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Linking Poverty Reduction and Environmental Management

Policy Challenges and Opportunities

DFID Department for International Development
Directorate General for Development European Commission
United Nations Development Programme
The World Bank

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Department for International Development, United Kingdom (DFID)

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Foreword

ne in five people on the planet—two-thirds of them women—live in abject poverty. While the last century saw great progress in reducing poverty and improving well-being, poverty remains a global problem of huge proportions. Of the world's 6 billion people, 2.8 billion live on less than US$2 a day, and 1.2 billion on less than US$1 a day. To address this challenge, the world's governments committed themselves at the United Nations Millennium Summit to the Millennium Development Goals, including the overarching goal of halving extreme poverty by the year 2015.

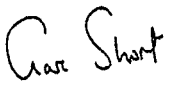
At the same time, however, our planet's capacity to sustain us is eroding. The problems are well known—degrading agricultural lands, shrinking forests, diminishing supplies of clean water, dwindling fisheries, and the threat of growing social and ecological vulnerability from climate change and loss of biological diversity. While these threats are global, their impacts are most severe in the developing world—especially among people living in poverty, who have the least means to cope.

Is this environmental decline inevitable in order for poverty to be reduced? We argue not. Indeed, quite the opposite is true. If we do not successfully arrest and reverse this erosion of natural resources, the world will not be able to meet the Millennium Development Goals, particularly the goal of halving extreme poverty. As this paper demonstrates,

tackling environmental degradation is an integral part of effective and lasting poverty reduction. The 2002 World Summit on Sustainable Development (WSSD) provides the international community with a pivotal opportunity to redirect the global debate, and to forge a more integrated and effective global response to poverty and environmental decline.

To succeed, we need to focus on the most important links between poverty, the environment, and sustainable development. Up until now, many have argued that ensuring sound environmental management means curtailment of economic opportunities and growth, but without growth we cannot reduce poverty. In fact, there is no simple relationship between economic growth and environmental degradation, and appropriate policies nationally and internationally can bring major benefits on both fronts. To this end, we need to look beyond what environmental institutions can do, and search for opportunities across all sectors.

This document is based on contributions from four organizations that are pursuing similar objectives for poverty eradication and environmental management—the Department for International Development (DFID) in the United Kingdom, the Directorate General for Development of the European Commission (EC), the United Nations Development Programme (UNDP), and the World Bank. Inspired by our common agendas and the opportunity provided by WSSD, we have pulled together our existing (but independent) strategies on poverty and environment. We have consulted widely and are grateful to the more than one thousand people from 84 countries who have participated in the discussions, many of whom have submitted comments. Drawing also from the work of others, we have assembled evidence of the important linkages between environmental management and poverty reduction, and what we believe are significant policy opportunities for moving the poverty-environment agenda forward.



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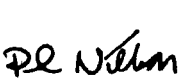

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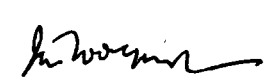

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The paper has been widely disseminated and discussed in the process leading up to the 2002 World Summit on Sustainable Development (WSSD). In January 2002, the paper was issued as a Consultation Draft and posted on several public websites. The Consultation Draft was presented at "side events" during the Second (January 2002) and Third (March 2002) Preparatory Committee meetings for WSSD. It also was presented in Tunisia at the 7th Bi-Annual Conference of the International Society of Environmental Economics, and in El Salvador at a World Wide Fund for Nature workshop.

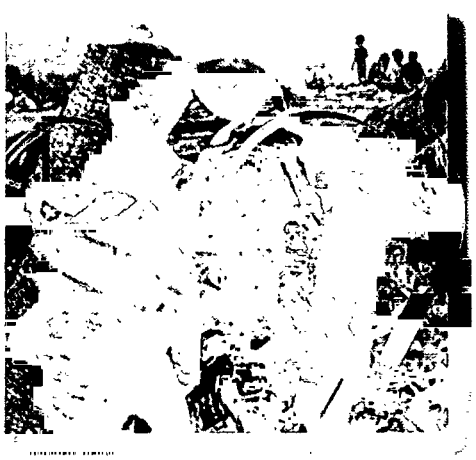
From 1 February until 31 May 2002, the World Bank Institute hosted an electronic discussion on the Consultation Draft, which drew more than 1,000 participants from 84 countries. Over the course of the four-month e-discussion, a total of 668 messages were received, and regular summaries of the discussion together with authors' responses were distributed. During the final 10 weeks of the e-discussion, a thematic format was introduced based on several key topics that had emerged from the discussion, including directional causality of poverty and environment; appropriate technology; quality of growth and environmental management; and trade, foreign direct investment, and the environment. Numerous amendments to the previous text in the Consultation Draft have been inspired by contributions to the e-discussion.

Special thanks go to Rama Chandra Reddy (World Bank), who moderated the e-discussion on the Consultation Draft, and to Jim Cantrell (World Bank), who guided the design and production of the paper from the Consultation Draft through to this final version.

While the authors have made strong efforts to accommodate comments received, the responsibility for this paper remains with our four organizations.

Abbreviations and Acronyms

DFID	Department for International Development (UK)
EC	European Commission
FSC	Forestry Stewardship Council
GDP	gross domestic product
GEF	Global Environment Facility
IMF	International Monetary Fund
IPM	integrated pest management
MEA	multilateral environmental agreement
NEMA	National Environmental Management Authority (Uganda)
OECD	Organisation for Economic Co-operation and Development
PEAP	Poverty Eradication Action Plan (Uganda)
PPA	participatory poverty assessment
PRSP	Poverty Reduction Strategy Paper
SPS	sanitary and phyto-sanitary
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WSSD	World Summit on Sustainable Development



OVERVIEW

Linking Poverty Reduction and Environmental Management

Addressing environmental issues that matter to the poor is critical to sustained poverty reduction and achieving the Millennium Development Goals.... But this requires a more "pro-poor" and integrated approach—linking action at local, national, and global levels.

Prepared as a contribution to the 2002 World Summit on Sustainable Development, *Linking Poverty Reduction and Environmental Management* focuses on ways to reduce poverty and sustain growth by improving environmental management, broadly defined. It seeks to draw out the links between poverty and the environment and to demonstrate that sound and equitable management of the environment is integral to achieving the Millennium Development Goals, in particular to eradicating extreme poverty and hunger, reducing child mortality, combating major diseases, and ensuring environmental sustainability.

Four priority areas for sustained policy and institutional change are highlighted:

- ***Improving governance*** *to create a more enabling policy and institutional environment for addressing the poverty-environment concerns of the poor, with particular attention to the needs of women and children.*
- ***Enhancing the assets of the poor*** *to expand sustainable livelihood opportunities and to reduce the poor's vulnerability to environmental hazards and natural resource–related conflict.*
- ***Improving the quality of growth*** *to promote sound environmental management and protect the environmental assets and livelihood opportunities of the poor.*
- ***Reforming international and industrial-country policies*** *to address the poverty and environment concerns of developing countries and the poor.*

Policy opportunities exist to reduce poverty and improve the environment

The environment matters greatly to people living in poverty. The poor often depend directly on a wide range of natural resources and ecosystem services for their livelihoods; they are often the most affected by unclean water, indoor air pollution, and exposure to toxic chemicals; and they are particularly vulnerable to environmental hazards (such as floods, prolonged drought, and attacks by crop pests) and environment-related conflict. Addressing these poverty-environment linkages must be at the core of national efforts to eradicate poverty.

Many opportunities exist to reduce poverty by improving the environment—but there are significant and often deeply entrenched policy and institutional barriers to their widespread adoption. The decade of experience since the 1992 Earth Summit in Rio reveals some important lessons that help point the way forward. Three broad lessons are highlighted here:

- ***First and foremost, poor people must be seen as part of the solution rather than part of the problem.*** Efforts to improve environmental management in ways that contribute to sustainable growth and poverty reduction should reflect the priorities of the poor. Supportive policies and institutions are needed, including access to information and decisionmaking, that expand the poor's opportunities to invest in environmental improvements that can enhance their livelihoods. At the same time, it is essential to address the activities of the non-poor, since they are the source of most environmental damage.
- ***The environmental quality of growth matters to the poor.*** It cannot be assumed that environmental improvement can be deferred until growth has alleviated income poverty and rising incomes make more resources available for environmental protection. This ignores the importance of environmental goods and services to people's livelihoods and well-being, and

how the diversity of these goods and services contribute to the poor's opportunities for moving out of poverty. Further, there are many examples of how bad environmental management is bad for growth, and of how the poor suffer most from environmental degradation. Ignoring the environmental soundness of growth—even if this leads to short-run economic gains—can undermine growth itself and its effectiveness in reducing poverty.

- ***Environmental management cannot be treated separately from other development concerns.*** Rather, it must be integrated into poverty reduction and sustainable development efforts in order to achieve significant and lasting results. Improving environmental management in ways that benefit the poor requires policy and institutional changes that cut across sectors and that lie mostly outside the control of environmental institutions—changes in governance, domestic economic and social policies, and international and industrial-country policies.

Improving governance

- **Integrate poverty-environment issues into national development frameworks** by addressing the environmental concerns of the poor in nationally owned poverty reduction strategies and related macroeconomic and sectoral policy reforms, so that they can become national sustainable development strategies.
- **Strengthen decentralization for environmental management** by integrating poverty-environment issues into subnational policy and planning processes and sectoral investment programs.
- **Empower civil society, in particular poor and marginalized groups,** to influence environmental management policy and planning processes at all levels by expanding public access to environmental information, decisionmaking, and justice.
- **Address gender dimensions of poverty-environment issues** by ensuring that they are fully integrated into the formulation, implementation, and monitoring of poverty reduction strategies and related policy reforms.
- **Strengthen anti-corruption efforts to protect the environment and the poor** by improving legislative and regulatory frameworks and oversight mechanisms, by increasing the penalties for violators, and by ensuring effective mechanisms for feedback from communities to enforcement agencies.
- **Reduce environment-related conflict** by improving conflict resolution mechanisms in the management of natural resources and biodiversity and by addressing the underlying political and economic issues that affect resource access and use, including the role of corruption.
- **Improve poverty-environment monitoring and assessment** by strengthening government and civil society capacity to monitor environmental change and how it affects

the poor, by integrating poverty-environment indicators into national poverty monitoring systems, and by building capacity to apply monitoring and assessment results to poverty-environment policy formulation and implementation.

Enhancing the assets of the poor

- **Strengthen resource rights of the poor** by reforming policies and formal and informal institutions that influence land and natural resource access, ownership, control, and benefit-sharing, with particular attention to resource rights for women.
- **Enhance the poor's capacity to manage the environment**—including conservation and sustainable use of land, water, and biological resources, and access to clean energy, water, and sanitation services—by strengthening local management arrangements and capacity and by supporting women's key roles in managing natural resources.
- **Expand access to environmentally sound and locally appropriate technology**—such as crop production technologies that conserve soil, water, and agrobiodiversity and that minimize the use of pesticides, or appropriate renewable energy and energy-efficient technologies that also minimize air pollution—by improving protection of and access to indigenous knowledge and technologies, by improving incentives for pro-poor technology development, and by involving the poor in technology research, demonstration, and dissemination.
- **Reduce the environmental vulnerability of the poor** by strengthening participatory disaster preparedness and risk reduction and mitigation capacity, by supporting the formal and informal coping strategies of vulnerable groups, and by expanding access to insurance and other risk management mechanisms.

Improving the quality of growth

- **Integrate poverty-environment issues into economic policy reforms** by expanding the use of strategic environmental assessment and poverty social impact analysis approaches and by strengthening environmental management standards and monitoring capabilities.
- **Increase the use of environmental valuation** in adjusting national income accounts and determining appropriate price levels to better reflect the value of environmental goods and services and to improve economic decisionmaking.
- **Encourage appropriate private-sector involvement** by strengthening government and community capacities to partner with the private sector to expand environmental services for the poor, by providing incentives for local enterprise development based on the sustainable use of biodiversity (such

as community-based ecotourism or sustainable harvest of natural products), and by putting in place appropriate regulations and voluntary codes to safeguard the interests of the poor and the environment.

- **Implement pro-poor environmental fiscal reform** by pricing natural resources appropriately, particularly energy and water; by expanding the use of fiscal incentives to promote environmentally sound practices and sustainable use of biodiversity; by improving the use of rent taxes to better capture and more effectively allocate natural resource revenues; and by improving the use of pollution charges to better reflect environmental costs in market prices.

