CHAPTER 11
IMPLEMENTING SUSTAINABLE DEVELOPMENT THROUGH POLICY AND ECONOMIC INSTRUMENTS

Effective environmental agreements need to include carrots as well as sticks. (French, 1992, p. 165)

IMPERATIVES FOR SUSTAINABLE DEVELOPMENT

The direct management of the resource base of the globe is in the hands of the millions of individuals who make use of specific parts of the global environment. There are many different forms of rights to these resources — from individual to collective, community or nationally based, founded on ownership or user rights to territory (land), or based on use rights to specific resources such as trees, minerals, or water. In all cases, individual environmental managers make their decisions at least partly in response to the messages they receive from regulatory agencies, from government policies, or from the marketplace. As a consequence, there exist many means to influence environmental decisions through the policies and programs of governments at all levels, and through the mechanism of the marketplace. This chapter reviews the range of policy and financial levers available for influencing decision makers at all levels, and examines some of the more promising approaches and strategies for achieving environmental objectives through the use of these instruments.

The World Commission on Environment and Development (WCED, 1987) argued persuasively that the establishment of a sustainable system will require far more than traditional governmental legislative and regulatory systems. At the same time, many governments are encountering popular resistance to further regulation, as well as calls to limit the growing government presence in the lives and business of private citizens. The resolution of the global problematique will involve mobilization of all partners in the pursuit of environmental citizenship. But how can this transition be effected? The emerging imperatives for national and local governments, particularly in nations of the North, include:

- pressure to reduce the government regulatory presence;
- pressure to reduce the overall levels of taxation and government activity;
- pressure to respond to increasing demands for environmental accountability by government and industry;
- a growing demand for greater direct public and community participation in decision making; and
- pressure to integrate economic, social, and environmental planning and delivery mechanisms.
In developing countries, the same imperatives are present, in the face of pressure to maintain or accelerate the rate of economic growth and development. An important response has been to examine the degree to which existing policy instruments and the market economy can be mobilized to help incorporate environmental values in decision-making processes, and to deliver desired environmental results.

This chapter summarizes a range of policy tools and economic instruments that show promise as means for promoting environmentally sound development and management activity. The instruments discussed fall into the following broad categories.

- **Policy Instruments:**
  - modification of existing policies and programs
  - review of new programs

- **Economic Instruments:**
  - marketplace instruments
  - financial instruments
  - marketplace opportunities

Together, these present a menu of powerful tools that can be used to address particular types of environmental issues as substitutes for, or adjuncts to, the more traditional regulatory approach to environmental governance.

**POLICY INSTRUMENTS**

All nations and local jurisdictions have in place a variety of policies and programs aimed at achieving their mandated objectives. Normally, these are designed to address particular goals or meet specific needs — to encourage food production, to transport goods quickly, to provide housing, or to create jobs, for example. Most such policies and programs are not explicitly environmental; yet in the delivery, all can have positive or negative environmental side effects. All these policy instruments have the potential to be used to support sound and sustainable practice, or to penalize poor practice, but they have seldom been effectively used for these purposes.

Government programs strongly influence the message received by each individual decision maker regarding the relative merits of different decisions and the benefits likely to be received from making them. A 1986 Canadian study (Bond et al., 1986) documented the effects of current national-level policies and programs on environmental management, focusing particularly on land resources. The study identified over 1,000 federal government policies and programs that can influence individual decisions with respect to the environment, as well as a similar number of provincial instruments in each jurisdiction. Empirical research on rural decision makers in North America, New Zealand, and Europe has shown clearly that citizens make management decisions within the framework of the policies and programs of government bodies (e.g., Munton, 1987). However, few of these policies and programs are viewed, by those who administer them, to be environmental instruments with clear-cut environmental impacts.

