Making better decisions: information, institutions, and participation

The principles of sound environmental policy do not conflict with development objectives. Why, then, are wise policies frequently the exception? A principal reason is that such policies often mean the withdrawal of entrenched "rights"—to pollute or to use resources—that tend to benefit the wealthy and influential, often at the expense of the poor. Effective governmental action is also hampered by incomplete information, uncertainty, and weak regulatory powers.

In implementing change, governments must make the best use of their scarce administrative capacity. To do so requires, first, improved information and analysis to inform priority-setting and policy design; second, responsive and effective institutions suited to the administrative traditions of the particular country; and, third, greater local participation in policymaking, monitoring, and enforcement. The benefits of public participation frequently outweigh its costs.

This chapter asks why governments find it so hard to develop and implement wise environmental policies. The guidelines for environmental management discussed in Chapter 3 are easier to describe than to put into practice, so that, in both industrial and developing countries, there is a gap between policy and performance. For example, many middle- and low-income countries set environmental standards that are unrealistically high and then fail to enforce them. In some countries serious environmental problems are apparently ignored, while in others decisions are often based on the lobbying clout of industry or of environmental activists rather than on balanced analysis. Sometimes public investments proceed with little or no attention to environmental impacts, while others are thwarted by NIMBY ("not-in-my-backyard") campaigns that hamper dispassionate analysis of the benefits and costs of alternative measures.

The political economy of environmental degradation

Governments face many pressures in making environmental policy. Conflicting interest groups lobby noisily, public opinion demands action on the most dramatic rather than the most important issues, and governments even find it difficult to curb their own damaging behavior. Building constituencies is an important part of the solution to these pressures.

Redistributing environmental rights

People benefit from being able to use environmental resources without paying for them, and removing these benefits has direct distributional consequences. Often, those who have been enjoying the benefits are the wealthiest and most politically powerful members of the society. Taking away their rights to pollute or to exploit resources can be politically painful and will often require compromises. Second-best policies are not desirable, but if well implemented, they are often preferable to unenforced "perfect" policies. Chile's new fishing law (Box 4.1) is an example.

Whereas the rich are often good at protecting their positions, the poor—whether they be slum dwellers in Manila, Lagos, or Rio de Janeiro, pastoralists in East Africa, or artisanal fishermen in Peru and Indonesia—tend to play little part in the environmental debate. Yet they usually bear the
Box 4.1 Chile’s new fishery law

Chile has one of the five largest fishing industries in the world. In 1990 exports of fish and fish products totaled more than $900 million, making the sector second only to mining as a foreign exchange earner. Managing the open-access fisheries has become more difficult as additional investment in the fishing sector has led to overfishing. The Chilean government has responded with a new law (Ley de Pesca) designed to prevent overexploitation and the collapse of any one fishery by regulating access to the different species being fished. Since any management scheme would imply some restrictions on the fish catch, the law became the subject of public debate. The evolution of the law illustrates some of the constraints on making environmental policy.

Three main regulatory systems were considered in designing the new management scheme: global quotas, individual transferable quotas (ITQs), and limits on individual boats and their gear. The final version of the law combines open access (within an overall quota), selected controls on boats, and a licensing scheme that is to be phased in gradually after the third year and is based on a percentage of the total catch.

The new law is an improvement over the previous situation of completely open access without restrictions on the catch. It was not possible, however, to implement a strict ITQ system—the preferred approach from the standpoint of both sustainable management and the economic viability of the fishermen. Fishing companies in the north opposed the inclusion of ITQs in the law. They preferred open access within overall quotas, which would allow them to switch their boats from a declining fishery to another area. Many fishermen saw any catch restriction as a zero-sum game in which they stood to lose.

The new fishery law is an important step that demonstrates that a compromise solution is frequently better than none. Its implementation will have to be monitored carefully. Chile is receiving assistance from the Nordic countries and the World Bank in strengthening its capacity to monitor and analyze the fishing industry.

brunt of environmental degradation. They may be the ones to suffer most when forests that once provided free fuel are logged or when factories pollute rivers. Unlike the better-off, they lack the means to defend themselves—by switching to other fuels, say, or by boiling polluted water. Thus, the poor generally have the most to gain from effective environmental policies. Governments must represent the interests of those without a voice, including the urban poor and ethnic minorities.

Crisis-driven policymaking

Even when environmental cause and effect are well understood by scientists, individuals may make perverse judgments about relative risks when setting priorities. People are more concerned about cancer and nuclear accidents than about many known health problems. Overreaction to environmental disasters is also common. Dramatic images of oil spills or leaking toxic wastes have captured public attention and played a powerful role in initiating policy change. Less attention has been paid to the insidious, chronic problems of exposure to high levels of particulates or to unsatisfactory drinking water—environmental problems that may put many more lives at risk.

The use of the dramatic or photogenic to garner popular support and donations is common. Many environmental activists have found these to be powerful metaphors for broader environmental concerns. The danger remains, however, that priorities can be distorted. Governments must make sober determinations of the relative importance of different environmental problems and set priorities in an informed, cost-effective manner.

Difficulties in self-regulation

In many countries the public sector owns the most-polluting industries and controls important natural resources. Instead of performing better on environmental criteria than private enterprises, state-owned enterprises tend to be less efficient, to use more resources, and to produce more wastes. The public sector is also notoriously bad at policing itself. The environmental problems of Eastern Europe and the former U.S.S.R. clearly demonstrate this. Being both poacher and gamekeeper does not work, especially when public agencies are responsible for such essential but massive tasks as wastewater treatment or solid waste disposal.

Creating a greater separation between the regulator and the regulated is one option. The establishment of semiautonomous regulatory bodies, or the use of independent commissions to regulate
such natural-resource matters as interprovincial water allocation, the fish catch, or logging policies, helps depoliticize decisions and creates greater responsibility for self-regulation. Privatization with appropriate regulation can also help; in the United Kingdom when water companies were privatized, they came under tighter government scrutiny.