Reforming international and industrial-country policies

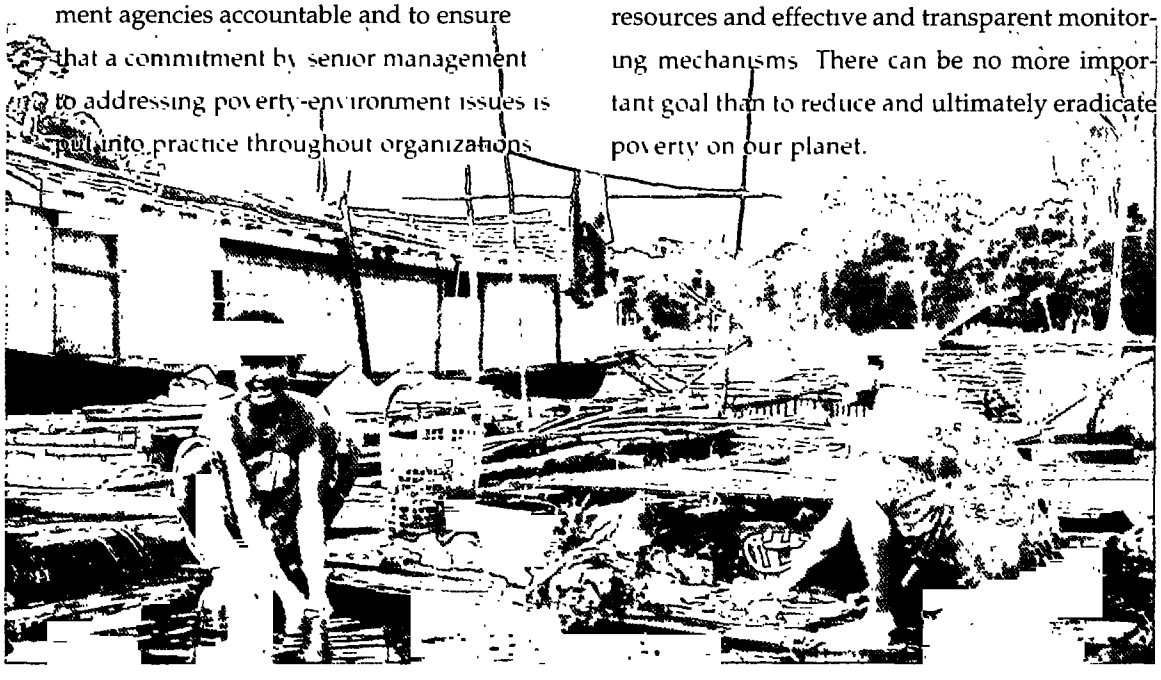
- **Improve international and industrial-country trade policies** by addressing trade-environment-poverty links in the negotiation and implementation of multilateral trade agreements, by reforming trade-distorting agricultural subsidies and trade barriers to give developing countries equitable access to international markets and to encourage environment-friendly products and trade practices, and by eliminating subsidies that lead to unsustainable exploitation—such as subsidies for large-scale commercial fishing fleets that encourage overharvesting in developing-country fisheries.
- **Make foreign direct investment more pro-poor and pro-environment** by encouraging corporations' compliance with the revised Code of Conduct for Multinational Enterprises from the Organisation for Economic Co-operation and Development, by raising awareness among shareholders and investors of corporate social and environmental responsibility issues, and by expanding the United Nations Environment Programme's Global Reporting Initiative and other approaches to improving corporate social and environmental reporting.
- **Enhance the contribution of multilateral environmental agreements (MEAs) to poverty reduction** by strengthening developing-country capacity to participate in the negotiation and implementation of MEAs (for example, to ensure that the Clean Development Mechanism promotes investments that benefit the poor and the environment), by improving coordination among MEAs so that scarce developing-country capacity is used most effectively, and by increasing funding for the Global Environment Facility as a major source of finance for global public goods in the environment, such as a stable climate, maintenance of biodiversity, and protection of international waters and the ozone layer.
- **Encourage sustainable consumption and production.** Industrial-country consumers and producers through their trade, investment, pollution, and other activities affect the environmental conditions of developing

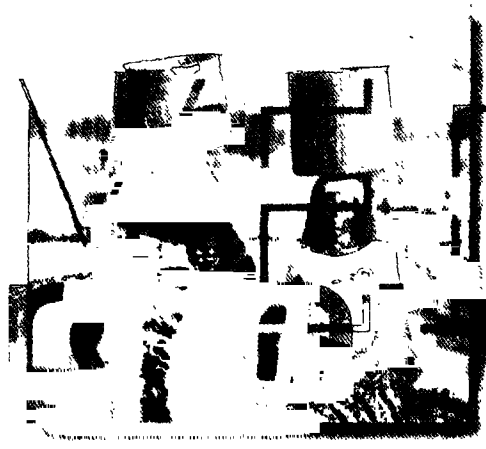
countries. Making rich-country consumption and production more sustainable will require a complex mix of institutional changes—addressing market and government failures as well as broad public attitudes.

- **Enhance the effectiveness of development cooperation and debt relief** in addressing poverty-environment issues, particularly for the poorest countries, where aid and debt relief continue to have a valuable role to play in helping governments make many of the changes needed. This includes "mainstreaming" environment in donor agency policies and operations through staff training; development and application of new skills, tools, and approaches; and revisions to the way resources and budgets are allocated. Improved monitoring of progress against stated objectives and targets is needed in order to hold development agencies accountable and to ensure that a commitment by senior management to addressing poverty-environment issues is put into practice throughout organizations.

Conclusion

This paper looks ahead with some degree of hope and optimism for the future—there are sometimes win-win opportunities, and there are rational ways of dealing with tradeoffs. Environmental degradation is not inevitable, nor is it the unavoidable result of economic growth. On the contrary, sound and equitable environmental management is key to sustained poverty reduction and achievement of the Millennium Development Goals. There are significant policy opportunities to reduce poverty and improve the environment, but more integrated and pro-poor approaches are needed. The World Summit on Sustainable Development is an opportunity to focus on what is most important and to forge a coherent framework for action, with clear goals and achievable targets backed up by adequate resources and effective and transparent monitoring mechanisms. There can be no more important goal than to reduce and ultimately eradicate poverty on our planet.





PART 1 Why the Environment Matters to People Living in Poverty

"Water is life and because we have no water, life is miserable." (Kenya)

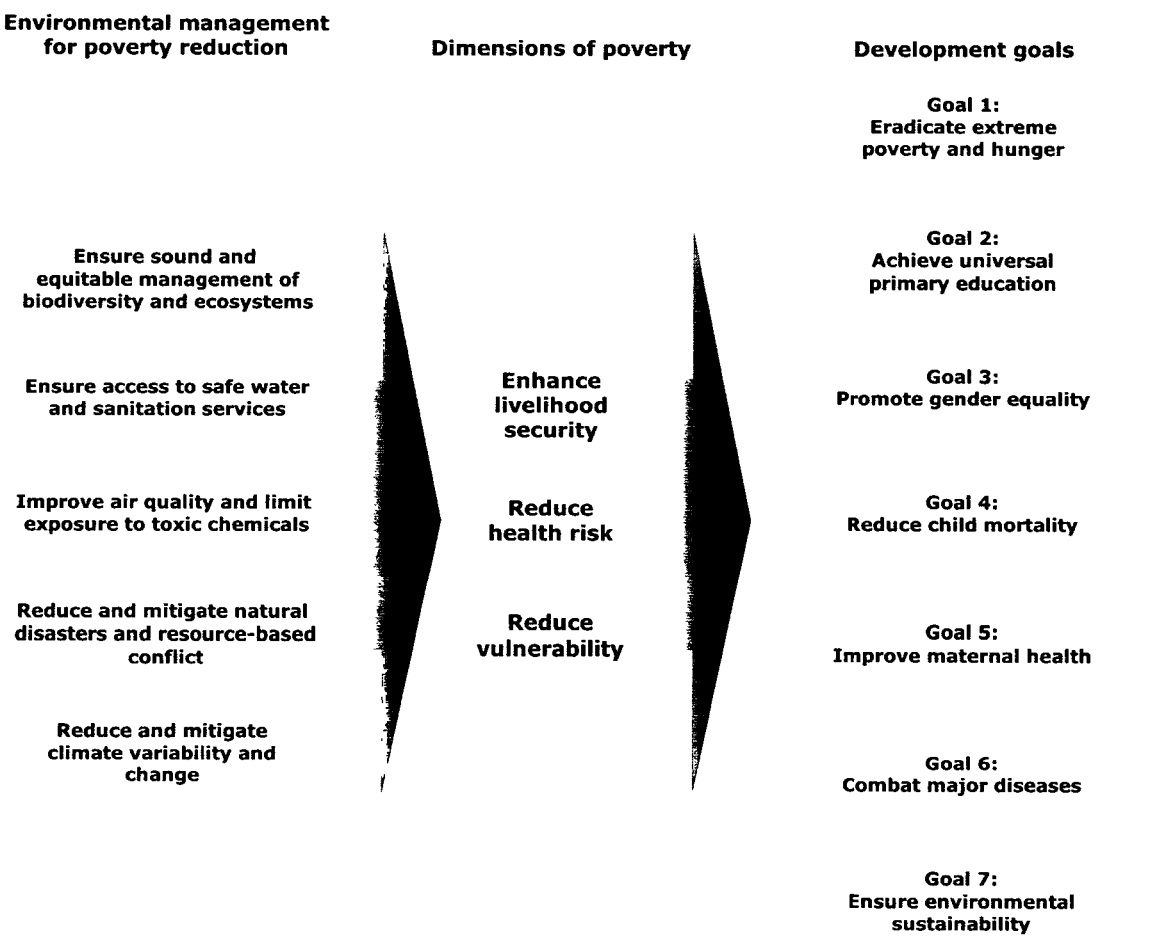
"We think the earth is generous; but what is the incentive to produce more than the family needs if there are no access roads to get produce to a market!" (Guatemala)

"In the monsoons there is no difference between the land in front of our house and the public drain. You can see for yourself." (India)

In their own words, the environment matters greatly to people living in poverty.[1] Indeed, poor people's perceptions of well-being are strongly related to the environment in terms of their livelihoods, health, vulnerability, and empowerment to control their own lives. Figure 1 provides a simplified framework for understanding how environmental management relates to poverty reduction, and why these poverty-environment linkages must be at the core of action to achieve the Millennium Development Goals and related national poverty eradication and sustainable development objectives.

FIGURE 1

Environment and the Millennium Development Goals



Part 1 of the paper focuses on the poverty-environment relationship by examining how the environment and environmental change in both rural and urban settings affect the poor in terms of three key dimensions of human poverty:

- *Livelihoods*—poor people tend to be most dependent upon the environment and the direct use of natural resources, and therefore are the most severely affected when the environment is degraded or their access to natural resources is limited or denied.
- *Health*—poor people suffer most when water, land, and the air are polluted, and environmental risk factors are a major source of health problems in developing countries.
- *Vulnerability*—the poor are most often exposed to environmental hazards and environment-related conflict, and are least capable of coping when they occur.

We also are concerned with the relationship between growth and the environment and how it affects the poor and efforts to reduce poverty. The environmental soundness of growth is critical to the livelihood opportunities of the poor, and countries with similar levels of income and growth can have quite different levels of environmental performance as a result of differing policy and institutional frameworks and implementation capacities.

While Figure 1 illustrates the main pathways between environmental conditions and dimensions of poverty, in reality these linkages are dynamic and often interconnected:

- ***Poverty*** is now widely viewed as encompassing both income and non-income dimensions of deprivation—including lack of income and other material means; lack of access to basic social services such as education, health, and safe water; lack of personal security; and lack of empowerment to participate in the political process and in decisions that influence someone's life. The dynamics of poverty also are better understood, and extreme vulnerability to external shocks is now seen as one of its major features (UNDP, 1997).
- ***Environment*** refers to the living (biodiversity) and non-living components of the natural world, and to the interactions between them, that together support life on earth. The environment provides goods (natural resources) and services (ecosystem functions) used for food production, the harvesting of wild products, energy, and raw materials. The environment is also a recipient and partial recycler of waste products from the economy and an important source of recreation, beauty, spiritual values, and other amenities.
- ***Poverty-environment linkages*** are dynamic and context-specific—reflecting both geographic location and scale and the economic, social, and cultural characteristics of individuals, households, and social groups. Different social groups can give priority to different environmental issues. In rural areas, poor people are particularly concerned with secure access to and the quality of natural resources—arable land and water, crop and livestock diversity, fish and bushmeat resources, forest products and biomass for fuel. For the urban poor, water, energy, sanitation and waste removal, drainage, and secure tenure are key concerns. Poor women regard safe and physically close access to potable water, sanitation facilities, and abundant energy supplies as crucial aspects of well-being, reflecting women's primary role in managing the household (Brocklesby and Hinshelwood, 2001; UNDP and EC, 2000).