**Modification of Current Policy Instruments**

How can current policy instruments be modified to better reflect environmental objectives and to minimize negative impacts? Most government programs and policies, covering a myriad of individual projects, subsidies, regulatory mechanisms, and information initiatives, operate largely in ignorance of their own environmental impacts (Bond et al., 1986). Yet, to a great extent, they establish the parameters within which
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**Government Policy Instruments**

- Regulation
- Financial incentives
- Sectoral development policies and incentives
- Regional development policies and incentives
- Management policies and procedures for publicly owned property and facilities
- Operational guidelines for government activity
- Public works investments
- Research and information
- Fiscal and budgetary measures

(After Bond et al., 1986.)

the "free" market operates. In Canada, wheat quota conditions were found to be encouraging tillage of erosion-prone hillsides to create marginal farmlands; health-related regulations were found to encourage wasteful packaging; the cumulative effects of two drainage subsidy programs resulted in paying rural residents large sums to drain good wildlife habitat to create farmland, which in many cases would never be used for intensive production (Bond et al., 1986). Several hundred such programs were found to have inadvertent negative effects. A majority of these could be avoided through relatively straightforward redesign of the programs in question, sometimes through a very simple alteration to the conditions for eligibility, or to the operational guidelines for field managers. Similarly, many programs with potentially positive effects were found to lack the design to allow these effects to be realized. For example, policy instruments could require cross-compliance to conservation practices with no additional cost either to the program or to the recipients of the program.

Similar unintended impacts of government programs have been reported in many parts of the world. In Barbados, water and sewage servicing programs sponsored by development banks have contributed to the depletion of the freshwater aquifer on which much of the nation depends for its water supply (Manning, 1993). Tourism development programs in many nations (e.g., Spain, India, Malaysia) have resulted in polluted beaches and watercourses, to the detriment of both the environment and the industry dependent upon it. In some areas, programs to improve infrastructure have only concentrated pollutants in particular environments, rather than managed the problem (Manning 1993). In many cases, these programs could have been employed to solve, rather than exacerbate, environmental problems. If the problems had been adequately anticipated in a review or Environmental Impact Assessment (EIA) process, the same programs could have been designed to address environmental effects as integral parts of the program and its component projects. What is clear from the limited number of empirical studies of government program effects on the environment is that negative environmental impacts are frequently incidental and unforeseen — yet often significant.

The significant unforeseen environmental impacts of government policies are replicated at a global scale. Trade wars in grains and oilseeds — with consequent subsidy battles involving European and North American agriculture, and therefore global market prices for these commodities — determine the incentives offered worldwide for different commodities. Changes in them can either encourage or discourage different land uses, affecting the global distribution of production of key food
Inadvertent Impacts of Infrastructure Programs Cause Fruitland Loss

A study of factors influencing fruitland loss in the Okanagan valley of British Columbia, Canada, identified several dozen programs from different levels of government that provided the framework within which most decisions affecting environmental management were made. These included infrastructural programs, transportation and storage subsidies, and research into new fruit varieties. Overall, these programs clearly support the economic vitality of the fruit-producing sector. Yet, the inadvertent effects of one program led to the near elimination of the industry from the best and most productive lands. The servicing of the fruitland area to domestic standards with water under a joint federal/provincial irrigation program resulted in nearly all urban growth in the 1970s being directed onto existing productive orchards — removing nearly a quarter of the land with fruit production potential and raising market values for the land to levels that priced the land too high to be used for orchards. This unfortunate situation was only rectified when the province countered the effects of this program with restrictive agricultural land protection legislation (Kerr et al., 1986).

crops, and determining whether or not farmers in all parts of the world have the wherewithal to undertake sustainable farming practices. “Farm policy in the United States, Japan, and Western Europe has been exceedingly economically inefficient, exceedingly burdensome fiscally, disruptive of trading relations among these regions, harmful to agricultural producers in other regions, and highly regressive (since benefits are proportional to amounts produced). In addition, these policies encourage environmentally damaging and ecologically unsustainable farming systems” (Repetto, 1990). Similarly, the impacts of taxation and royalty policies for forestry in one country can affect the production and export levels of forest products from that country, and the market advantage of all competitors. The establishment or elimination of tariff barriers also clearly influences commodity prices for export products such as rubber, fruits, sugar, or hardwoods from developing countries.

Integration of Environmental Factors into New Policies and Programs

Until recently, most government policy instruments have operated largely without integration of environmental factors. It is common for policies and programs to be subjected to environmental review only after completion of the project or in response to specific incidents of public reaction to highly visible problems. The principal objective of most government programs has been to deliver a specific product or service, such as housing, product safety, or effective transportation services. Managers therefore have sought solutions that:

› apply to specific problems;
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- are within their mandate;
- are cost-effective, particularly in terms of their own budgets; and
- provide visible results in the short term.