Building constituencies

If governments are to challenge established polluters or reallocate existing rights to resources, they need to build on and promote wider support for good environmental policies. Much evidence suggests that the basis for such support already exists, having been stimulated sometimes by particular environmental issues, sometimes by a powerful book (such as Rachel Carson’s *Silent Spring*) or an expert report. As voters, protesters, and consumers, people in many countries show a similar interest in environmental causes. ‘‘Green’’ political parties have appeared in a number of countries, and increased activism by nongovernmental organizations has made governments and public institutions more accountable for their actions. Environmental causes frequently cross established political divides. Indeed, even in countries where conventional political participation is discouraged, the environment may be one area in which governments are willing to allow and respond to popular protest. It is no accident that the move toward more democratic forms of government has coincided with the worldwide increase in popular environmental awareness.

The behavior of consumers and producers is also changing. In many countries people are willing to recycle, to think about using energy and materials more efficiently, and to alter their consumption patterns. Companies often respond by using the environment as a selling point. ‘‘Green labeling,’’ increased use of recyclable and biodegradable packaging, and more energy-efficient technology are most common in industrial countries, but the same trends are appearing in some developing countries. Businesses sometimes argue that environmental measures will diminish competitiveness or lead to loss of jobs, but they are usually wrong. (As Chapter 3 noted, many environmental measures have little effect on competitiveness.) Business is increasingly realizing that it can take actions which yield both environmental and economic benefits. For example, *Changing Course* (Schmidheiny 1992), a report prepared by the Business Council for Sustainable Development in anticipation of UNCED, forcefully advances the idea that good environmental management is also good business.

Given the multitude of environmental problems and political pressures, governments must conserve their scarce administrative capacity. To develop good environmental policies, they need informed analysis based on accurate information. They also need to improve the way bureaucracies make and enforce decisions. To implement policies, they need to build popular support and encourage local participation. These are the themes of the next sections.

Improving knowledge and understanding

Ignorance is an important cause of environmental damage and a serious impediment to finding solutions. This principle holds for international negotiators and poor households alike, as is illustrated by the global damage done to the ozone layer by CFCs and the serious implications of indoor air pollution for family health. It is necessary, first, to know the facts; second, to determine values and analyze the benefits and costs of alternative measures; and, third, to ensure that information is available to inform public and private choices.

Establishing the facts

Frequently, especially in developing countries, decisions are made in the absence of environmental information. Collecting basic data can be expensive, but the rewards are usually high. Although different countries have different needs, there are some general guidelines. For example, the discussion in Chapter 2 suggests some priorities for monitoring pollution and waste problems:  
- Quality and availability of drinking water and sanitation facilities
- Exposure to ambient air pollutants, especially particulate matter and lead, in urban areas
- Fecal coliform and heavy metals in rivers and lakes
- Indoor air pollution from the burning of biomass
- Hazardous wastes and pesticides in selected ‘‘hot spots.’’

Essential management information on land use and natural resources needed for improved management of these resources (see Chapter 7) includes:  
- Data on soils, from surveys and experiments in each agricultural zone
A worldwide network monitors air pollution

Figure 4.1 Participants in the GEMS project for monitoring urban air quality

- Rate of depletion and quality of groundwater in threatened aquifers
- Changes in forest area and data on harvesting and replanting
- Data on fish harvest and wildlife depletion in vulnerable areas
- Damage to coastal and wetland resources.

Efforts are being made to help countries with environmental monitoring and to compile internationally comparable data. The Global Environmental Monitoring System (GEMS), managed by UNEP, has activities related to air and water quality in 142 countries. Monitoring of urban air quality began in 1974. Most of the cities shown in Figure 4.1 report on concentrations of sulfur dioxide and suspended particulate matter, both important air pollutants. Unfortunately, the amount of financial help has so far been inadequate, and thus the coverage and quality of data are weaker than is desirable.

Given limited resources, it is better to concentrate on the most significant pollutants and to limit collection points to the numbers that can be accurately monitored. In the late 1980s Poland was reported to be regularly monitoring river pollution at more than 1,000 sites. Even if all the samples collected were properly analyzed, the gain in knowledge about river quality over that attainable with a system of 100-200 monitoring points would not justify such an extensive system.

Valuing resources and analyzing benefits and costs

Ending well-entrenched but environmentally damaging practices is difficult enough for governments when the damage is readily quantifiable. When environmental damage threatens health or jeopardizes economic output, it is relatively easy to point to the benefits of changes in policy. But as previous chapters have stated, some environmental values—important to poor and rich people alike—are not only unmarketed but also intangible. The more difficult it is to quantify the benefits of preserving these values, the harder it will be
for policymakers to weigh the gains from conservation against the quick profits from resource degradation or pollution. As described in Chapter 3, however, more sophisticated methodologies are now making it possible to estimate the value of less-tangible environmental benefits.

In many cases local analysis of costs and benefits can build on international experience. Researchers in Bangkok, in analyzing the health impacts of pollution, tested local data against what had been learned in other countries about the links between exposure to pollutants and health. They found that the greatest threats to health were particulate matter, lead, and microbiological diseases. Other environmental problems that traditionally receive a great deal of attention—contamination of groundwater and surface water; air pollutants such as sulfur dioxide, nitrogen dioxide, and ozone; and disposal of hazardous wastes—were much less dangerous. (In fact, the gravest threats were at least 100 times more serious than the lowest risks.) This information was used to develop cost-effective pollution control policies.

Improving information and education

Environmental education based on careful analysis can add rationality to the environmental debate. Publication of annual reports on the environment is increasingly common. When the public has a well-informed grasp of environmental issues, there is a better prospect of developing positive rather than purely defensive policies. Without such knowledge, people tend to focus on causes of death (for example, technological hazards and nuclear accidents) that are sensational and are caused by somebody else and to worry less about the probability of death from causes that are less dramatic and often under an individual’s own control, such as cigarette smoking and wood fires. The work of independent research institutes—such as the Thailand Development Research Institute—can help to modify people’s views.