Environmental management needs to reflect the multidimensional and dynamic nature of poverty-environment linkages. Thus, as used in this paper, environmental management extends well beyond the activities of environmental institutions in order to meet two fundamental and inter-related challenges: the need to manage and

sustain the long-term capacity of the environment to provide the goods and services on which human development depends, and the need to ensure secure and equitable access by the poor to environmental assets and the benefits that they can provide in order to expand people's livelihood opportunities, protect their health and capacity to work, and reduce their vulnerability to environment-related risks.

This broader approach to environmental management and poverty reduction calls for policy and institutional change across many sectors and involving many actors in the public, private, and civil society arenas—within both developing and industrial countries and at the international level. These actions need to affect political and economic processes—both of which have a major impact on how the environment is managed and how poor and marginalized groups are affected.

There have been some impressive gains since the 1972 United Nations Conference on the Human Environment, which was the first global conference devoted to environment and development issues. There has been a proliferation of environmental policies and institutions at national and sub-national levels, and environmental issues are firmly placed on the agendas of governments, civil society, and the private sector. Major global environmental agreements have been forged and global environmental organizations established. Environmental sustainability has become a core concern of bilateral and multilateral development cooperation, and billions of dollars have been spent on environment-related programs and projects.

Tangible progress also has been achieved "on the ground," although the picture is usually mixed. For example, in the 1990s some 900 million people gained access to improved water sources. This was merely enough to keep pace with population growth, however, and about 1.2 billion people are still without access to improved water sources, with rural populations particularly under-served (Devarajan, Miller, and Swanson, 2002).

Despite progress in some areas, pressure on the environment continues to mount worldwide, posing major challenges to the prospects for poverty reduction and human development in developing countries, particularly the least developed ones. The situation is summed up succinctly in the *2002 Global Environment Outlook* of the United Nations Environment Programme (UNEP): "The level of awareness and action has not been commensurate with the state of the global environment today; it continues to deteriorate" (UNEP, 2002b). Box 1 summarizes key environmental challenges facing developing countries in relation to the Millennium Development Goals. These linkages are addressed in more detail in the following sections on livelihoods, health, vulnerability, and growth.

Livelihoods and the environment

"There is a strong correlation between sound natural resource management and poverty reduction." (Cambodia Interim Poverty Reduction Strategy Paper, 2000)

BOX 1

Key links between the environment and the Millennium Development Goals

Millennium Development Goal	*Examples of links to the environment*
1. Eradicate extreme poverty and hunger	Livelihood strategies and food security of the poor often depend directly on healthy ecosystems and the diversity of goods and ecological services they provide.
2. Achieve universal primary education	Time spent collecting water and fuelwood by children, especially girls, can reduce time at school.
3. Promote gender equality and empower women	Poor women are especially exposed to indoor air pollution and the burden of collecting water and fuelwood, and have unequal access to land and other natural resources.
4. Reduce child mortality	Water-related diseases such as diarrhea and cholera kill an estimated 3 million people a year in developing countries, the majority of which are children under the age of five.
5. Improve maternal health	Indoor air pollution and carrying heavy loads of water and fuelwood adversely affect women's health and can make women less fit for childbirth and at greater risk of complications during pregnancy.
6. Combat major diseases	Up to one-fifth of the total burden of disease in developing countries may be associated with environmental risk factors—and preventive environmental health measures are as important and at times more cost-effective than health treatment.
7. Ensure environmental sustainability	Current trends in environmental degradation must be reversed in order to sustain the health and productivity of the world's ecosystems.

The poor, particularly those living in rural areas, often rely on a variety of natural resources (biodiversity) and ecosystem services as a direct source of livelihood. Increasingly, the rural poor live in areas of high ecological vulnerability and relatively low levels of biological or resource productivity, such as subtropical drylands or steep mountain slopes. New estimates for the *World Development Report 2003* indicate that some 1.3 billion people live on marginal lands (World Bank, 2002d). Limited access to land and other natural resources is another key aspect of rural poverty—more than half of the rural poor have landholdings too small to provide an adequate income, and nearly a quarter are landless (UNCHS, 1996). Thus, both environmental conditions and access to a variety of natural resources are crucial to the ability of poor people to

sustain their livelihoods. "Variety" is key since the poor need to have options so that they can continually diversify and differentiate their use of available natural resources as environmental conditions change (BDP, 2001; Koziell, 2001; Koziell and Saunders, 2001.

Biodiversity and natural resources

Natural resources can be a primary source of livelihood or may supplement a household's daily needs and income. A growing body of research shows that poor rural households often derive a significant share of their incomes from natural resources. An excellent study from Zimbabwe (Cavendish, 1999) illustrates the degree of natural resource dependence of poor people in rural areas.[2] Two facts stand out from his analysis: the poorest are most dependent on environmental income in relative terms, but the somewhat better off make more use of natural resources in absolute terms (see Figure 2). Hence, degradation of natural resources would hurt the poorest the most. However, rising income would tend to increase the use of natural resources; growth will not automatically alleviate environmental pressure in this context.

Natural resource degradation and biodiversity loss are undermining the livelihoods and future livelihood opportunities of large numbers of the poor. This is most evident with respect to agricultural systems. Soil and water degradation and the loss of pest and drought-resistant crop and livestock varieties are major threats to improving agricultural productivity, which underpins the livelihoods of the vast majority of the rural poor and is a cornerstone of poverty reduction strategies in many countries.

Poor people are affected by natural resource degradation and biodiversity loss much more than the better off because of their limited assets and their greater dependence on common property resources for their livelihoods. For example, in a study in West Africa, children showing growth abnormalities associated with poor nutrition (stunting) were found most frequently in areas of high soil degradation (GRID/Arendal, 1997).

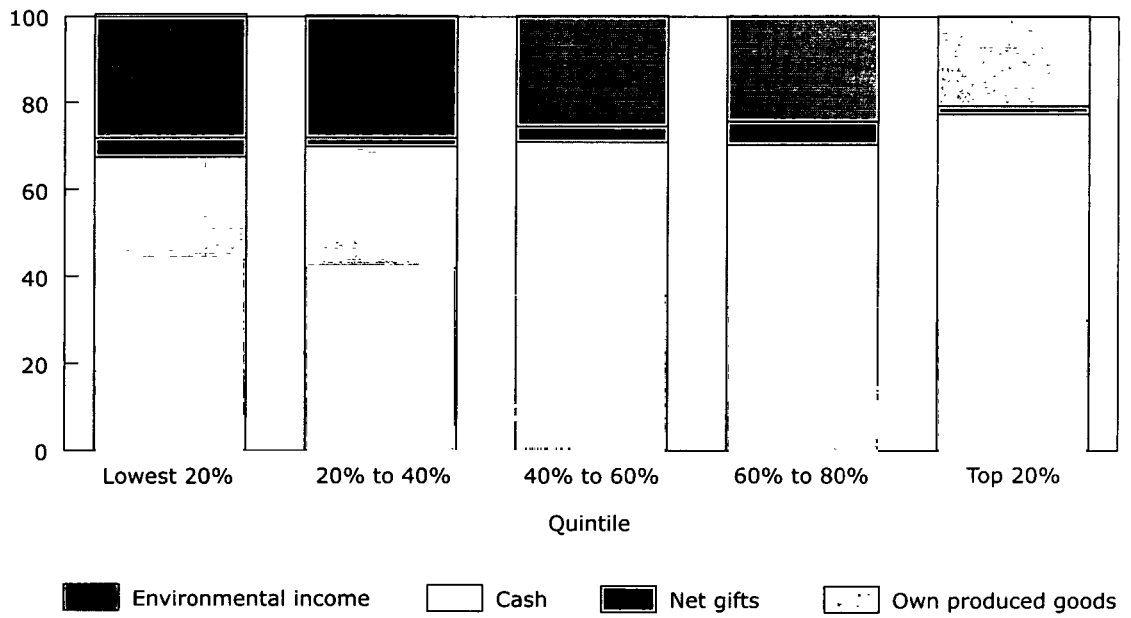
Current estimates are that up to 1 billion people are affected by soil erosion and land degradation due to deforestation, overgrazing, and agriculture. Water scarcity is a major issue in more than 20 developing countries. If current trends in water use persist, two-thirds of the world's population could be living in countries experiencing moderate or severe water scarcity by 2025. Fisheries provide livelihoods for some of the poorest and most marginalized groups, and often are the main source of animal protein for the poor. Yet many small-scale fisheries are overharvested, often by commercial enterprises that do not benefit the poor (IFAD, 2001; WRI, 2000; UNEP, 2002a).

Over 2 billion people continue to rely on biomass fuels and traditional technologies for cooking and heating, and 1.5–2 billion people have no access to electricity (UNDP, UNDESA, and World Energy Council, 2000). Shortage of wood fuel imposes time and financial costs on poor households, putting a particular burden on those that are short of labor and making it harder for children to attend school.

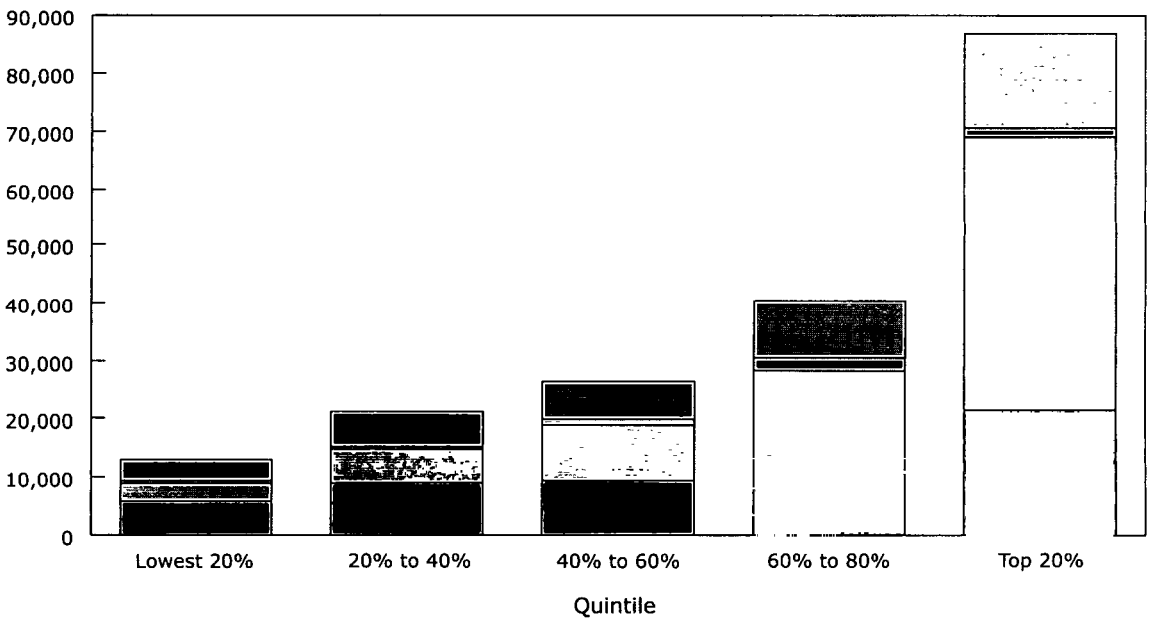
Natural resources and household income in rural areas of Zimbabwe

FIGURE 2

Income shares by quintile and major income source



Income in Z$ by quintile and major income source



Source: Cavendish, 1999.

Poor rural women are disproportionately affected by natural resource degradation and biodiversity loss. For example, participatory poverty assessments and other studies have shown the increased time, physical burden, and personal risk that women face in having to travel greater distances in order to collect fuel, fodder, and water due to growing resource scarcity or more restricted access to common property areas. This reduces the time spent on income-generating activities, crop production, and household and child-rearing responsibilities (Brocklesby and Hinshelwood, 2001; Dasgupta and Das, 1998).