This has fragmented the management process into departments and categories that are resistant to "externalities" such as environmental concerns, long-term implications for the sector or other sectors, and cross-sectoral impacts.

When large projects are involved, the environmental impact assessment (EIA) process may act as a safeguard to limit the adverse effects of individual projects. However, the EIA process is seldom sufficiently broad-based to assess the cumulative effects of many projects within the context of broader programs or policies. The Organization for Economic Cooperation and Development (OECD) has led the work of examining the effective integration of environmental and economic policy and program instruments (OECD, 1988), but few good models exist. With respect to agriculture, in particular, commodity subsidies in various forms have altered the economics of production significantly — to the extent that British sources (Munton, 1987) have calculated that if the government wished to acquire a hectare of land for conservation purposes in that nation, the first several thousand pounds sterling would go to offset the effects of agricultural subsidies.

Efforts to broaden the perspectives of government program managers have brought mixed results. These efforts have included mechanisms such as roundtables, regional think tanks, conservation strategy development, and internal review procedures. There are some promising advances, such as efforts under the North American Waterfowl Management Plan to integrate wildlife protection values into rural development programs (Girt, 1990; Manning, 1991). One approach has been to suggest that farmers be treated as rural managers, and that the means be found to reward them not only for food production, but also for the full range of values they provide to society, such as habitat management, water supply management, rural environmental and aesthetic maintenance, erosion control, and so on (Bond, 1981). It should be noted, however, that most government programs and the offices that administer them are designed to promote specific production options; significant institutional changes may be required if these broader objectives are to be fostered.

One encouraging new development is the effort to integrate comprehensive planning and environmental assessment to address a broad range of environmental, economic, and social objectives. In North America, advance review of policies and programs is emerging from the EIA tradition — essentially a regulatory and review approach. Formal legislation of review processes has been motivated by a realization by governments that the population is willing to empower them to limit individual and corporate actions more rigorously — a reaction to a visible change in the public ethic relative to environmental concerns. But the extension of this to policies and programs has been slow to occur, as the needed methodologies are just emerging. Furthermore, the policy-making process tends to occur within a very politicized arena, and policy makers have been reluctant to grant to anybody the ability to second-guess policy decisions relating to their own portfolios. In Canada, under the national environmental strategy called the Green Plan (Government of Canada, 1990), each government minister has been charged with the responsibility for the environmental review of the policies and programs of his or her own department —
an attempt to internalize the responsibility and accountability within each body. This has resulted in a somewhat limited review procedure for most new policies, in part because of the lack of expertise and experience in this new field, and the comparative lack of ability to predict the impacts of new programs effectively.

**ECONOMIC INSTRUMENTS**

Partly in response to the report by the World Commission on Environment and Development (WCED, 1987), there has been increased consideration of the use of marketplace and financial mechanisms to achieve environmental objectives. This is commensurate with:

- a recognition by governments that they cannot accomplish these goals alone, but must seek to mobilize private sector partners;
- a desire to reduce unpopular regulation;
- a desire to achieve fairness in the distribution of costs and benefits;
- a desire to make social and private benefits and costs match, in order to motivate private decision makers to take socially or environmentally desirable actions;
- an effort to anticipate and prevent problems from occurring (e.g., Crerar, 1986).

Because most of the economic activity and property of the planet is privately owned and managed, the mobilization of the marketplace to aid in the achievement of environmental objectives is very promising.

**Marketplace Instruments**

Specific marketplace tactics are commonly aimed at using the existing economic system as an instrument of change — giving individual decision makers consistent economic messages on what is desirable from an environmental point of view (Stavins, 1990; OECD, 1988). While environmental goals continue to be set within a broad policy framework, increased attention is being given to the use of specific economic instruments to achieve these goals. A very wide range of economic tools has been given consideration by bodies such as the OECD Environment Committee (1988), the World Resources Institute, the WCED (e.g., submission by the Nordic Council of Ministers, 1985), and Canada’s National Round Table on the Environment and the Economy (e.g., Cassils 1991). Proposals for the use of market-based instruments have included a number of different approaches aimed at business, industry and commerce, and at the modification of consumer and producer behavior, such as:

- the licence to sell or trade pollution permits or emission rights;
- the sale of development rights;
- various approaches to full-cost pricing;
- full-cost accounting;
- user-pay or use charges; and
- performance bonds.