Communities are increasingly bombarded with a variety of environmental information and need sources of information that they can trust. Independent commissions can help to depoliticize decisionmaking by analyzing thorny environmental issues and producing recommendations for policy action. Box 4.2 illustrates how some of these bodies have contributed to the development of the consensus required for policy decisions on such complex topics as global warming, pollution control, and urban planning. Independent commissions can also audit public agencies and so make them more accountable.

The most important effect of improved information and environmental education is to change behavior. Well-informed citizens are in a better position to put pressure on governments and on polluters and are more likely to accept the costs and inconveniences of environmental policies. The results can be dramatic. In Curitiba, Brazil, a combination of an energetic mayor, a committed municipal government, and an informed and involved public have led to many environmental innovations and an improved quality of urban life in this city of 2 million. Public transport is used by most of the population, green spaces have been expanded, recycling is widely practiced, and industrial location and product mix are carefully chosen to minimize pollution.

Changing institutions: making the public sector more responsive

Given that the scarcest government resource is frequently not money but administrative capacity and that political pressures make environmental policymaking particularly difficult, governments must think carefully about what they do and how they do it. The “what” of environmental management consists of setting priorities, coordinating activities and resolving conflicts, and creating responsible regulatory and enforcement institutions. The institutional response to these tasks—the “how” of the equation—includes developing legislation and administrative structures, providing needed skills, ensuring funding and donor coordination, and implementing decentralization and devolution.

Essential government functions

Setting priorities and formulating policies. Since all countries face multiple environmental problems, governments must set priorities on the basis of informed analysis so that they can make the most efficient use of scarce administrative and financial resources. Frequently, better environmental policy is more important than more environmental policy. In many developing countries top priority must be given to environmental impacts on health and productivity (see Chapter 2). Actual priorities will depend on whether a country is largely rural or urban and on the average level (and distribution) of income. In highly urbanized countries such as Argentina, Korea, and Poland,
Box 4.2  Independent commissions and improved environmental analysis

Governments have often used independent panels of experts (sometimes constituted as special commissions) to investigate contentious policy issues. In recent years environmental issues have increasingly been referred to such bodies. The procedure has a number of advantages.

- It relieves, at least temporarily, the pressure for an early decision.
- It facilitates open debate, sometimes through public submissions or hearings, without committing the government to adopt any of the recommendations that may emerge. Scientific disagreement can be clarified and the public educated.
- It allows a number of scientific disciplines and interest groups to be brought together. A consensus is more likely to emerge if the commission is chaired by an independent person rather than by a government representative.

There have been several interesting examples of the use of this approach.

On global issues. In 1990 the Enquete Commission on Preventative Measures to Protect the Earth’s Atmosphere presented a comprehensive report to the German Bundestag. The commission, which was made up of scientists and representatives of the country’s main political parties, made specific recommendations not only on national energy policy but also on international measures.

In the United States, Congress asked the National Academy of Sciences to review available evidence on global warming and evaluate policy options. The report, issued in 1991, recommended that even though the effect of global warming on the United States was uncertain, selected low-cost actions to reduce greenhouse gas emissions should be initiated.

On national priorities. Industrial countries have occasionally used expert panels to help prepare national environmental strategies. The United Kingdom has had a Royal Commission on Environmental Pollution since 1970. Members serve as individuals, not as representatives of organizations or professions, and are appointed for at least three years. The commission is empowered to request documents and even to visit premises. Over the years it has produced fifteen reports, most of which have influenced policy. For example, following the 1983 report on lead, the lead content of gasoline was reduced and unleaded fuel was introduced.

On specific environmental issues. Governments increasingly finance independent “think tanks,” such as the Thailand Development Research Institute, which analyzes a wide range of issues, including environmental topics. Sometimes governments use interagency task forces to examine discrete issues. In Hungary a group evaluated a proposed hydropower dam on the Danube; in Mexico a task force will analyze the use of economic instruments to control pollution and manage natural resources.

Air and water pollution in cities will be priorities. In more rural economies, as in many Sub-Saharan African countries, parts of Central America, and India and Bangladesh, land, forest, and water management may well have top priority.

The distribution of impacts is important. Wealthier city dwellers, who can protect themselves against unsafe water, may lobby governments to assign higher priority to air pollution, which affects rich and poor alike, than to ensuring a safe water supply. Yet water investments may have a much larger immediate health benefit.

National environmental action plans are proving useful tools for setting priorities. Plans are being drawn up for a number of African countries and have already been completed for Lesotho, Madagascar, and Mauritius. The experience of Burkina Faso with such a plan (Box 4.3) demonstrates the importance of building consensus and the will to act.

Coordinating and planning. Once priorities have been determined and appropriate policies designed, implementation of policies and the resolution of conflict become important. Environmental policy often cuts across the normal bounds of bureaucratic responsibility. Whether it is watershed management to protect a new dam, allocation of a region’s water resources among competing users, or the complex problem of managing a city’s air quality, many different actors must be brought together. Agencies need to collaborate, and some machinery for resolving conflict is needed. Although there is a natural bureaucratic tendency for governments to respond to intersectoral conflicts by setting up regional bodies, these organizations have rarely been successful in the past because they are inevitably at odds with strongly established, sectorally organized government bureaucracies.

A common problem with environmental issues
that cross normal bureaucratic demarcation lines is the absence of an effective mechanism for coordinating the work. In São Paulo, Brazil, the metropolitan area has a planning agency, while the state has agencies with responsibilities for environmental protection, water, and sanitation. A consequence of divided responsibility is that programs for controlling industrial pollution have not been integrated with investments in wastewater treatment, and the sanitation master plan has not been sensibly implemented. (For example, treatment plants have been constructed, but not the needed interceptor and trunk line sewers.)

