventions. The establishment of an Interim Multilateral Fund to help developing countries cover their incremental costs of compliance with the Montreal Protocol on Substances that Deplete the Ozone Layer is the clearest indication to date that developed countries are prepared to free up resources to enlist the co-operation of

developing countries in addressing common environmental concerns. The very recent joint meeting of the OECD Ministers of Environment and Development (held on 2-3 December 1991) has also acknowledged the special responsibilities of the OECD Member countries in the international pursuit of sustainable development.

The real test of global resolve is still to come with the negotiation of a global agreement on global climate change and the reduction of greenhouse gas emissions. The potential costs to developing countries could be orders of magnitude greater than in case of ozone layer protection. In the developing countries, rapid industrial and economic development create strong demands for new energy generating capacity. While greater energy conservation may dampen demand growth, ultimately much new energy demand will have to be met from alternative sources or with new generating technologies that are still in many cases more costly than traditional ones. Even today, developing countries are likely to find it difficult if not impossible to finance planned investments in coal- and oil-fueled power plants. Similarly, there is an absence or limited development of sewerage and effluent treatment systems as well as a lack of clean water — all of which take a heavy toll in human health terms in developing countries. Here too, finance is often lacking for the construction of more adequate systems. The extent to which the developed nations will dig deeper into their pockets to finance the immense need for capital to upgrade and to safeguard the environment in the developing world is still perhaps the largest open question on the international agenda.

A further challenge is posed in terms of the need for the rapid development and diffusion of new, affordable “clean energy” technologies and other technologies for the elimination or capture of greenhouse gases; also, technologies to deal with other environmental problems in developing countries. In the first instance, the international diffusion of environmentally sounder technologies involves commercial transactions between firms or transfers within firms. Once policy reforms in developing countries raise the costs of polluting, stronger incentives to acquire cleaner technologies should come into play. There are increasing numbers of clean technology suppliers in any given field, so competition is becoming more intense, helping to hold down prices. At the same time, those suppliers expect to recoup R&D and investment outlays through their international sales. A key concern voiced by developing countries is that they should have access to those new technologies on the most favourable terms.

Developing countries may need technical assistance to strengthen their capacity to absorb and utilise new, cleaner technologies developed in the OECD Member countries. There may also be considerable scope, given adequate technological capabilities, for the adaptation of imported technologies to local environments and even the local development of innovative environmental technologies. Opportunities for co-operation between developed and developing countries in joint technology development need to be explored, especially where technology design is location- or environment-specific. In the development and adaptation of commercially viable technologies, partnerships between private

firms are likely to prove most productive. For more basic environmental research, collaboration between universities or research institutes in different countries may be desirable.

Here too, the recent OECD meeting of Ministers produced an agreement to expand technology co-operation, provide assistance and address barriers to technology transfer. The appropriate role for the donor community in fostering technology co-operation for environmentally sustainable development is also to be further explored through OECD's Development Assistance Committee.

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DEVELOPMENT CENTRE POLICY BRIEFS

In its research activities, the OECD Development Centre seeks to identify issues that will become of growing concern in the near future and whose implications are of vital interest to both OECD Member and non-member countries. This work naturally gives rise to publications and documents containing research findings and offering policy directions for dealing with the issues involved.

The *Policy Briefs* have been designed to make the policy conclusions and implications from the research accessible in a succinct and timely way to policy makers and others who might not usually come into contact with or have time to read the complete studies. They are intended to stimulate reflection and discussion, leading to a better understanding of the issues, and contribute to the resolution of some key problems.

To come to grips with their serious environmental problems, developing countries must design and implement workable systems of environmental management. This *Policy Brief* seeks to distill lessons in environmental planning and policy making from a range of experiences in both developing countries and OECD Member countries. It examines how governments need to set environmental priorities in the face of tight resource constraints, how they can improve the effectiveness of the regulatory system, and how they might employ market-based instruments to cope with some of the shortcomings of “command-and-control.” It highlights the need for private sector, NGO and popular participation in the environmental management effort. Finally, it identifies the role of the international donor community in strengthening environmental institutions and policies in developing countries.