**Pollution Permits.** The concept of pollution markets based on tradable “permits to pollute” or emission rights has emerged from the need for private industry to respond to pollution caps or legislated limits. Typically,
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a specific limit would have been legislated on the basis of tolerable pollution levels in a stream, or as total airborne emissions in a region or industry. One such example is the 1994 emission cap for sulfur dioxide negotiated as part of the Canada-U.S. agreement on control of acid rain (The Agreement between the Government of Canada and the Government of the United States on Air Quality, 1991). This cap is less than the total of current emissions; therefore, someone will have to reduce emissions in order to meet the stated goal. A “tradable pollution rights” approach allows the marketplace to decide who will reduce and who will not, as long as the overall cap is achieved. Each current polluter obtains the right to pollute to the current level. As limits are reduced, the amount of pollution associated with each right or quota unit is reduced. Polluters have the choice: Reduce or acquire more rights by buying them from someone else. Those who wish to modify their operations, and can easily reduce emissions below the new limits, can sell their rights to those who need them because they cannot easily reduce. The market sets the price at which rights change hands. If new technologies make it very cheap and easy to meet the cap, the price will be low.

While offering flexibility to industries to choose their mode of response, this raises ethical questions regarding the existence and capitalization of “negative rights.” The decision to allow some pollution to occur must be taken first — the market then offers a way to deal with allocating the rights to pollute in an equitable fashion. Concerns with this approach are mainly related to ensuring that the “allowable” levels of pollution reflect empirically defensible levels of ecological damage or social cost. A further problem is the question of who must pay for common property rights, and who is to be compensated for their use. Shall polluters have to purchase pollution rights from the public in the first place, in order to compensate them for the costs of degrading their common property — the air, the water, or their health? Another concern is the boundaries of markets; can one region buy up all the pollution rights of another to create pollution havens and stimulate particular types of industry in their area? What happens if this exceeds the local carrying capacity of the watercourse, or causes the air quality in a particular area to exceed safe levels? These questions have yet to be resolved satisfactorily.

Development Rights. The concept of property covers a range of rights — rights to use, access, or sale, for example — that differ from one judicial system to the next. In most jurisdictions, however, these rights can be distinguished and separated from one another. This permits the sale or trading of particular rights, such as the right to develop, the right to block access, or the right to drain wetland wildlife habitat. The purchase of specific rights as easements, or the purchase outright of property followed by resale to others with caveats on the title, is now a common means to obtain environmental rights, used world-wide. This includes efforts by conservation groups in the North to acquire and protect areas in developing countries. One variation has been the introduction of Debt-for-Nature Swaps at the international (multinational or bilateral) level as a means of mobilizing Northern funding for the protection of specific environments in the South, while reducing the external debt load of developing countries. Private and government conservation organizations in Europe and North America frequently acquire specific rights from landowners. In areas of valued habitat such as wetlands or breeding areas, landowners commonly own the rights to use, sell, and/or develop their
land, excluding the right to drain the wetland or cut the woodlot. Those valuing the preservation of these environments have, in effect, created a market for them — or for specific attributes of those areas — and have paid to acquire the rights to those attributes that they value.

Development rights markets have been used primarily where individual property rights are strongly protected by law. In the United States, for example, direct government intervention through restrictive zoning or expropriation has often been ruled unconstitutional, or subject to compensation. Therefore development rights markets have been set up, primarily to allow the zoning “winners” to compensate the “losers.” In several U.S. jurisdictions (e.g., Kansas), this approach has been used along with farmland protection zoning. In simple terms, the owner of each acre receives one development right. If half of a county or region is zoned for agriculture and half designated for development, anyone who develops must produce two development rights for permission to develop. These can be purchased from those who are denied development by zoning regulations; the price is set by the pace of growth and by the number of willing sellers. The objective of this approach is to ensure equity among those who win or lose when a zoning decision is made. In practice, results have been mixed, although this seems a promising approach where fairness is the key objective. It may have broader application where there are clear winners and losers from decisions aimed at protecting common property resources.