If regional environmental planning is to be successful, countries need flexible management frameworks that encourage the actors to “think globally, act sectorally.” In rural areas resource analysis and planning should be done at the level of the individual watershed or irrigation scheme, even if line ministries take responsibility for implementation. In cities the management of air and water pollution requires a strong mechanism for intersectoral planning and coordination. For example, Santiago and Mexico City recently established special organizations for planning pollution reduction strategies to be implemented by line agencies for the wider metropolitan areas; in Mexico City the commission will include part of the state of Mexico as well as the federal capital. In Jakarta the work of several intersectoral groups has led to the relatively successful implementation of a program to protect the metropolitan area’s ecologically sensitive watershed by shifting growth away from the south, where the watershed is located, and toward the east and west of the city.

Regulating and enforcing. Agencies, chronically short of money and manpower, need to devise cost-effective ways of implementing policy. One way is to give citizens more power to challenge polluters, whether public or private. For example, public environmental agencies may give local communities or voluntary organizations substantial responsibility for implementing or monitoring programs. This approach can be formalized through the legal system. In the Clean Air Act of 1970 the U.S. Congress authorized private citizens to seek injunctions (and in some cases financial penalties) against companies that violated the terms of their operating permits, thus making environmental enforcement no longer the exclusive responsibility of the government.

Enforcement may be bolstered by making more use of the private sector or of nongovernmental groups. Many governments now hire private companies and technical consultants to perform environmental assessments, collect and analyze data, undertake monitoring and inspection, and provide specialized advice. Mexico City, for example, is implementing air pollution control measures

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**Box 4.3 Setting priorities in Burkina Faso**

Improved environmental management requires a commitment from both the government and the wider public. The recent experience of Burkina Faso in developing a national environment action plan illustrates how the process itself can be an essential component in creating awareness and building the political will needed for action.

When Burkina Faso began to develop its plan, the process was based on a series of previous national meetings synthesized by local consultants in commissioned reports. These resulted in the identification of several key program areas: developing environmental management capability at all levels, improving living conditions in rural and urban environments, focusing on environmental management at the village (“micro”) level, addressing key national (“macro”) resource issues, and, in support of all these, managing information on the environment.

With the aid of funding from a number of bilateral and multilateral organizations, including the World Bank, the entire process took about three years and cost about $450,000. A national seminar was held to debate the draft plan and to set priorities in preparation for approval by the Cabinet in September 1991. A meeting is planned for mid-1992 at which donors will be asked to pledge support for specific projects that make up the action plan.

The main lesson from Burkina Faso is that by working with the government and local participants, it was possible to develop a plan that incorporates the work of those who will have to implement it. Although it might have been quicker and cheaper to produce the plan using international consultants, the plan would not have been a Burkinabé product and would probably have joined other “external” products on a bookshelf instead of resulting in action.
through private vehicle-inspection stations and is considering using private laboratories to analyze air and water samples.

Community groups can play an important role in enforcement. In India an "environmental audit" procedure has been developed for the 500-megawatt Dahanu Thermal Power project, currently under construction. The authorities in charge of pollution control plan to distribute to local communities and NGOs summaries in non-technical language of the results of environmental monitoring. Community groups can then check emissions against legal standards and seek redress in the courts if necessary.

The success of such approaches will depend partly on how freely information about polluting activities is available. Sometimes simply obliging large polluters to publish information about specific emissions will have some effect on behavior. Legislation in the United States now requires some 20,000 plants to make public information on their annual emissions of 320 potential carcinogens. Public disclosure can also help focus the attention of senior management on emissions and the opportunities for reducing them and can supplement official monitoring with public and community oversight.

The institutional response

Policymaking has frequently outpaced administrative capacity to analyze and implement policies. Laws are multiplying, and often the result is a large number of contradictory regulations that are beyond the capacity of governments to enforce. This situation, in addition to doing little for the environment, breeds skepticism about laws in general and government commitment to the environment in particular and may encourage corruption. It is essential to close the gap between making and implementing policy. That means reforming the way the machinery of government handles environmental issues.

When the World Bank expanded its lending for environmental purposes in the 1980s, it was clear that the public sector was often unable to deliver the expected results. The World Bank and member governments therefore began drawing up comprehensive country environmental action plans. These plans take into consideration both the legal and the administrative frameworks in countries as diverse as Brazil, Poland, and the Philippines (Box 4.4). Experience with the plans has shown that there are five main requirements for successful policy implementation: a clear legislative framework, an appropriate administrative structure, technical skills, adequate money, and decentralized responsibility.

Enacting legislation. Laying the legal foundations for environmental management frequently necessitates the repeal of outdated laws and the codification of new concepts. If the laws are to be effective, detailed regulations, without which most laws are only general principles, also have to be developed. New environmental provisions need to be integrated into existing government procedures or into traditional local law. In Chile one of the first steps taken by the new National Environment Commission (CONAMA) was to review existing legislation and prepare a comprehensive environmental law. This law and a companion law implementing requirements for environmental assessments, both now under consideration, will provide a rational framework for environmental management.

Building administrative structure. Institution building is a long-term business. It depends on local conditions, political factors, and the availability of manpower and money. Frequently, it is easiest to build on existing institutions. In practice, the structure of environmental administration matters much less than the ability to get the job done. As outlined above, governments need the capacity to set priorities, coordinate and resolve conflicts, and regulate and enforce. Countries will allocate these roles differently; for instance, coordination and conflict resolution might be undertaken by an independent executive agency, by an interdepartmental committee, or by a small, politically and technically astute group in the office of the president. The key is clear statutory powers combined with the authority to resolve intragovernmental disputes and the ability to provide continuity when administrations change.

Institutional arrangements that have been found to be helpful include:

- A formal high-level agency that can provide advice on policy and monitor implementation. Examples are IBAMA in Brazil, the Federal Environmental Protection Agency (FEPA) in Nigeria, and the State Environmental Protection Commission in China.
- Environmental units in the principal line ministries that can provide the central unit with technical expertise and monitor those environmental policies that the ministries are responsible for im-
Box 4.4 The gap between policy and implementation

In a growing number of borrower countries World Bank assistance for national environment plans includes help with institution building. Here are some examples of attempts to reduce the gap between policies on paper and results on the ground.