Biodiversity and ecosystem services

Ecosystems—such as forests, agroecosystems, grasslands, and freshwater and coastal ecosystems (including coral reefs) and the biodiversity contained within them—provide essential "services" that contribute in numerous ways to productive activities. Some examples of ecosystem services that support livelihoods include provision of natural habitat for wild pollinators that are essential to food crops; natural predators that control crop pests and soil organisms important to agricultural productivity; watershed protection and hydrological stability, including recharging of water tables and buffering of extreme hydrological conditions that might otherwise precipitate drought or flood conditions; maintenance of soil fertility through storage and cycling of essential nutrients, and breakdown of waste and pollutants.

These services are "public goods," providing indirect values that are only partially traded in the marketplace but that are vital to the livelihoods of the poor, especially in more marginal environments or where the poor have limited access to external technology and other inputs (Koziell and Saunders, 2001). By maintaining productivity and a healthy and stable environment, ecosystem services also contribute to maintaining livelihood options and the potential for livelihood diversification. When ecosystem functions are impaired, this inevitably leads to a narrowing of livelihood choices and an increase in the vulnerability of the poor (BDP, 2001; Koziell, 2001; Koziell and Saunders, 2001).

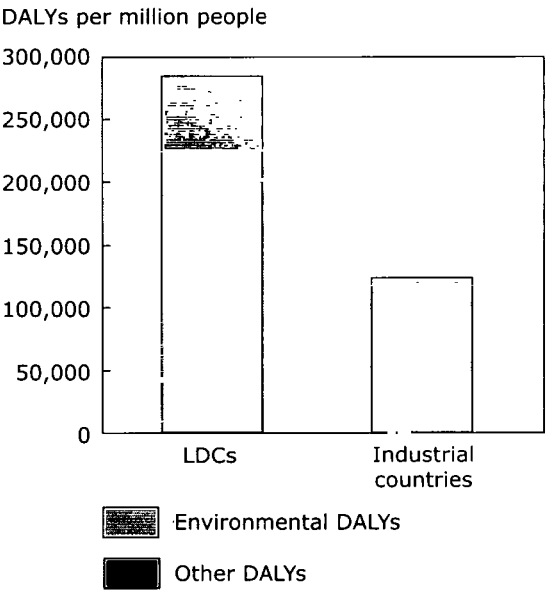
While biologically diverse ecosystems can be highly resilient to human disturbances, certain ecosystem types are at particular risk of a sudden collapse. For example, coral reefs and freshwater systems may go from a functioning to a nonfunctioning state in a very short time due to pollution, overuse, or other perturbations that reduce biodiversity or that exceed a certain threshold of tolerance. The consequence is that people who depend on these ecosystems may find themselves deprived of essential goods and services in a relatively short time span and unable to cope or adapt (Folke, 2002).

Health and the environment

"A study in Tegucigalpa showed . . . high lead intoxication in the children attending public schools. The study also notes that contaminants in soil and water are responsible for a high index of diarrhea diseases. . . . Soil and water pollution is further compounded by solid waste dumping with low coverage of garbage collection services, poor waste management, and the lack of sanitary landfills. Respiratory diseases are also common, especially among children under five . . . partly caused by increasing number of cars and the presence of factories that are not subject to any kind of environmental regulations." (Honduras Poverty Reduction Strategy, 2001)

Burden of disease and environmental risks (1990)

FIGURE 3



Note: Disability-adjusted life-years are a measure of the burden of disease. They reflect the total amount of health life lost to all causes, whether from premature mortality or from some degree of disability during a period of time.
Source: Lvovsky, 2001.

Up to one-fifth of the total burden of disease in the developing world—and up to 30 percent in sub-Saharan Africa—may be associated with environmental risk factors.[3] This is comparable to malnutrition and larger than any other preventable risk factors and groups of disease causes. While the total burden of disease in poor countries is about twice that of rich countries, the disease burden from environmental risks is 10 times larger in poor countries (see Figure 3). The poor, particularly women and children, are most affected by environmental health problems, and traditional environmental hazards—lack of safe water and sanitation, indoor air pollution, and exposure to disease vectors—play by far the largest role (Lvovsky, 2001; WHO, 1997).[4] Indeed, poor people are acutely aware of how poor environmental health affects their ability to move out of poverty (Brocklesby and Hinshelwood, 2001; Narayan, 2000).

Analyzing the impact on the poor of policy changes and investments is important in bringing out the specifics in the relationship between income growth and environmental quality. Such analysis frequently shows that the poor stand to benefit from environmental interventions now rather than later. Many interventions are low-cost, yet can save people from disease that can seriously impair their earning capability and welfare.[5]

Water and sanitation

Inadequate access to safe drinking water and sanitation, combined with poor hygiene practices, are major causes of ill health and life-threatening disease in developing countries. The rural poor rely on natural water sources such as streams for their washing and drinking water (see Box 2). Water-related diseases, such as diarrhea and cholera, kill an estimated 3 million people a year in developing countries, the majority of whom are children under the age of five (Murray and Lopez, 1996).

Vector-borne diseases such as malaria account for up to 2.5 million deaths a year and are linked to a range of environmental conditions and factors related to water contamination and inadequate sanitation (WRI, 1998). These are likely to worsen as a result of climate change (IPCC, 2001).

BOX 2

Burden of water collection on women and children

A recent water use study in Kenya, Uganda, and Tanzania went back to the same 34 sites that were studied in 1972. Water is still primarily collected by women and children and carried on the head, leading to headaches, general fatigue, and pains in the chest, neck, and waist. The distance walked to collect water was about 580 m in rural areas (although for some it can reach over 4 km) and 300 m in urban areas. This is a slight improvement since 1972 due to more standpipes, wells, and private vendors, including in rural areas. Due to population increase, however, time spent queuing has increased significantly, especially in urban areas. A return journey to collect water takes about 25 minutes (double the time since 1972), and 3.9 trips per day are made by each household. Thus, an average household spends 1 hour and 40 minutes each day collecting water. This reduces time for cooking and can affect the amount of time children spend at school.

Source: IIED, 2002.

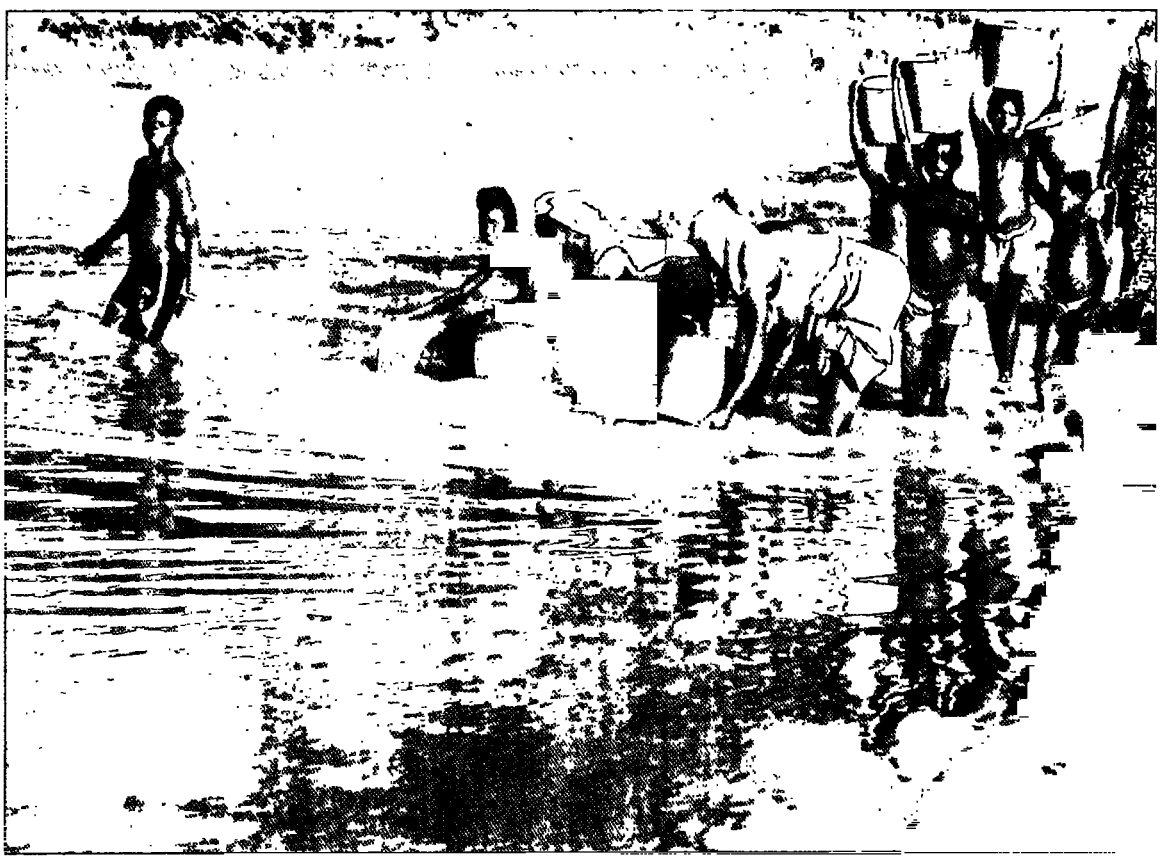
Pollutants

Indoor air pollution caused by the burning of traditional biomass fuels (wood, dung, crop residues) for cooking and heating affects 1 billion people, resulting in premature death for an estimated 2 million women and children each year (Smith, 1999). In India, recent studies suggest that 130,000–150,000 women may die prematurely as a result of indoor air pollution (Smith, 2000). A new study of rural households in central Kenya found that "exposure to high emissions from cooking and other domestic activities for adults results in women being twice as likely as men to be diagnosed with acute respiratory infection or acute lower respiratory infections" (Ezzati and Kammen, 2001). This has been confirmed by similar studies in Gambia (Campbell, 1997) and Guatemala (Bruce et al., 1998). In addition, the increased time and energy involved in the collection of biomass fuels contributes to the physical burden and ill health of women and children.

Outdoor air pollution is becoming a more significant health issue in urban areas of a num-

ber of developing countries, especially in large industrializing ones such as China and India, and is projected to become as important a health risk as indoor air pollution over the next two decades.

Pesticide poisoning is a significant health problem among poor farmers in developing countries, although the exact extent is not well documented. One estimate by the World Health Organization in 1990 indicated some 3 million cases of acute, severe poisoning per year worldwide. Widening the scope to cases of pesticide "exposure" that can result in either acute illness or chronic health impacts, estimates for Africa alone point to some 11 million cases per year (Goldman and Tran, 2002). The poor also suffer more indirect effects from excessive use of pesticides, such as depletion of fish stocks due to pesticide loads in agricultural runoff. Contamination of food crops with pesticide residues is a growing income problem for farmers producing for export markets, as several important markets are tightening their regulations regarding permissible levels of pesticide residues.



Vulnerability and the environment

"Natural disasters are a risk factor, which affect the pace of economic growth and destroy the assets of the poorest segments of the population in affected areas, reducing them to a state of dependency, at least temporarily, on donations . . . natural disasters seriously affect the living conditions of affected populations, and constitute an obstacle to a definite break with certain degrees and patterns of poverty. Therefore, measures aimed at managing this risk are of the utmost importance." (Mozambique Action Plan for the Reduction of Absolute Poverty, 2001–2005)

Insecurity is one of the key concerns of poor people, including their vulnerability to unpredictable events. Insecurity relates to people's risk of exposure, susceptibility to loss, and capacity to recover. Both the rural and the urban poor are most often exposed to environmental hazards and environment-related conflict, they suffer the greatest losses (at least in relative terms), and they are in the weakest position to cope and adapt.

Environmental stresses and shocks

Resource mismanagement and environmental degradation can exacerbate the frequency and impact of droughts, floods, forest fires, and other natural hazards. The poor are the most vulnerable to environmental disasters ("shocks") as well as to more gradual processes of environmental degradation ("stresses")—as the majority of the rural poor live in ecologically fragile areas, while the urban poor often live and work in environments with a high exposure to environmental hazards. By worsening economic deprivation in the short term, environmental disasters can compromise long-term welfare by forcing affected households to sell assets that would otherwise be used to meet future needs and contingencies. The effects of droughts and long-term land degradation are felt more gradually. They may build up over several years, during which a household's accumulated reserves are run down as a result of recurrent years of poor production. This will result in a slow but inexorable inability to invest in production and often leads to impoverishment and the abandonment of land.