**Full-Cost Pricing.** The philosophy behind resource pricing approaches is that, if all of the values that are important to society are made an intrinsic part of the market price of resources or services, then people will behave in environmentally and socially responsible ways. In essence, the market will provide the “full knowledge” on which classical economic models are based. Full-cost pricing of resources is one form of pricing approach based on the inclusion of known social/environmental costs into the pricing of specific resources. Approaches include, for example, calculating the replacement cost for renewable and nonrenewable resources, or for valued uses of specific environments. As well, the cost of mitigation of environmental effects, the cost of developing substitutes, and the cost of waste disposal have all been suggested as legitimate components to be built into the selling price of natural resources or environmental services.

A key concern is to identify all of the functions and values inherent in “full” pricing, throughout the life cycle of the product or service. Most common property resources are not easily valued. The existence of many of the common property functions of the environment, such as toxic buffering, habitat, aquifer recharge, and aesthetic values, may not even be recognized, much less documented to the extent where their value (particularly marginal value) can be calculated (Bardecki et al., 1988, among others). The principle of full cost accounting is attractive and appears to reflect an ethic of responsibility and equity; in practice, it cannot be expected to reflect all of these values effectively. It also encounters problems when competing jurisdictions do not use the same approach, and can therefore undercut prices through the drawdown of their own environmental capital stocks. Another element of this approach is the concept of “no-net-loss,” in which the current situation is established as a baseline. All users of the environment are required to maintain identified values (e.g., size of fish stock, area of tree cover, area of wetland) at current levels. This presupposes that current levels are needed, sufficient, and, indeed,
Debt-for-Nature Exchange:  
A Tool for International Conservation

Approaches to international conservation are changing to meet the complex needs of today's global environment. The pressures of burgeoning populations, growing external debt burdens, and the shrinking of natural resources and biological diversity require a new blend of conservation and development, ecology, and economics. One tool international conservationists have created to address these challenges is the "debt-for-nature exchange." This innovative financial mechanism allows conservation organizations to help underwrite their conservation investments while simultaneously providing a way for a host country to reduce its external debt.

In a debt-for-nature exchange, a conservation organization acquires the commercial bank debt of a developing country, either by purchasing it at a substantial discount from the debt's face value or receiving it as a donation. The organization then agrees to cancel the debt in return for the borrower country's commitment of additional resources to local conservation. The first debt-for-nature exchange was initiated by Conservation International (CI) and the government of Bolivia in July, 1987. Since that transaction, debt-for-nature exchanges have followed in Ecuador, Costa Rica, Zambia, Dominican Republic, the Philippines, Mexico, and Madagascar.

Although debt-for-nature exchanges are not a solution to either the debt or conservation crises of the Third World, they mark an important development in the evolution strategies used by non-profit conservation organizations. The debt-for-nature exchange can be an effective mechanism for channelling in-country support towards the sustainable development of natural resources. The second generation of exchanges offers further opportunities to expand both the amount of in-country support generated for conservation and the amount of Third World debt reduced through these transactions. Structural developments in the exchanges and the involvement of bilateral and multilateral development institutions will shape the degree to which these opportunities are explored and used.


Full-Cost Accounting. Full-cost accounting involves estimating the full social cost of private actions such as development impacts or waste generation and disposal, and the creation of mechanisms to build these costs intrinsically into the prices of products and services. Like full-cost pricing, full-cost accounting involves a broadening of accounting procedures, to build in the true costs to
society of an particular process or action. One practical example is the institution of pollutant taxes equivalent to the cost of mitigating the effects. A current example under widespread discussion is the establishment of a carbon tax for polluters based on their contribution to the greenhouse gas problem. In some U.S. and European cities, the full-cost accounting approach is in use to deal with waste. In one example from Washington state, each home is allowed one container of garbage per week. Additional containers are charged at actual cost to the community of handling the additional waste (this can be quite high — approaching $10 [U.S.] per bag in some communities). Another approach has been to sell specially marked garbage bags and limit pick-up to these costly containers. Similarly, industrial users are commonly charged full-cost recovery for industrial waste as each truck enters the dump site; dumping charges can be very high as the limits of fill sites are reached and standards for landfills and other disposal sites are raised.