The Brazil National Environment Project, a $117 million loan signed in mid-1990, is designed to strengthen the institutional and regulatory framework and promote better management of biological resources. In support of the first three-year phase of Brazil’s National Environmental Program, the project finances the strengthening of national conservation units; improved environmental management of threatened ecosystems in the Pantanal, the Atlantic Forest, and the Brazilian coast; and reinforcement of IBAMA (Brazil’s national environmental agency, the executing agency for the project) and state environmental agencies. The loan provides support for staff training, equipment, better technical information, and legal and technical assistance; improvement of regulations and technical guidelines for environmental management; and environmental education. Implementation of the project has been delayed by fiscal and management problems. The slow start highlights the need to strengthen the management capability of executing agencies before they can effectively undertake project implementation.

Building environmental institutions is a key concern in Eastern Europe. The Poland Environmental Management Project, approved in April 1990, was the third World Bank loan to Poland and the first for environmental activities. The purposes of the $18 million loan include strengthening environmental management, introducing consistent standards and enforcement, improving monitoring, and regionalizing environmental management. The government has identified the most-polluted areas and has told the eighty worst industrial polluters to improve their environmental performance at once. At the same time, government task forces are revising the regulatory system and designing a national environmental monitoring strategy.

In the Philippines a loan and credit package totaling $224 million, approved in 1991, will promote policy reform and strengthen institutions. The loan contains provisions to help protect biodiversity in the country. Since the largest threats to biodiversity are encroachment by land-hungry farmers and illegal commercial logging, the project supports more sustainable patterns of resource use by small farmers in exchange for secure tenure rights and improves the enforcement of logging regulations, partly by strengthening the regional and local offices of the Department of Environment and Natural Resources. The loan also supports the design of a network of protected areas and provides resources to manage ten priority protected areas.

implementing. Oversight, from a public health perspective, of general environmental quality (especially air and water) is frequently carried out by the ministry of health, and the management and conservation of natural resources may be spread among government units responsible for agriculture, forestry, fisheries, and parks and wildlife.

- Regional and local environmental units that allow local implementation and monitoring and feed information back to the national government (see below).

CLOSING THE SKILLS GAP. The public sector in many developing countries is short of qualified staff at all levels. The necessary skills may exist but may not be attracted into the public sector because salaries are well below the market rate. Environmental agencies are therefore condemned to being outsourced by the private firms that they are charged with regulating or may be forced to rely on expertise on expensive temporary consultants. Some countries have found ways to mitigate this problem. In Latin America, for example, foundations and institutes financed by nongovernmental sources sometimes undertake both policy analysis and resource management.

Another common problem is an imbalance of professional skills. In some countries agencies are dominated by engineers and contain few natural or social scientists; in other countries the reverse is true. But environmental management requires a mix: natural or biological scientists to manage renewable resources, social scientists—economists, sociologists, and anthropologists—to identify problems and formulate policies, and engineers to design solutions.

Economic analysis is particularly important to (and frequently absent from) the dialogue between those responsible for environmental management and those in charge of the budget, planning, and economic policy. An environmental economics unit in the ministry or agency responsible for economic planning and public finance can fill this role by assessing budgetary allocations, ensuring that economic incentives are consistent with environmental objectives, and helping to strike an appro-
appropriate balance between environmental and economic goals in determining development priorities.

Obtaining funding. Environmental agencies have not yet firmly established their place in the competition for scarce government funds. Given the secondary importance usually attached to environmental management, budgetary allocations are sometimes insufficient and highly variable. When money runs out, the effect may be disproportionately damaging. For instance, if a shortage of cash means that enforcement of water pollution regulations has to be suspended, the consequent damage to groundwater and surface water can be substantial. If a national park goes unprotected during a dry season because of lack of funds, poachers may quickly undo what has taken years to achieve.

Environmental administration can often be improved even within a tight budget. But an environmental agency needs a core of skilled technical staff, as well as laboratories and other monitoring devices, to do its job properly. In some countries more money is becoming available as environmental management is accepted as an important national objective. Economic instruments—fines for polluters, charges for permits to use forests and fisheries, entrance fees for parks and protected areas, and so on—can help to pay for enforcement and administration.

Donors, including development banks and multilateral agencies, are often reluctant to finance what is needed most—improved operation and maintenance of fledgling national environmental administrations. Rather, they seek to make specific investments that tie up scarce local staff. Sometimes contributions come in the form of technical assistance and other tied aid, which does not necessarily strengthen local capabilities, and sometimes the donor community floods local officials with well-meant but unorchestrated offers of assistance. Finally, most donor-funded projects are relatively short term and small scale. What is needed most is longer-term reliable funding, especially for institution building and research.

Decentralizing and delegating. Once national priorities and policies have been set, it is often cost-effective to solve problems at the local level. Many governments therefore pass day-to-day responsibility to local bodies. This approach was used successfully in Japan (Box 4.5) and is being increasingly applied in other countries. In

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**Box 4.5 Japan: curbing pollution while growing rapidly**

Japan’s postwar reconstruction brought about both rapid economic growth and major environmental problems. In the 1960s, when it was still a middle-income country, Japan began to invest heavily in control technology to combat severe air and water pollution, largely from industrial sources. Expenditures for pollution control by large firms peaked at more than 900 billion yen in the mid-1970s before declining to 400 billion yen or less by 1980. Japan is now enjoying the benefits of its investments: between 1970 and the late 1980s emissions of sulfur oxides decreased by 83 percent, emissions of nitrogen oxides by 29 percent, and concentrations of carbon monoxide by 60 percent. Similar advances were made in improving water quality. These results were obtained through stringent governmental regulations and negotiations between industry and communities to define solutions that could be fine-tuned to varying local requirements. An estimated 28,000 such agreements are now in force.