Natural hazards claim an estimated 100,000 lives each year and inflict billions of dollars in damage. While natural hazards can strike everywhere, about 97 percent of the deaths related to such disasters occur in developing countries. The relative economic losses are also highest in poor countries (ISDR Secretariat, 2002). Natural disasters affected an estimated 256 million people in developing countries in 2000 (ICRC, 2001).

When asked, the poor talk of living in increasingly fragile environments and experiencing natural hazards, changing climatic conditions, and unpredictable seasons. These environmental stresses were making livelihood tasks more time-consuming, more dangerous, and more costly, and they often required more inputs. Poor people highlight their dependence

on the diversity of common property or open access resources—grazing lands, water bodies, and forests and the variety of products they hold—as a safety net during hard times. A decline in the abundance and diversity of these resources reduces people's livelihood options and increases their vulnerability (Brocklesby and Hinshelwood, 2001).

Increasingly, environmental degradation and disasters cause their victims to migrate in search of better conditions. People may be able to recover, with help, from sudden disasters, and they often return and rebuild after floods and storms. But long-term attrition caused by drought or land degradation has led to permanent migration from susceptible areas such as the Sahel. The Red Cross estimates that 1998 was the first year in which the number of refugees from environmental disasters exceeded those displaced as a result of war (ICRC, 1999). Much of the information on environmental degradation and disasters as a source of migration is anecdotal, however, and it is difficult to analyze the complex system of interconnected social, demographic, and environmental phenomena that together form the basis for cross-border migration (Leighton, 1999).

The frequency, intensity, and duration of extreme weather events is likely to increase as a result of climate change. The latest report on the impacts of climate change suggest that many developing countries in Africa, Asia, and Latin America will suffer potentially significant negative impacts from increased food insecurity, greater spread of vector-borne disease, more flooding, and exacerbation of land degradation (see Box 3).

BOX 3

Impacts of global climate change on the poor

Climate change will particularly affect poor countries that will find adaptation measures more costly, and will affect poor people who have more-limited coping mechanisms. Major impacts include declining water availability, reduced agricultural productivity, the spread of vector-borne diseases to new areas, increased flooding from sea level rise, and heavier rainfall.

In Bangladesh, the risk of flooding is predicted to rise by 20 percent in the next 20–50 years. Predicted yield changes for wheat, maize, and rice by 2020 suggest that yields in Nigeria and Brazil will fall by 2.5–5 percent, and in India by 5–10 percent (although there are also countries where yields may rise). Relatively small increases in temperature may spread malaria into large urban areas such as Nairobi and Harare that currently lie just outside the malaria range.

Source: IPCC, 2001; IIASA, 2001; CGIAR, 2000.

Poor people use a range of coping mechanisms and survival strategies in the face of environmental degradation and disasters. But their capacity to mitigate and recover from disaster is often constrained by the wider policy and institutional context, in addition to factors related to their social and economic status. For example, in many developing countries there is a lack of social safety nets and other protections that can help soften the impacts of environmental disasters on

the poor. Informal institutions such as local social networks also are important, and their density and capacity can underpin the ability of the poor to cope.[6]

Crisis and conflict

Tensions between diverse interest groups over natural resources can contribute to conflict. These tensions may be played out at the regional level, as can be seen in the water conflicts in the Middle East; at the national level, as in the competition for control of diamonds in Sierra Leone; and at the local level over access to natural resources on which the poor directly depend for their livelihoods (DFID, 2000a). In such circumstances, the poor will be the most negatively affected because they have the fewest resources to cope with physical loss, and they are the most vulnerable to violence and lack appropriate means for legal redress.

New research suggests that civil wars more often are fueled by rebel groups competing with national governments for control of diamonds, coffee, and other valuable primary commodities than by political, ethnic, or religious differences. Analysis of 47 civil wars from 1960 to 1999 shows that countries that earn about a quarter of their yearly gross domestic product (GDP) from the export of unprocessed commodities face a far higher likelihood of civil war than countries with more diversified economies. Since conflict prevention efforts have paid relatively little attention to these issues, there would seem to be considerable scope for both domestic and international policy to prevent civil conflict more effectively (World Bank, 2001a).

In some cases, natural resource conflicts can be so severe that they contribute to wider unrest and can affect the political stability of a country. In Burundi and Rwanda, there is some evidence that intense population pressure combined with limited land resources contributed to the ethnic tension that led to full-scale civil war (ACTS, 2000). And there is evidence that some of the enduring conflicts in other African countries—for example, in Angola, Democratic Republic of the Congo, Liberia, and Sudan—have arisen from competing desires to control rich natural resources, including conflict among elites over control of profits from natural resource exploitation, or that such exploitation has provided funds for conflict to continue (ACTS, 2000; Oxfam, 2002; Göeteborg University, 2002).[7]

1.4 Economic growth and the environment

The links between growth, economic policies, and the environment are important for poverty reduction in two inter-related ways:

- Countries can have high levels of growth and improved environmental performance. There is no simple tradeoff between growth and the environment—countries with similar levels of income and growth can have quite different levels of environmental performance.

- Ignoring the environmental soundness of growth—even if this leads to short-run economic gains—can hurt the poor in the short term and undermine long-run growth and its effectiveness in reducing poverty.

The quality of growth matters

Current strategies for poverty alleviation are fundamentally built upon premises of economic growth. A wealth of empirical evidence reveals that economic growth, as commonly measured in increases of real GDP, is necessary but not sufficient to reduce the number of people living in poverty—equally important is the equitable distribution of growth (World Bank, 2001f).

Critical to discussing economic growth as it relates to environmental impact and poverty is the consideration of the quality of growth. The same rate of growth in an economy can be associated with widely different environmental impacts, as seen in Figure 4. Depicted on the y-axis are changes in environmental quality based upon an environmental quality index measuring changes in water pollution and air pollution during the 1980s and deforestation over the 1980s and 1990s.[8] The higher the position on the y-axis, the more a country's environmental quality ranking has improved.

As economies grow, their environmental performance tends to deteriorate or improve depending on what variable is considered. Comparing across countries at different income levels:

- Water quality tends to improve with rising income
- Air pollution from sulfur dioxide tends to first get worse with rising income, but then decline
- Emissions of carbon dioxide tend to continue to grow with income, although not uniformly so (World Bank, 1992).

These are comparisons across country income groups, but countries at similar income and growth levels show large differences in environmental performance. These differences are largely a function of a country's policy and regulatory framework and institutional capacity. Thus, while this type of un-weighted, simple index only partially covers the concept of environmental quality, it serves to illustrate a fundamental point—there is not a simple tradeoff between growth and environment.

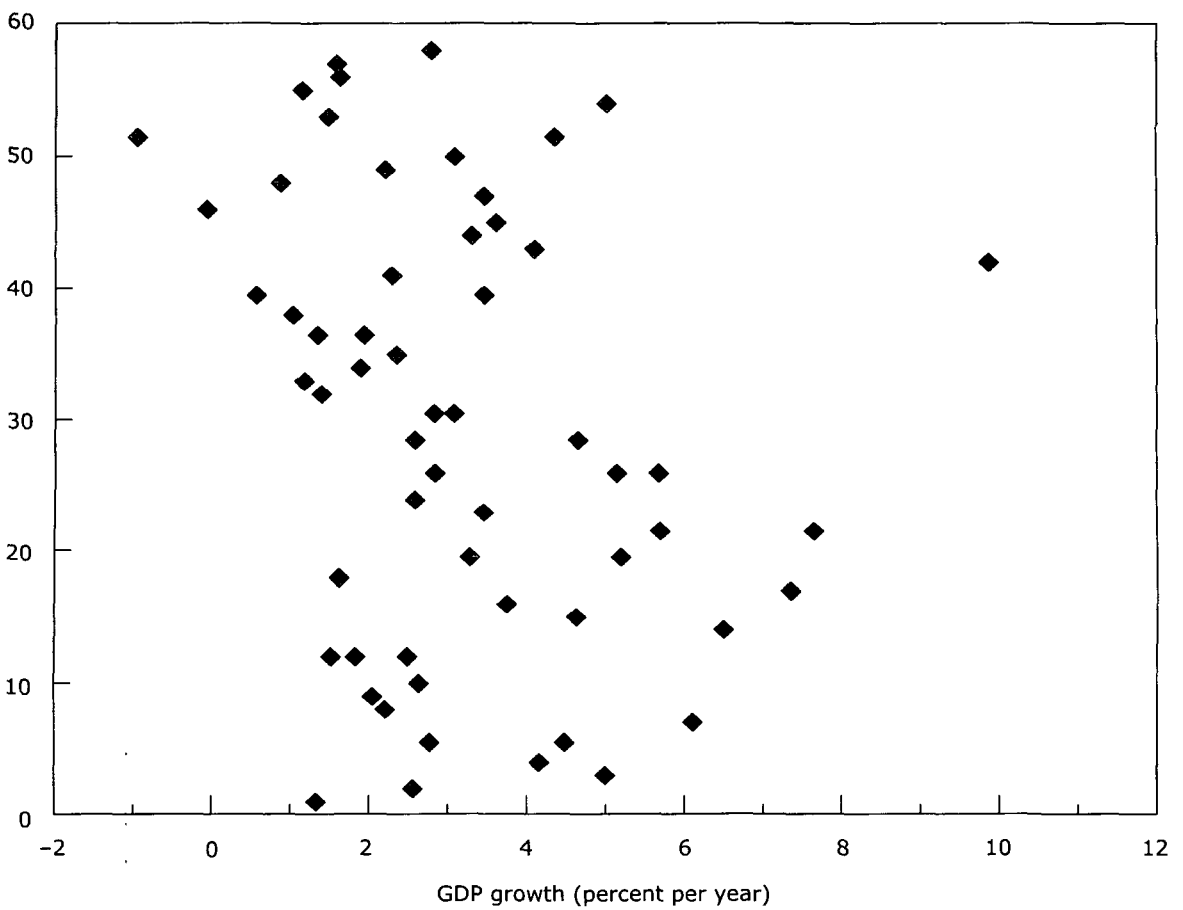
Ignoring the environment can undermine long-term growth

While there is no simple relationship between growth and environment, there are many examples of how bad environmental management is bad for growth. These short-run growth paths are bad for long-run growth, but also have high social and environmental costs that disproportionately affect the poor. Some examples include:[9]

- Collapse or near collapse of fisheries in many countries in both the industrial and the developing world—for example, the

FIGURE 4

Economic growth and environmental quality (1981–98)



Source: World Bank, 2000c.

cod fishery in the North Atlantic and the Argentina hake fishery. The latter was overfished by about double the maximum sustainable yield in the late 1990s (UNEP, 2002a).

- Decline of agriculture due to salinization from irrigation in several countries—for example in Pakistan, where it has been estimated that about 16 percent of the country is subject to salinization from low-quality groundwater provided by tubewells and excessive water application. The damage from salinization costs the country over US$200 million per year in reduced yields (World Bank, 1996b). Another example of unsustainable irriga-

tion was the draining of the Aral Sea to grow cotton, which has cost the region millions of dollars.

- Downstream impacts due to upstream land use change—the linkages between land use and downstream siltation and flooding are complex, but there is some evidence of the connection. For example, the Chinese government has concluded that the severe flooding of 1998 was caused in large measure by deforestation in the Yangtze River's watershed (World Bank, 2002d). The reduction of forests on slopes in Central America was found to contribute significantly to the October 1998 floods and mudslides caused by Hurricane Mitch, which killed nearly 18,000 people (Girot, 2000).
- Decline in exports of intensively farmed commercial aquaculture operations, in particular shrimp farming due primarily to disease from pollution and poor environmental controls—for example, the Taiwanese shrimp industry collapsed after the introduction of diseased animals. Disease caused financial losses of over US$1 billion in Asia in the 1990s. In addition, there were costs of land degradation, human health impacts, and mangrove destruction—estimated to be over 20 percent of revenues in Bangladesh (UNEP, 1999). The shrimp industry in Latin America is now being threatened by these same pathogens (Bartley, 1999).

Thus environmental improvement is not a luxury preoccupation that can wait until growth has alleviated income poverty, nor can it be assumed that growth itself will take care of environmental problems over the longer term as incomes rise and more resources are available for environmental protection. To improve the environmental soundness of growth, economic policies and decisionmaking need to better reflect the "public goods" nature of many environmental goods and services by addressing the persistent policy and market failures that lead to their undervaluation and misuse.