This approach is effective not only because it raises money to deal with the problem, but also because it tends to broaden the frame of reference for decision making, helping individuals to focus on the broader implications of their actions. People learn directly the real cost of producing waste that must be disposed of. For relatively simple situations such as landfills, the approach seems to work well, although it can lead to night-time dumping in unauthorized areas if fees are set too high. For more complex pollution control, this approach encounters serious practical problems in the identification of future, downstream, and cross-sectoral costs and benefits, making the setting of fees and enforcement very difficult. While metering of discharges at outflow points is possible, identifying the impacts and costs of these discharges is often problematic.

**Use Charges.** Use charges ("user pays" or "polluter pays") represent a specific means of using full-cost pricing to limit the demand for access to resources. A common form of use charge, designed to reduce water demands, is direct metering of water use. Reduction of water use in water-poor areas can be effected through the metering of water — with a "per liter" charge for water use. This, in effect, establishes a user-pay system for the construction and maintenance of water systems, as well as reducing demand to some extent. But if the water meter is hidden outside behind a shrub and reads in cubic meters, rather than on the kitchen wall reading in dollars, pounds, or pesos, its real impact on water-use decisions will be more limited. For maximum impact on the decision-making process, this type of charge must be very visible. A visible charge tends to reduce demand, while at the same time educating users with respect to the real social costs of their actions.

One concern with this approach is that viable ecologically based limits must be established; this can be very complex, particularly if the full range of functions is included. High user charges can also have unfair impacts on the poor, denying them access to basic services or to publicly owned recreational sites. In some areas where user charges have been established to reduce impacts on popular recreational sites, a dual system has been used, with one price in effect for residents and another higher one for visitors. While this may dilute the overall effect, it helps maintain a form of equity — and satisfy local users for whom the site may be the only practical (and traditional) option.

One intriguing variation on use charges has been proposed for the Rhine River; the proposal is that users of water for industrial purposes be required to return waste water to the river immediately upstream from
**Differential Environmental Standards:**
*A Form of Differential Pricing*

An innovative approach has been developed in the Canadian province of Saskatchewan to promote the rehabilitation of strip mine sites. Differential requirements for rehabilitation are in place, depending on the capability of the land for other uses, such as agriculture. While poorer lands need only be rehabilitated to grade, good agricultural land must be fully restored, including restoration of drainage and the replacement of topsoil. This approach has caused the mining of sites overlain by good farmland to become more expensive than that under poorer soils, and therefore has the ultimate effect of directing mining development away from prime agricultural lands. In effect, a differential pricing system is in place for access to the mineral resources, reflecting the long-term social or environmental value of the other ecological functions that are affected.

Performance Bonds. Performance bonds are means to ensure that private enterprise meets legal requirements to achieve particular standards in new developments. A performance bond is like a deposit, which can be used to ensure compliance to particular pollution standards once a plant is operating, to ensure that reclamation is done on completion of resource extraction, or simply to ensure that the requirements for mitigation deriving from, for example, an EIA, do indeed happen. A central concern is the value of such bonds: If set too high, they will discourage nearly all investment; if set too low, they will not be taken seriously. A rule of thumb is that the bond should be sufficient to cover the costs of mitigation of damage that would occur if a site were abandoned at any time in its life. But since only some of a site is likely to be outstanding at any one time (for example, a strip mine is commonly backfilled as mining advances), the deposit need not cover all possible disturbances over the entire lifetime of the project. In Ontario, Canada, a 1992 mining bond requirement has seriously affected smaller operators who cannot meet such a bond, and have no collective means of providing guarantees. Larger companies are able to spread such costs over many sites. Like other financial requirements, performance bonds may not work well if competing nations or sites have no such requirements.
Financial Instruments: Full-Risk Approaches

Full-risk financial approaches and the emergence of environmentally sound industrial processes are also founded on market and price incentives to achieve environmental objectives.