Three lessons from the Japanese experience may offer useful guidance to today’s middle-income countries:

- **Establish a national policy framework.** The initial legal framework, established by the Diet, included the Basic Law for Environmental Pollution Control (1967), the Air Pollution Control Laws (1967 and 1970), and the Water Pollution Control Law (1970). These laws define responsibilities and divide them among government at various levels, private firms, and individuals, thereby encouraging the decentralization of environmental management.
- **Negotiate agreements at the local level.** The open negotiation of agreements between polluting industries, local authorities, and citizens’ groups often led to emissions considerably lower than the minimum required by law.
- **Allow flexibility in setting emissions levels and promote self-regulation.** Since industries were often located in the middle of residential areas, firms were very sensitive to local environmental concerns. The negotiating process allowed emissions levels to be tailored to local conditions and also encouraged self-regulation by industry, thus fostering the idea of good corporate citizenship.
China, for example, the actual work of environmental protection takes place mainly at lower levels of government. The provinces are responsible for carrying out national policy set by the State Environmental Protection Commission. All provinces and municipalities and most counties now have environmental protection bureaus (EPBs) that answer to local environmental policy commissions headed by a vice governor or vice magistrate. China’s network of environmental protection agencies thus consists of the central units and about 2,400 EPBs, which together employ more than 16,500 people.

In Nigeria, a federal state, most policy is implemented at the state level. Over the years the states have monitored their environmental problems through their administrative systems, which include representation from local governments. Local capacity, however, has been weak. The 1988 decree establishing Nigeria’s FEPA encourages the establishment of local environmental protection bodies, but most have only limited capacity to carry out their responsibilities for environmental management. If decentralization is to work, it must be accompanied by a transfer of finance. Otherwise, a policy vacuum is created: the center sheds responsibilities, but local agencies are ill equipped to take them up.

Some countries have made specific allocations to local administrations for environmental investments. China and Colombia, for example, have passed national laws that permanently assign a percentage of the income from hydropower sales to local governments for watershed protection, environmental education, soil protection, and environmental training programs for municipal officials. In others emissions fees serve as local sources of finance. The Municipal Environmental Protection Bureau of Tianjin, China, has created an industrial pollution control fund financed by emissions fees mandated under national legislation. Revenues are used to finance investments in control and treatment at individual enterprises. Investments in decentralized treatment of industrial wastewater increased the treatment rate from 35 to 46 percent between 1985 and 1990.

Involving local people

Many environmental problems cannot be solved without the active participation of local people. Few governments can afford the costs of enforcing management programs that local people do not accept. Participation can also help with afforestation, wildlife conservation, park management, improvements in sanitation systems and drainage, and flood control. Local people can provide the manpower and knowledge for dealing with the aftermath of environmental disasters, and local knowledge of genetic diversity has led to breakthroughs in crop production.

Participatory approaches offer three main advantages: (a) they give planners a better understanding of local values, knowledge, and experience; (b) they win community backing for project objectives and community help with local implementation; and (c) they can help resolve conflicts over resource use.

Drawing on local values, knowledge, and experience

People’s views of their environment strongly influence how they manage it. Even when attitudes toward the natural world do not achieve the sophistication described in Box 4.6, few cultures view natural resources as worth nothing more than their cash value in the marketplace. Only if environmental programs reflect local beliefs, values, and ideology will the community support them.

The belief that traditional knowledge of the environment is simple and static is changing rapidly. More and more development projects are taking advantage of local knowledge about how to manage the environment. For example, people in the tropical rainforests of the Amazon and Southeast Asia have accumulated a valuable understanding of local ecosystems, and African pastoralists, such as the Maasai and Samburu of Kenya, are able to exploit apparently marginal savannahs (see Box 4.6). Building on these strengths requires great care, expertise, and patience. But development projects that do not take existing practices into account often fail.

A particularly costly instance of neglecting local practices occurred in Bali, Indonesia. For centuries the traditional Balinese irrigation calendar had provided a highly efficient way of making the most of water resources and soil fertility and of controlling pests. When a large internationally financed agricultural project tried to replace traditional rice varieties with high-input imported varieties, the result was a sudden increase in insect pests, followed by declining crop yields. A subsequent project that built on the indigenous production system has been much more successful.

Sometimes local knowledge can be applied in other parts of the world. Vetiver grass has been
Box 4.6 Indigenous values and knowledge of land and the environment

Many of the world's remaining indigenous people—estimated to number over 250 million living in more than seventy countries—take a view of nature that differs strikingly from conventional attitudes. A study (Davis, background paper) commissioned for this Report analyzes the attitudes of three groups of indigenous peoples: the Quichua-speaking Amerindians in the rainforests of eastern Ecuador, the Maasai and Samburu nomadic pastoralists of Kenya, and the indigenous swidden (slash-and-burn) farmers in the upland areas of the Philippines. The study concluded that many indigenous people view land not as a commodity to be bought and sold in impersonal markets but as a substance endowed with sacred meanings, embedded in social relations, and fundamental to the understanding of the groups' existence and identity.

Tribal Filipinos see land as a symbol of their historical identity: an ancestral heritage to be defended and preserved for all future generations. According to the Episcopal Commission on Tribal Filipinos,

They believe that wherever they are born, there too shall they die and be buried, and their own graves are proof of their rightful ownership of the land. It symbolizes their tribal identity because it stands for their unity, and if the land is lost, the tribe, too, shall be lost.