PART 2 Policy Opportunities to Reduce Poverty and Improve the Environment

Part 2 looks at policy opportunities to reduce poverty by improving the environment. Given the complex and multidimensional nature of poverty-environment linkages, it is inevitable that this encompasses a broad agenda for policy and institutional change across many sectors. We have grouped these issues into four main areas of policy action (see Figure 5).

Experience demonstrates that, with judicious policymaking, significant "win-win" opportunities exist to reduce poverty by improving the environment.[10] If better environmental management can contribute to poverty reduction, how can these opportunities be taken and what is preventing their wider adoption?

Many of the underlying causes of poverty and environmental degradation are related to issues of governance and politics. There are significant and often deeply entrenched policy and institutional barriers—at local, national, and global levels—that work against the interests of poor and marginalized groups, and that often create incentives to cause or overlook damage to the environment.

The decade of experience since the 1992 Earth Summit in Rio reveals some important lessons that help point the way forward. Three broad lessons are highlighted here:

FIGURE 5 **Key areas for policy action to improve poverty-environment outcomes**

Improve governance →	• Integrate poverty-environment issues into national development frameworks • Strengthen decentralization for environmental management • Empower civil society, in particular poor and marginalized groups • Address gender dimensions of poverty-environment issues • Strengthen anti-corruption efforts to protect the environment and the poor • Reduce environment-related conflict • Improve poverty-environment monitoring and assessment.
Enhance the assets of the poor →	• Strengthen resource rights of the poor • Enhance the poor's capacity to manage the environment • Expand access to environmentally-sound and locally-appropriate technology • Reduce the environmental vulnerability of the poor.
Improve the quality of growth →	• Integrate poverty-environment issues into economic policy reforms • Increase the use of environmental valuation • Encourage appropriate private sector involvement in pro-poor environmental management • Implement pro-poor environmental fiscal reform.
Reform international and industrial country policies →	• Reform international and industrial country trade policies • Make foreign direct investment more pro-poor and pro-environment • Enhance the contribution of multilateral environmental agreements to poverty reduction • Encourage sustainable consumption and production • Enhance the effectiveness of development cooperation and debt relief.

- ***First and foremost, poor people must be seen as part of the solution rather than part of the problem.*** Efforts to improve environmental management in ways that contribute to sustainable growth and poverty reduction should begin with the priorities of the poor. In many cases, policies continue to be based on uncertain assumptions and oversimplifications concerning the poor and their relationship to the environment. Pro-poor environmental management means challenging orthodoxies that blame the poor for environmental degradation, and challenging policies that protect the environment at the expense of poor people's livelihoods. A

considerable body of evidence now exists that supports an improved understanding of poverty-environment interactions, in particular how environmental conditions affect the poor and their access to environmental assets (see Box 4).[11] Supportive policies and institutions are needed, including access to information and decisionmaking, to expand the poor's opportunities to invest in environmental improvements and enhance their livelihoods. At the same time, however, it is essential to address the activities of the non-poor, since they are the source of most environmental damage.

- ***The spatial and temporal tradeoffs and competing economic and political interests that often underlie environmental management decisions and practices need to be addressed in ways that involve and benefit the poor.*** Developing countries can face difficult choices in allocating scarce resources among pressing development needs, and the environment is often viewed as a longer-term concern that must be traded off to address short-term needs (as has often been the case in industrial countries). At the same time, many examples are known where efforts to protect the environment have not taken into account the priorities of poor and marginalized groups and have left them worse off. For example, elite groups might be concerned with wildlife protection to conserve national or global biodiversity, while poorer villagers prioritize wild bushmeat for protein. There are rational ways of dealing with conflicting interests and tradeoffs, but they require more participatory, transparent, and accountable policy and decisionmaking processes to ensure their credibility and longer-term effectiveness.
- ***Environmental management cannot be treated separately from other development concerns, but requires integration into poverty reduction and sustainable development efforts.*** Improving environmental management in ways that benefit the poor requires policy and institutional changes that cut across sectors and lie mostly outside the control of environmental institutions—changes in governance, domestic economic policy, and international policies.

Improving governance

Key areas for policy action:

- **Integrate poverty-environment issues into national development frameworks**
- **Strengthen decentralization for environmental management**
- **Empower civil society, in particular poor and marginalized groups**
- **Address gender dimensions of poverty-environment issues**
- **Strengthen anti-corruption efforts to protect the environment and the poor**
- **Reduce environment-related conflict**
- **Improve poverty-environment monitoring and assessment.**

BOX 4

An improved understanding of poverty-environment relationships

- **Most environmental degradation is caused by the non-poor:**
  Most environmental degradation is caused by the non-poor as a result of their production and consumption levels, which are much higher than those of the poor, particularly in the highly industrialized countries. Even where poor people degrade the environment, this is often due to the poor being denied their rights to natural resources by wealthier elites and, in many cases, being pushed onto marginal lands more prone to degradation.
- **Population growth does not necessarily lead to increased degradation:**
  While increasing population undoubtedly places greater pressure on productive land and resources, it is not necessarily population per se that causes the damage. The complex of locally specific social, economic, environmental, and governance circumstances in which population increases take place—which in turn can be strongly influenced either positively or negatively by external economic and political forces—are the primary driving forces behind poverty-environment interactions. Indeed, conventional economic theory would suggest that as population increases and land becomes scarcer, the land should increase in value and merit greater care and investment. Research in Kenya has documented cases where, even in the face of increasing population pressures, farmers have managed semiarid, degraded, unproductive lands in a manner that has rehabilitated them and made them profitable (Tiffen, Mortimore, and Gichuki, 1994). A wider review shows that for population growth to lead to improved soil and water investments, market access and attractive producer prices are essential, as well as social and economic support to prevent the collapse of social structures (Boyd and Slaymaker, 2000). In many areas, these conditions will not be present, and population growth will increase pressure on the environment.
- **The poor are capable of investing in environmental improvement:**
  The conventional wisdom has been that poor people are too impoverished to mobilize resources for enhancing the environment. In some cases this is true. But numerous experiences demonstrate that when incentives are favorable, low-income households and social groups can mobilize enormous resources, particularly labor. There are many well-documented cases of poor people investing their own time and resources in environmental management, and succeeding in maintaining production and profitability while keeping their families and communities from the worst effects of poverty.[a] For example, many urban environmental problems can most effectively be solved when poor communities mobilize themselves or form coalitions with less-poor groups to improve service provision, often with some contribution in cash or kind (Hardoy, Mitlin, and Satterthwaite, 2001).
- **Poor people often have the technical knowledge for resource management:**
  It is often assumed that a lack of technical knowledge is a key constraint to poor people's management of natural resources. Indeed, when poor people move to areas with new ecological conditions, or when something happens to change the balance under which their resource management practices developed, a period of adjustment is required. Evidence is increasingly showing that poor people have an enormous store of indigenous technical knowledge—for example, environmentally sound cultivation practices, efficient water harvesting techniques, and myriad uses for medicinal plants. This knowledge is often undervalued or completely ignored.

a. For some examples, see the Poverty and Environment Initiative (UNDP and EC, 1999a-1999g); Reij and Waters-Bayer, 2001; and the Equator Initiative at www.EquatorInitiative.org (for examples of communities simultaneously reducing poverty and protecting biodiversity).

Poor people are quite capable of sustaining and improving their own livelihoods as long as they have adequate opportunities to make a living, a voice in decisions that affect them, and recourse to justice to defend their rights. Improved governance—including an active civil society and open, transparent, and accountable policy and decisionmaking processes—is often the missing link in creating a more enabling policy and institutional environment to address poverty-environment issues that matter to the poor. Addressing governance issues at both national and sub-national levels is vital. Politicians, the judiciary, the civil service, and the private sector all have a role to play as the state directly controls access to many natural resources or determines the rules for resource use, controls investments for environmental infrastructure, and creates the framework for public policy debate about poverty-environment issues.

Integrate poverty-environment issues into national development frameworks

Poverty-environment issues need to be integrated into mainstream development planning and resource allocation processes—including national development plans and budgets, poverty reduction strategies, and sector plans and budgets. This is necessary in order to forge a broad-based and more coordinated response to poverty-environment challenges, to achieve synergy between diverse interventions across many sectors and levels of action, and to ensure that adequate domestic and external resources are being allocated and effectively targeted.

All countries have some form of national strategic planning process. At the 1995 World Summit for Social Development, governments committed themselves to developing more explicitly pro-poor policy frameworks through the preparation or strengthening of national strategies to reduce poverty. In 1999, the World Bank and the International Monetary Fund (IMF) made Poverty Reduction Strategy Papers (PRSPs) the basis for debt forgiveness and new concessional lending.[12] Nationally owned poverty reduction strategies, including the PRSP process, provide a critical entry point for incorporating relevant poverty-environment issues and ways to tackle them into a country's mainstream development policy framework.

Although poverty reduction strategies are intended to reflect the poor's priorities, issues that matter most to the poor, including poverty-environment links, have often been overlooked or received inadequate attention. Recent environmental reviews of PRSPs prepared in 40 countries found that some, such as Bolivia, Honduras, Mozambique, Nicaragua, and Uganda (see Box 5), have made a significant effort to address the issues of improved natural resource management, better environmental health, and disaster preparedness. In most other countries, however, these issues have not been adequately addressed in the context of poverty reduction planning (DFID, 2002b; Bojö and Reddy, 2002).

Even where environmental matters are adequately addressed in PRSPs, considerable work still needs to be done to ensure that Medium-Term

BOX 5

Integrating environment in Uganda's Poverty Eradication Action Plan

In early 2000, Uganda's Poverty Eradication Action Plan (PEAP) was updated. Early drafts of the revision contained little recognition of environmental issues and long-term sustainability. For example, the focus in energy policy was on electrification, although fuelwood accounts for 96 percent of domestic energy supply. The National Environmental Management Authority (NEMA) engaged in the process by producing a series of amendments and additions that were incorporated into the strategy. Other parts of the Ministry of Water, Lands and Environment submitted their own PEAP amendments once the influence of the NEMA initiative became known. Since the PEAP was adopted, NEMA has been engaged in following up on sectoral plans, such as the Plan for the Modernization of Agriculture, and in identifying poverty-environment indicators to monitor implementation.

Source: DFID, 2000b.

Expenditure Plans and sectoral plans and budgets contain adequate and properly directed resources for investment in the environmental management concerns of the poor.[13] Promoting commercial farming that drains a wetland without thinking of the effect this will have on its current users is shortsighted and may have a negative impact on the poor. Promoting an energy policy that focuses only on electrification, which the poor cannot afford and so will remain dependent on fuelwood, is counterproductive. Funding more rural health clinics without investments to reduce environmental health hazards is not cost-effective. All relevant sectoral policies need to be assessed to ensure that environmental opportunities to help the poor have not been overlooked (Yaron and White, 2002).

At the 1992 UN Conference on Environment and Development, governments made a commitment to adopting national strategies for sustainable development, which is reflected in the Millennium Development Goals (e.g., Goal 7 on "ensuring environmental sustainability"). The UN has prepared guidance to assist countries in preparing a sustainable development strategy (UNDESA, 2002), and the Development Assistance Committee of the Organisation for Economic Co-operation and Development (OECD) has prepared similar guidelines for development agency support to such processes (OECD, 2001c).[14] Each country needs to determine its own strategy process. The challenge is to seek convergence between poverty and sustainable development strategies and to avoid the continuing tendency of donors to promote multiple and competing strategy frameworks. Where poverty reduction strategies adhere to their stated principles, including the integration of relevant environmental issues, then this can be considered a national strategy for sustainable development (OECD, 2001c; DFID, 2000c).[15]

A greater emphasis on cross-sectoral approaches does not imply a less significant role for Environment Ministries and natural resource-related agencies, nor does it reduce the need for adequate funding, staffing, and training to carry out their policy and regulatory mandates. How-

ever, it does mean that environmental organizations—including in civil society—need to understand better how environmental conditions affect the poor and the ways in which environmental management can contribute to poverty reduction. It also means that environmental organizations should engage more effectively with Ministries of Planning and Finance or other agencies driving the national planning process to ensure that poverty-environment issues are addressed. In most cases, this shift in orientation will require a reassessment of environmental management mandates and capacity development needs.