Globally, financial institutions set the terms for access to funds. The cost of money for investment, and the terms and conditions for repayment are set according to known risks; poorly performing sectors and risky investments commonly pay higher interest rates, and must repay in shorter terms than solid, relatively risk-free investments. Proposals are now emerging that would use this feature of financial services to encourage environmentally sound practice (Cassils, 1991). Increasingly, industries that follow environmentally unsound practices are encountering financial difficulties - through depletion of their resource stocks, through prosecution for pollution effects, or through liability for cleanup of degraded sites or the effects of environmental catastrophes, such as Bhopal or the Exxon Valdez. These clearly affect the profitability and prospects of firms and of particular investments. The key will be to develop good risk assessment procedures to allow financial institutions to identify environmentally-related risks clearly.

This approach has immense potential, because it is in the interests of financial institutions to delineate the risks if they are to be knowledgeable lenders. It will also be a significant tool in giving a clear message to borrowers that environmental risks are real, and that pursuing environmentally sound management will be of direct benefit to them. The insurance industry is examining similar risk-assessment procedures. Because most development projects, whether public or private, must be financed through borrowing, this financial instrument is a powerful tool. If full environmental risk were effectively incorporated into the financial services industry on a global basis, it would deliver a pointed message to investors regarding the merits of environmentally sound practice.

Marketplace Opportunities: Environmental Industries

In the past two decades, many business leaders have discovered that it is lucrative to manage their operations in an environmentally sound manner. Moreover, market opportunities have emerged, such as waste exchanges, eco-tourism, and conservation consultancy, whereby increasing numbers of individuals are making a living doing things that promote environmental sustainability.

A particularly encouraging trend is the emergence of industries that address environmental problems and make money in the process. A growing number of success stories exist as models, including new industrial procedures, techniques, approaches, and technologies that bring economic benefits directly to the user, and social and environmental benefits in the form of reduced toxic production and reduced waste stream. For example, Mother Parkers, a food wholesaler in Ontario, Canada, has gained significant revenues by selling coffee processing wastes as animal feed and providing coffee sacks to local municipalities for shrub protection. They have also reduced the need to truck waste to the dump, saving thousands of dollars in trucking and dumping charges for themselves, and reducing the stress on municipal waste disposal facilities (Environment Canada, 1989). Public values can also be brought to bear on the marketplace, to urge the production and sale of environmentally sound products. Programs are in place in many countries to allow consumer choice to be used by those who prefer such products.
INTEGRATING POLICY AND MARKETPLACE INCENTIVES

Marketplace and financial approaches make use of the mechanisms of money and the marketplace to send economic messages to individuals and firms, encouraging them to operate in a more ecologically sound manner. All of these approaches attempt to create situations where personal or corporate gains are achieved in concert with (or at least not at the expense of) broader environmental and social benefits. All involve ethical and ecological questions, in that "acceptable" use levels must be established, and attempts must be made to assign values to the social benefits and ecological functions inherent in each system.

The marketplace is, by definition, an anthropocentric or human-centered instrument, with serious conceptual and logistical barriers to the incorporation of more holistic values. For one thing, there is an assumption that human use is pre-eminent — the market is designed to serve humans and to provide the goods, services, and experiences that they value (Manning, 1990). Pricing mechanisms are also ill-suited to internalize

Deposit-Refund Systems

Long in use worldwide to encourage the return of soft-drink bottles, the concept of deposit-refund systems can have much broader application. For example, this approach can be used to bring about the return of potentially damaging materials, such as toxic substances, to the producer or to a specific site. Obvious candidates include lead- and mercury-based batteries, containers of various types, and manufactured products like mattresses, which may be recyclable. In Scandinavia, this approach is in use to encourage the return of old car bodies, and in some North American jurisdictions to help deal with the disposal of used car tires.

In this approach, users of the product must make a deposit upon purchase. The deposit is a financial incentive to return the item to a place where it can be reused, recycled, or disposed of in an environmentally sound manner. Deposits must be carefully calculated to be enough to clearly reward those who return the item. Experience with nominal deposits for tires shows little real effect. Such deposits must also be universal, applying to all equivalent products available in a jurisdiction, otherwise competitors who do not require deposits will have a market advantage.