Ownership of the land is seen as vested upon the community as a whole. The right to ownership is acquired through ancestral occupation and active production. To them, it is not right for anybody to sell the land because it does not belong to only one generation, but should be preserved for all future generations. (p. 68)

Like many indigenous people, the surviving tribes of the rainforests of South America draw on traditional knowledge and practices to make a living in fragile environments. The study observes,

Quichua forest management is often overlooked and unappreciated by outsiders who are unfamiliar with it, in part because the methods that they use to alter the course of forest succession are technologically simple (consisting of axe and machete and a vast array of knowledge), and also because the forest that regrows is diverse and complex and hard to distinguish from undisturbed mature rainforest. The lowland Quichua achieve this effect by altering the mix of species that regrow in their agricultural clearings... (The result is) a patchwork of habitats of different ages in different stages of succession and with a varying blend of useful resources. (p. 12)

In most countries legal recognition and practical protection of the customary land and territorial rights of indigenous people are limited or nonexistent. Pastoralists in Africa face particular problems in maintaining access to their traditional pastures. An example is the case of the Maasai and Samburu of Kenya. At one time the Kenyan government hoped to set up group ranches as a way of increasing beef exports while retaining collective management. Recently, the government has promoted the privatization of these ranches, asserting that corporate land tenure impedes rational land management. The Bank study notes that Maasai elders regard private landownership as an "alien concept" and express fears that "subdivision may lead to a disastrous change of lifestyle of the Maasai people."

The only source of income for the Maasai people is livestock. Their culture provides them with a system in which they can preserve the arid and semiarid areas... in such a way that certain areas are put aside in periods of drought in order to keep grazing areas in good condition. Although lately it has become more difficult to do, it still works within and among group ranchers, especially where upgraded cattle breeds are introduced. However, in the fragile (semi-)arid areas it might even become impossible to keep livestock on an individual basis on small plots; it will also irreversibly lead to soil erosion, overuse of water resources, and desertification. (pp. 37-38)

used for centuries in the hilly areas of Tamil Nadu and other parts of India as cattle fodder and as a hedge plant to conserve soil and moisture. Experience from the Kabbalama Watershed Development Project in 1987 prompted the World Bank to support the use of vetiver in countries as diverse as China, Madagascar, Nepal, Nigeria, the Philippines, Sri Lanka, and Zimbabwe. The costs of vetiver are one-fifteenth those of soil conservation systems that rely more heavily on engineering (see Chapter 7). However, local management practices—embedded as they are in specific cultures—are not always so transferable.

Improving project design and implementation

Projects are more successful if they are participatory in design and implementation. A review of thirty completed World Bank projects from the 1970s found an average rate of return of 18 percent for projects that were judged culturally appropriate but only 9 percent for projects that did not
include mechanisms for social and cultural adaptation. A more detailed study of fifty-two USAID projects similarly found a strong correlation between participation and project success, especially when participation took place through organizations created and managed by the beneficiaries themselves.

The contrasts between environmentally beneficial projects designed on participatory principles and those that fail to include participatory designs can be striking. Haiti's top-down afforestation program, plagued by high sapling mortality rates on forest department lots and by conflicts with villagers, consistently fell short of tree-planting targets. Starting in 1981, an alternative approach was tried. NGOs helped to provide trees that were selected by farm households. The result was dramatic: instead of the 3 million trees on 6,000 family farms originally planned, 20 million seedlings were planted on the farms of 75,000 families who voluntarily joined the program.

Ideally, both local communities and the responsible agencies gain from participation, as the experience of the National Irrigation Authority (NIA) in the Philippines illustrates. Early involvement of community groups in planning construction and in finding ways to avoid the silting of channels and drains has brought about better maintenance of irrigation works and higher agricultural yields. Users have also been more willing to pay for the NIA's services.

Growing numbers of countries are devising partnerships with local people to provide municipal environmental services. In Accra sanitation services in low-income areas have improved greatly since NGOs and local entrepreneurs have been allowed to operate improved community pit latrines. Desludging and disposal are carried out by the city's central waste management department. This division of responsibility has proved more effective than attempting to operate a completely centralized sewerage system that had fallen into disrepair. In Jakarta neighborhoods organize the collection of solid wastes by collecting monthly dues that are used to buy a cart and hire a local garbage collector. At least once a month, one volunteer from each household assists in collecting garbage and cleaning the neighborhood drainage system. The wastes are taken to a transfer station. There they are picked up by municipal authorities—a task that is gradually being contracted out to private companies. This combination of community collection and centralized disposal has allowed Jakarta to achieve an 80 percent waste collection rate—high by developing country standards.

**Resolving local conflicts**

Properly planned participation eases resolution of the conflicts inherent in environmental decision-making. When mechanisms for resolving conflicts exist, people may be less likely to overuse natural resources out of fear of losing their access to them. All too often, top-down rules that govern access to natural resources appear arbitrary and unfair. Many governments are changing resource allocation rules to reduce conflicts between authorities and local communities and to set up procedures for resolving disputes among competing claimants to resources.

When large infrastructural investments—dams, irrigation facilities, roads, and ports—are planned, listening to public opinion and local NGOs at an early stage is a good way to avoid trouble later on. If this is not done, community opposition can gather momentum and delay or stop the project. A good environmental assessment should clarify potential environmental and social impacts, propose mitigative measures, and present the costs and benefits of alternatives.

A particularly difficult challenge for conflict resolution is posed by projects such as dams, highways, and some types of wildlife reservations that change land use and lead to involuntary displacement and resettlement. Rarely have local views been consulted to any extent in making such investment decisions or, until recently, in planning resettlement programs. This omission has led to inefficiency, as well as injustice; traditional resettlement has turned out to be needlessly slow and expensive. Governments and donors now broadly agree on several principles: (a) project designers should explore ways of minimizing resettlement; (b) resettlers' living standards should be as good as or better than before resettlement; (c) compensation for lost assets should be paid at replacement costs; and (d) communities should be encouraged to participate in all stages of resettlement planning and implementation. Examples from Mexico and Thailand illustrate this new approach (Box 4.7).

**The limitations and costs of participation**

Public participation has its drawbacks. Extensive participation, especially when information is inadequate, can delay decisionmaking. Communities with political influence sometimes reject proposals
Box 4.7 Reforming resettlement through participation: Mexico and Thailand

Resettlement of people displaced by large hydroelectric dams has typically been the extreme case of nonparticipatory planning. But experience with two recent projects in Mexico and Thailand illustrates how participation can help with issues as difficult as involuntary displacement and resettlement.