Strengthen decentralization for environmental management

With the trend toward greater decentralization and devolution in many countries, planning is increasingly being undertaken at provincial, district, and local levels. For example, countries such as Malawi, Tanzania, Egypt, and Sri Lanka have introduced district-level environmental planning. While this is an important development, it is vital that these environmental plans are integrated into the mainstream local planning process. It is also important that these plans focus on issues that are relevant to poor people—approaching the topics from their perspective rather than only from an environmental perspective.

Decentralization in rural areas has given local governments control over many key natural resources—such as state land—and responsibility for infrastructure such as water supply, sanitation, and irrigation. Rules on resource access—such as permits for mining, timber harvesting, grazing, and industrial emissions—are generally issued by local government. In cities, up to half of urban land is commonly in the public domain as public buildings, public infrastructure, and land (e.g., roads, railways, canals). The way local government chooses to use this land affects where industry locates, how congested a city is, where people live, and how the city will develop (DFID, 2001).

Decentralization and local empowerment is not a guarantee for environmental stewardship. While greater local government control has in some cases made decisionmaking more responsive and accountable, this is by no means guaranteed. Local governments can be subject to the same "capture" by wealthy elites as central government; they can also manage local resources unsustainably to raise revenue and may have weaker environmental management capacity than central governments. In addition, decentralization has often been undermined when central governments have not provided sufficient resource transfers or revenue-raising powers for local governments to implement their responsibilities.

Further, not all stakeholders have compatible objectives, and degrees of power and influence can differ, often significantly. This can lead to conflicts when poorer and more marginalized groups are left out of the process or when success encourages others to enter. Hence, efforts to empower communities to manage natural resources locally should safeguard against elite capture and should build local capacity for participatory management (UNDP and EC, 2000). Also, devolution of power to the local level can

increase pressure on natural resources in view of the income, employment, and revenue needs of local government and their constituents. Hence, when tradeoffs between environmental conservation and poverty reduction are resolved locally, they may result in short-term exploitation. This can be mitigated by two factors, however. First, local resource control also means that the benefits of sustainable management will accrue locally. Second, financial transfers from the outside, for example through nationally directed subsidies or international funding sources such as the Global Environment Facility (GEF), can make a big difference as to how these tradeoffs are resolved.[16]

Empower civil society, in particular poor and marginalized groups

Civil society organizations, including organizations of the poor, have a key role in promoting sound and equitable environmental management. Farmers groups, community groups, religious organizations, trade unions, professional associations, and public interest organizations can be instrumental in raising awareness of environmental issues, in helping poor people to secure their access to natural resources and environmental infrastructure, and in monitoring the performance and accountability of government, the private sector, and international agencies. In this context, there is a need for enhanced cooperation between environmental, social development, and human rights groups. Where government is responsive, it can have a major impact. In India, reformist governments in the states of West Bengal and Andhra Pradesh were instrumental in promoting greater joint management by the poor of forestry resources (Lele, 2001). In several Latin American cities, progressive mayors and city councils have had a major impact in improving the access of the poor to environmental infrastructure (Hardoy, Mitlin, and Satterthwaite, 2001).

Strengthening civil society's role in environmental management, particularly among poor and marginalized groups, requires access to environmental information, to decisionmaking processes, and to adequate means of redress through the justice system.

Public access to information is vital for effective environmental management. A free media has been instrumental in highlighting environmental problems in both the public and the private sectors. In some countries, the state has effectively used public pressure by making information publicly available in order to encourage greater pollution compliance (see Box 6). This also applies to rural areas. In the Philippines, for example, access to information has contributed to community monitoring of forestry offenses and the enforcement of forest regulations (Brunner et al., 2000).

The participation of poor and marginalized groups in policy and planning processes is essential to ensuring that the key environmental issues that affect them are adequately addressed. It also fosters commitment to implementation of environmental policies and interventions. The effective participation of these groups depends on a number of factors, however. The participatory mechanisms put in place should be sensi-

BOX 6

Indonesia's Program for Pollution Control, Evaluation, and Rating (PROPER)

The Indonesian environment agency, BAPEDAL, introduced PROPER in early 1995 and focused on 187 of the worst water polluters. The Vice President presided over a high-profile ceremony to congratulate the one-third of companies that met the regulations, while BAPEDAL privately notified the remaining two-thirds that they were noncompliant and had six months to go before public disclosure. Following full disclosure, the program had by mid-1997 reduced pollution by 40 percent. Indonesia is now expanding the program to 2,000 plants. Other countries have learned from this approach and similar schemes are now under way in the Philippines, Mexico, and Colombia, and are planned in China and Venezuela.

Source: World Bank, 2000a.

tive to the resource constraints of poor people, should increase their access to environmental information, and should enhance transparency and accountability in order to convince poor people that their views will be considered and given due weight in decisionmaking.

Poor and marginalized groups often lack access to environmental justice in order to address environmental abuses and to protect their rights. At the same time, governments often do not have the resources to monitor in a timely and effective manner the resources and services that the poor depend on, particularly in remoter rural areas. Governments need to support representation by institutions that are accountable to the poor, so that monitoring of action and enforcement of rights can take place at all levels. Citizen oversight boards, community-level review processes for government development plans and projects, and ombudsman systems for dispute resolution are examples of such mechanisms. It is also important to strengthen the judicial system as an impartial and independent institution, and to foster the emergence of institutions of civil society that can mediate between different actors (UNDP and EC, 2000).

Address gender dimensions of poverty-environment issues

Gender roles and relationships in environmental management and access to environmental assets are a key dimension of the poverty-environment nexus and must be taken into account for effective policy and program design (OECD, 2001a). Women play a critical and often primary role in food production and natural resource management activities. Rigid gender roles can contribute to inefficiencies in natural resource management (World Bank, 2001b), and equity between women and men in gaining access to natural resources is essential to improving food security and livelihoods. And, as described in Part 1, women are at higher risk and more vulnerable than men to many environmental hazards because of their particular social and economic roles.

To date, poverty-environment links that matter to poor women—such as lack of land and resource rights, the additional disease burden from

indoor air pollution, and the time and physical burden of collecting fuelwood and water—have been given very little recognition in most PRSPs. Existing gender analysis methods and tools should be employed to ensure that poverty reduction strategies, policy and budget frameworks, and monitoring systems reflect a more gender-disaggregated understanding of poverty-environment concerns and needed policy and institutional responses.

Strengthen anti-corruption efforts to protect the environment and the poor

Corruption is a general governance problem, but it relates strongly to poor environmental management, especially concerning the extraction of natural resources, the regulation of pollution, and the preference for lucrative hardware solutions (for example, the power and water sectors) over softer solutions like efficiency savings. The Environmental Sustainability Index found that the variable that most correlated with poor environmental performance was corruption.[17]

The provision and effective dissemination of good-quality information, combined with an appropriate legal and regulatory framework and the eventual imposition of adequate sanctions, can improve the situation. Pressure can be brought to bear by national and international civil society, by international buyers and consumers, by donors, and by other governments (see Box 7). For example, according to Article 97 of the Cotonou Agreement between the European Union and ACP (African, Caribbean, and Pacific) countries, serious cases of corruption should give rise to consultations between the Parties to the Agreement, and require the relevant Party to take the measures necessary to remedy the situation immediately. In some cases, sanctions may be imposed, such as suspension of aid.

While developing countries have a major role to play in stamping out corruption, industrial countries also can play a part—as they may be home to the briber. The OECD Bribery Convention, which recently entered into force, requires member-states to introduce legislation that makes bribery of a "foreign public official" a criminal

BOX 7

Tackling corruption in the Cambodian forestry sector

Cambodia's Interim Poverty Reduction Strategy states: "controlling illegal logging, combined with measures already taken to restructure the forestry concession system, will begin to mobilize the revenue potential of the forestry sector which will become an important source of finance for poverty reduction measures in agricultural and other sectors." It is estimated that about US$100 million is lost each year from corruption, compared with only about US$13 million that is captured. The Forest Crime Unit, supported by the international nongovernmental group Global Witness, has been very blunt about drawing attention to the lack of action against illegal loggers. Faced with mounting domestic and international criticism, Cambodian Prime Minister Hun Sen announced the suspension of all logging operations as of January 2002.

Source: Hodess, 2001.

offense, including public officials of non-Parties to the Convention. Many OECD countries, such as the US and the UK, have passed such legislation. There is also a desire by some industrial-country governments and businesses to agree to multilateral rules that require public disclosure of the amount of rent taxes they are handing over to developing-country governments for legal exploitation—often for oil—in order to ensure that this money does not disappear.

Reduce environment-related conflict

Environmental conflict is an issue at the micro and intermediate levels (e.g., pastoralists versus settled farmers, river basin users) and at a macro level (e.g., over control of diamonds and timber). At the micro and intermediate levels, conflict resolution structures are needed that provide a forum for informed dialogue to solve problems. For example, river basin management authorities are being set up in many countries to establish and support dialogue and management rules between different resource users. In some cases, the open access nature of many resources—land, fisheries, forests—needs to be altered to stop overuse, which can lead to conflict. Local-level efforts to define appropriate management regimes need to be supported. This can be complex, as it is important not to exclude poor people. For example, while many protected areas are being managed with more involvement of local people, there are numerous examples of protected areas that lack effective mechanisms to facilitate local community participation and to resolve conflicts over access to 'protected' resources that local populations depend on for their livelihoods and well-being (Lewis, 1996; Ghimire and Pimbert, 1997; Buckles, 1999).

Control over natural resource rents—particularly oil and other minerals—can cause conflict between local residents, governments, and private extractors. In some cases, there also can be tension between the local district where the minerals are located and central government—which may get much of the revenue—an issue that has arisen in Indonesia, Papua New Guinea, and Nigeria. There is no easy solution to these problems, but they must be addressed by attempts to reach a political settlement on the appropriate and transparent sharing of resource revenues, based on public debate.

In more extreme cases, natural resources may fuel war, and they often provide the funds and incentives to prolong conflicts once they have started. This has been the case in West Africa and Southeast Asia. The underlying cause for the conflict needs to be addressed, but in the meantime pressure from the international community—governments, civil society, and consumers—can reduce the potential gains from resource extraction. The Kimberley diamond certification process is one such attempt, as is pressure by the UN Security Council to highlight natural resource extraction in the Democratic Republic of the Congo (see Box 8).

Improve poverty-environment monitoring and assessment

Improving environmental management to reduce poverty requires local understanding of

BOX 8

Natural resources fuel conflict in the Democratic Republic of the Congo

In the Democratic Republic of the Congo, the link between conflict and natural resources is now so explicit that in 2001 the UN Security Council asked the Secretary-General to set up a special expert panel on the illegal exploitation of natural resources and other forms of wealth in that country. The panel argued in its first report that there is "a pattern of continued exploitation carried out by numerous state and non-state actors, including rebel forces and armed groups, conducted behind various facades in order to conceal the true nature of the activities." The only loser in this huge business venture is the Congolese people.

Following a December 2001 debate on the panel's conclusions, its mandate was extended to include an update of information from all relevant countries; an evaluation of possible actions that could be taken by the Security Council in order to help end plundering; recommendations on specific actions that the international community might take in support of the Congolese government; and recommendations on possible steps that might be taken by transit countries, as well as by end-users, to contribute to ending illegal exploitation of natural resources.

Source: UN, 2001.

how environmental conditions relate to poverty, and the ability to identify and set priorities on alternative policy options and evaluate their effectiveness and impact. This, in turn, requires appropriate and effective indicators and monitoring systems. Environmental data tend to focus on environmental change without determining poverty effects, while poverty monitoring systems often ignore environmental concerns. Indicators are needed that measure how environmental conditions affect the livelihoods, health, and vulnerability of the poor, and these need to be integrated into national poverty monitoring systems and assessment.[18]

Some work is already under way to identify useful generic poverty-environment indicators, but the real need is to collect data in-country.[19] Surveys in Nepal, Honduras, and Uganda (Nunan et al, 2002) and in Nigeria (Osuntogun, 2002) show that some data are already available. Generally, environmental health data are currently the most widely available, drawing from Ministry of Health and household survey sources. However, the extent to which certain health outcomes such as malaria can be reduced by environmental interventions requires further research. There are some qualitative data on natural resources and vulnerability from participatory poverty assessments (PPAs), but future PPAs could be designed with a more explicit focus on key poverty-environment issues (Brocklesby and Hinshelwood, 2001). Household and community-level data on the poor's dependence on natural resources are sometimes available for a particular sector, such as forestry, often as part of preparing forestry sector and biodiversity strategies. Work has also been undertaken to overlay poverty data with existing environmental data to form "poverty-environment maps" that identify the spatial links between poverty and resource degradation (Henninger and

Hammond, 2000).[20] While this suggests that data may be more available than is realized, they are scattered among different agencies, not collected systematically, and often require careful analysis and interpretation to develop the relevance for poverty-environment issues.