Deposit-refund approaches may actually work better in poorer countries, as the incentive of refunds will be stronger. As with returnable containers, a market niche may be created in communities involved in the gathering and return of items like batteries or tires. In many developing nations, the gathering and recycling of secondary raw materials (i.e., waste) is already much more efficient than in nations of the North.
Profit From Pollution: Rooted in History

For centuries, Chinese farmers competed for the human waste produced by the travellers who passed by their fields — a key source of organic fertilizer. This waste had such value that farmers had to compete to obtain it. The main form of competition was in the construction of toilet facilities designed to attract the passing throng.

Modern industry is rediscovering that one person's waste is another's raw material. Much waste is really just misplaced raw material — usable as an input to industrial processes. In many centers, waste exchanges have been created to match the producers of waste with those who can make use of it. Waste metal filings from one industry become a low-cost input to a foundry in a nearby community. Wastepaper products are sought as raw materials by a producer of insulation materials. Waste wire, cloth, rubber, and leather become valuable materials for a craft center. The key challenge is to identify these complementary needs and to match them to the advantage of all participants so that less is wasted, and ultimately less space is taken for waste disposal.

such values as biodiversity and global system stability, or broader questions of equity.

Financial mechanisms, used in isolation, are in fact a delivery system for the values inherent in the marketplace. Their use is a form of sub-optimization, which modifies the rules of particular parts of the marketplace to achieve specific environmental goals. A complicating problem is that these explicit measures to modify the marketplace are not usually co-ordinated with the other messages given by government policies and programs. One government program may subsidize wetland filling and drainage, while another attempts to reward farmers for preserving wetland habitat through establishing a “market” for habitat paid for by the users of the product — the hunters (Girt, 1990). In Europe, commodity subsidies to farmers give them a strong message to plant and produce more, even if it means clearing woodlots and hedgerows, while conservation programs seek to maintain hedgerows and natural areas.

The bottom line is that the use of various market-related instruments, and the modification of existing ones, are only part of the solution. They need to be used in concert with other approaches, including regulation and other policy instruments, education, and efforts to change individual, institutional, and corporate attitudes and expectations. “We need to ascertain where regulations work best and how they may be complemented by economic instruments and by self-regulation to form an optimal mix to achieve the objectives of sustainable development. The integration of command-and-control regulations and economic instruments is essential to avoid a two-tier, perhaps contradictory system” (Schmidheiny, 1992, p. 29). The establishment of a sustainable system is, in the long run, contingent upon modifying human demands on the environment, in effect changing — and likely reducing — the market itself (Daly and Cobb, 1989; Manning, 1990). While some progress is evident
in success stories from various industry sectors and jurisdictions, the problem of non-sustainability continues to be driven by population numbers and by consumption levels. Unless attitudes and expectations change significantly, particularly in the industrialized world, the fine-tuning of these types of instruments and incentives will have little overall impact. In the long term, sustainability will depend on the management of human demands on the system, much more than on managing the system to meet human demands.
Questions for Review

1. What types of instruments are available to policymakers and to managers in promoting sustainable development/environmental goals?

2. Why are governments increasingly interested in the use of existing policy tools and marketplace instruments to achieve environmental objectives?

3. What are some methods of making environmental costs an integral part of the costs of doing business?

4. What are some of the ways in which government programs and policies result in unforeseen negative environmental impacts?

5. What are some of the pros and cons of Debt-for-Nature Swaps as a means of conservation and debt reduction?

Questions for Discussion and Research

1. Can the marketplace be used to establish and fulfill environmental objectives?

2. How can marketplace instruments be used to achieve environmental objectives while maintaining equity among those affected, that is, sharing costs and benefits more equally?

3. Which economic instruments are likely to be useful only within an established regulatory system that limits impacts?

4. How can existing government policies be altered to internalize environmental objectives? Are there any specific policies in your nation or region that are now causing individuals or firms to act in ways detrimental to the environment?

5. How can we effectively predict the environmental effects of new policies or programs and anticipate and prevent significant negative impacts?

6. Debate the ethical question inherent in pollution rights markets: that the right to pollute can be bought and sold.
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