The 200-meter dam at Zimapan, central Mexico, and the 17-meter Pak Mun dam on the Mun River in Thailand are at the core of two World Bank-assisted projects designed to provide urgently needed clean energy. But the national benefits of the dams meant little to the nearly 25,000 people who would be displaced. Nor was previous experience in either country encouraging; new housing and compensation for lost assets had proved no substitute for submerged farmland and uprooted communities. It was not surprising that resettlement proposals were greeted with skepticism and opposition.

In both countries the impact of resettlement was taken into account when the dams were designed. In the case of Pak Mun a review of technical options showed that locating the dam slightly upstream and lowering its height would reduce the number of people to be resettled from approximately 20,000 to fewer than 2,000. Detailed resettlement plans that followed the World Bank’s guidelines were prepared to help the affected farmers recover their lost livelihoods. Under repeated prodding by NGOs and community groups, the energy company began working with the affected communities on improving its approach to resettlement. Although problems remain, sharing information about resettlement alternatives, preparing meetings and publications to inform resettlers of their rights and entitlements, and providing farmers with good-quality replacement farmland are important steps in improving the resettlement program.

To implement the resettlement policy for Mexico’s Zimapan project, the parent company set up a unit that reported directly to the company’s president. The unit included anthropologists, technicians, economists, architects, and social workers, all of whom were to live in the affected villages, help identify local concerns and resettlement preferences, and provide a channel of communication between the villagers and the company. As villagers in Zimapan organized, they repudiated the local administration and elected their own much tougher council to manage the negotiations on compensation and resettlement. Farmers have been active in selecting and supervising designs for replacement housing, and the company has purchased and transferred to the resettlers functioning, productive farms that will improve their incomes and living standards.

In neither case has participation in resettlement planning led to the disappearance of opposition—that was not the purpose. Indeed, opposition remains strong, and confrontational encounters between the company and antidam organizations still occur. Nevertheless, in both projects pressure for more active participation by local people has led to significant improvements in what will always be a difficult process. Participation has allowed the people most adversely affected by the projects to be actively involved in directing the course that resettlement will take.

to construct facilities such as waste disposal centers on the most suitable sites because of the impact on local property values, aesthetics, or safety. Making compensatory payments for local use and giving communities control over how the project is sited and designed can help defuse opposition.

Participatory approaches tend to be expensive. Consultation requires plenty of staff and time, and government agencies, already short of funds, may cut corners. If they do, the most remote and marginal—and often the neediest—communities will be the ones to suffer.

The extra net expense of seeking participation need not be large, however. In the Philippine example described above, the additional cost for the community organization program was about $25 a hectare, but savings in construction costs—largely as a result of information provided by farmers—brought the net increase down to less than $2.50 a hectare. The outcome was a better irrigation system with higher utilization and higher revenues. Increased participation was clearly cost-effective.

A potential disadvantage of participation is that decentralization of decisionmaking can easily reinforce the power of local elites. In these cases strong supervision is needed to overcome local conflicts.

When projects involve voluntary provision of labor, participatory approaches can widen income differentials. This often happened with community woodlot programs in India in the 1970s and early 1980s. In many of these projects, despite an approach ostensibly built on village participation, poor villagers commonly found that their time and labor were welcome but that the benefits went disproportionately to wealthier villages who made a smaller contribution. More thought is needed on ways to ensure that participatory approaches are able to balance the claims of different groups.
How participation can be improved

How can the large benefits of participation be realized while minimizing the costs? Community organizations often require strengthening through technical assistance, management training, and gradually increased levels of responsibility. Several measures can enhance participation.

**Use of indigenous institutions.** Indigenous institutions (such as the subak, or traditional groups of water users, in Bali) that are already involved in managing natural resources can be useful, particularly when decisions on land use have to be made. Where such institutions do not exist, it is often necessary to create them. All too often, however, user groups have been legislated into existence rather than built on existing social foundations. User groups can be effective only when they enjoy broadly based local support.

**Use of local voluntary organizations.** Among the strengths of community groups and NGOs are their ability to reach the rural poor in remote areas and to promote local participation; their effective use of low-cost technologies; and their innovativeness. They work best when they complement the public sector but may also have an important “watchdog” function, thereby influencing public policy. The disadvantages of NGOs include a generally weak financial base and administrative structure and limited technical capabilities. Many NGOs are small and by themselves cannot be expected to cover large populations. The challenge is to retain the NGOs’ expertise and energy while simultaneously enlarging their financial and administrative bases.

**Increased access to information.** Many countries now support local involvement in environmental impact assessments. But if such consultations are to be effective, the people who are involved need to be well informed. Some ways to achieve that are (a) to share information with local communities at the early stage of identifying a project, (b) to discuss local worries with the affected communities, (c) to allow public comments on background studies, (d) to encourage public comments on the draft environmental assessment, and (e) to include hearings and comments in the final document. The World Bank expects its borrowers to arrange public discussion of environmental assessments prepared for the projects it finances.

**Institutional reforms.** The attitudes of bureaucracies often thwart the benefits of local participation. Forestry departments, for example, generally see as their mission protecting trees from people. Wildlife conservation agencies (sometimes justifiably) fail to distinguish local communities from game poachers. Often, the institutional units that have the best relations with local communities are themselves on the margins of their own agencies. Most technical agencies lack the skills to foster participation. High priority should therefore be given to increasing the organizational weight of units that specialize in participation, to hiring professional staff trained in the social sciences, and to providing institutional incentives for participation.

The following chapters describe particular areas of environmental concern. In each area, policies are available for mitigating the worst effects of pollution and degradation without sacrificing development. Although such policies may appear simple and logical, no one should underestimate the political difficulties entailed in implementing them. As this chapter has argued, governments can reduce those difficulties by introducing well-designed administrative structures for making and implementing environmental policy and by carefully building constituencies of support.