As with any indicators, the information collected is only useful to the extent that it is appropriately used. Poverty-environment data collection should build on existing efforts, such as those associated with livelihood surveys and PPAs, and should be anchored in institutions with appropriate skills, such as the Statistics Department, Ministry of Finance, or a competent local research institute. These institutions have experience in producing demand-led data and will make it more likely that the data are fed into ongoing poverty-related policy processes such as poverty reduction strategies and sectoral and spatial plans and programs.[21]

Enhancing the assets of the poor

Key areas for policy action:

- **Strengthen resource rights of the poor**
- **Enhance the poor's capacity to manage the environment**
- **Expand access to environmentally sound and locally appropriate technology**
- **Reduce the environmental vulnerability of the poor**

Many policy options for addressing poverty-environment interactions focus on improving the asset base of the poor. Assets include natural capital (land, forests, water, fish, energy resources, and minerals); social capital (relationships of trust and reciprocity, groups, networks, customary law); human capital (skills, knowledge, beliefs, attitudes, labor ability, and good health); physical capital (basic infrastructure such as water supply and sanitation services); and financial capital (monetary resources). Supportive policies and institutional arrangements are needed to enhance the assets of the poor and their capabilities to meet basic needs and to create more flexible and secure livelihood options.

Strengthen resource rights of the poor

Property rights to resources such as land, water, and trees play a fundamental role in the poverty-environment nexus (UNDP and EC, 2000).[22] Property rights encompass a diverse set of tenure rules and other aspects of resource access and use, and strongly influence the patterns of natural resource management. They may either facilitate or impede sustainable use, protection, or resource-improving investment.

Individual and collective property rights held by poor people represent key household and community assets that may provide income opportunities and access to credit, the ability to meet essential household subsistence needs, or a means of insurance against livelihood risk. Poorer people tend to rely more heavily on customary or informal rights that are not adhered to by outside user groups. Marginalized users, such as poor women, often lose out as a result of policies

and processes that privatize and reduce complex bundles of rights into a single unitary right (under many land and water reforms). Uncertain ownership conditions can also affect long-term agricultural productivity and incentives for resource conservation and investment, and can especially cause rapid deterioration of lands or natural resources when the owner tries to squeeze out the maximum revenue during a short period. This is also relevant in urban areas, where insecure tenure in slums brings risks of demolition and discourages investment to upgrade living conditions.[23]

Good examples are available of well-established common-property management regimes that do not meet the criterion of private exclusivity and yet function to the satisfaction of the included parties and have proved to be sustainable (Ostrom, 1990; Ostrom et al, 1999). There are also strong concerns that a shift toward privatization would be contrary to poverty alleviation: the rich tend to be the largest landowners after common land is privatized.[24] Where traditional common property management regimes have broken down and fail to protect the poor, however, the formal issuance of legal titles may be beneficial for the poor and for agricultural productivity, and may therefore create an incentive for investment in soil and water conservation (see Box 9). Yet as perceived security and local enforce-

BOX 9

Land tenure and environmental improvements

The relationships between land tenure and environmental improvements in terms of afforestation and soil and water management in rural areas and also of investing in better housing in urban areas are complex and location-specific.

A study of 115 upland farms in the Philippines using six years of soil erosion data found that farmers who had high security of tenure were more likely to install contour hedgerows to reduce erosion. However, the study also found that adaptation was more likely with farms that had access to credit, and that larger farms were more likely to adapt than smaller farms. This suggests that while tenure is important, it is by no means the only factor that matters. Studies from parts of Africa are less categorical—showing that while tenure is important, tenure security is not necessarily delivered by freehold titling. Tenure security is often a question of perception and interpretation of the socio-political climate in relation to land rights.

The relationship may also work the other way—with people either increasing or reducing tree cover to assert ownership. In some parts of Latin America, ownership of forested areas is asserted through replacing forest with crops, while there is some evidence of the reverse in parts of Africa. There, stronger tenure rights over communal land are sometimes granted to those who plant trees. This occurs in Ghana, where women plant cocoa on family land to assert ownership. In urban areas, tenure is often vital for access to improved environmental services. Improving tenure is one of the indicators for monitoring the Millennium Development Goal on environmental sustainability. However, there is limited accurate information on this at present.

Source: Shively, 2001; DFID, 2002a; Shepherd, 1991; Quisumbing et al., 2001; Payne, 2002.

ment are critical concerns, such formal titling may not be necessary if informal rules are honored.

To strengthen the land rights of the poor, it is necessary to reform the policies and institutions responsible for delivering land rights in order to make them more responsive to the poor's needs. These include central government land agencies; local government; traditional authorities; the justice system; and local land boards, commissions, and tribunals.

Enhance the poor's capacity to manage the environment

Strengthening the resource rights of the poor is a necessary but not a sufficient condition for improving environmental management and people's livelihoods. With the shift in many countries toward decentralization and devolution of environmental management responsibilities, greater emphasis should be given to strengthening local environmental management capacities by building social and human capital, especially among the poor. This is essential for decentralization processes to truly reflect and respond to the priority needs of the poor; otherwise, decentralization may serve to further concentrate power in the hands of the local elite and to marginalize poor and vulnerable groups even more (UNDP and EC, 2000).

In rural and urban areas throughout the developing world, a wide range of innovative approaches is being tried to empower local environmental management and to improve livelihood options. Many positive examples can be cited (see also Box 10):

BOX 10

Community forestry in Nepal

The 1993 Forest Act legalized forestry user groups, giving them the right to own the trees although ownership of the land remains with the State. User groups develop operational plans, set forest product sale prices, and determine how surplus income is spent. By June 1997, there were 6,000 user groups managing 450,000 hectares, with a further 6,000 waiting for formal registration. Issues still arise within user groups, between them, and with the Forest Department. Concerns have arisen about domination by local elites, politicization of user groups, and pressures from the Forest Department to focus on tree planting rather than harvesting. Nevertheless, experience has been encouraging, and the condition of the managed forests has often improved.

Source: UNDP and EC, 1999f.

- Community wildlife reserves managed for sport hunting in southern Africa have been transformed into areas managed for conservation, where indigenous people's livelihoods become a force for conservation.[25]
- Water users associations that buy and sell water rights and organize for collective system maintenance have been established.[26]
- Community-based forestry enterprises are being linked to international timber and certification markets.[27]
- Cooperatives producing organic foods or coffee for domestic and international markets have revitalized traditional agricultural systems with new technologies.[28]

In all these examples, the institutional framework, including the building and use of social capital, is a key element in success. Projects that successfully support such initiatives have included significant resources for human capital development, organizational strengthening, negotiation and conflict resolution, and other institutional skills. Community-level organizations have also developed relationships with higher-level institutions, and through them mobilized support for their interests and advocated a positive policy environment for their activities (Bojö and Pagiola, 2000). This is needed because often the non-poor may be responsible for environmental degradation—such as commercial trawlers who cause overfishing or commercial loggers who destroy forests—and local groups need government intervention to prevent this from occurring.

Expand access to environmentally sound and locally appropriate technology

There is an abundance of "appropriate" technologies that can improve the environment and the livelihoods of the poor. Many are based on local traditional knowledge and practices; others are the result of external technical innovation. Examples include terracing, tied ridging to hold rain water, grass bunds to reduce water runoff and soil erosion, water harvesting techniques, agroforestry, the use of natural products to eliminate pests, improved livestock and fish production, and the use of reeds or woody plants to trap and detoxify sewage.

Technology development and dissemination for the poor is often not fully provided by the market, however. Because of its possible spill-over benefits, governments, civil society groups, the poor themselves, and donors all have a role to play to support innovation. Such shifts might be brought about through introduction and demonstration projects that involve the full participation of poor people. There have been attempts to fund labor-intensive environmental technology projects through public works, especially "food for work" programs. However, the ownership and ultimate sustainability of works that have been carried out with the incentive of an external supply of income is usually questionable.

In agriculture, much more success has been achieved by empowering innovative farmers to adopt and adapt new technologies and to pass their knowledge on to their peers (Reij and Waters-Beyer, 2001). Support should be provided to involve farmers in testing the suitability of these new practices and the use of "farmer-to-farmer" advisory and training services, leading to the introduction of a number of different practices that require little or no cash inputs—a very important feature when dealing with poor farmers (see Box 11). The practices can be based, for example, on making the best use of rainfall and of waste products like animal manure and crop residues and whatever other organic material can be found on the farm.

Clean and affordable energy is essential both for poverty reduction and for environmental protection. Most poor households and communities have no access to modern energy services, and for them the establishment of appropriate renew-

BOX 11

Improving resource-poor farmer's access to environmentally sound technology

In many cropping systems, heavy reliance on chemical pesticides is threatening the sustainability of agricultural production. Small-scale farmers and the rural poor are disproportionately affected by the health and environmental impacts. Integrated pest management (IPM) has successfully provided poor farmers with a pest management technology they can afford. IPM is based on the farmer's management of the ecosystem though a mix of ecologically sound pest control techniques, taking into consideration the social and economic aspects of the pest management decision. One of the largest-ever investments by a developing country in farmer training on IPM was the Indonesian IPM Training Project (1993–99). Over 600,000 rice, vegetable, and soybean farmers have been helped to make better pest management decisions on their own farms. The project induced institutional development far beyond its originally planned extent.

Source: World Bank, 2000b.

able options is critical. Increased use of renewable energy sources in industry and transport will be essential in order to meet the rising energy demand from urban growth while maintaining air quality. Many cost-effective renewable technologies already exist, and they can contribute to reducing air pollution considerably.[29] For example, the two most populous developing countries—China and India—are also home to the largest small-scale biogas programs, with some 5 million and 2 million units respectively (Venkata, 1997).

Electricity for home consumption is associated with clear environmental health benefits (Wang, 2002). It is a clean source of energy at the consumption stage, enables refrigeration, extends reading time, and supports modern communications. However, most poor people live in rural areas where the cost of grid-connection would be prohibitive. Off-grid, decentralized alternatives should be promoted for them.

The public sector needs to provide an enabling environment for energy technology enterprises and to direct support to research and demonstration projects. Experience shows that successful energy technology needs to be adapted to local circumstances and based on sustainable consumer demand. Nongovernmental organizations, community-level organizations, and private-sector entrepreneurs all have a role to play in developing locally appropriate technology that can also become financially sustainable in the long run.[30]

In the area of human health, there is tremendous need for improved cookstove technology to reduce indoor air pollution and associated acute respiratory infections. In the past, many such programs have failed, but there have been countries where, especially in urban markets, the new technology has successfully taken off. In Kenya and Ethiopia, for example, several million improved stoves have been sold. The success of these programs stems from a number of factors, including initial support from governments and donors, but also the successful, long-term involvement of small-scale private-sector entrepreneurs.

These producers have found a commercially viable niche, particularly in supplying urban poor with an energy-saving appliance that also reduces indoor air pollution (ESD, 2000). The issue here, as with all technologies, is to focus not just on the engineering side, but on the social, cultural, financial, and marketing aspects of technical change.

Simple, low-cost technology is also available for better sanitation, but it should be introduced in a culturally appropriate manner, along with educational efforts.[31] Similarly, simple technologies exist for vector control to combat malaria, including control of habitats where mosquitoes breed and the distribution of bednets treated with insecticides.[32]

Reduce the environmental vulnerability of the poor

The poor have many informal mechanisms to manage the risks that they face every day. These include ways to reduce and mitigate risk (e.g., use of common property resources, temporary migration, income diversification, and informal insurance) and to cope with shocks once they occur (e.g., sale of assets, reduced consumption, and loans). These risk management strategies may be found at the individual, household, or more collective level (World Bank, 2001f).

State attempts to reduce the vulnerability of the poor to natural disasters should strike a balance between measures designed to prevent shocks that will adversely affect the poor and after-the-fact measures that reduce the impact of such shocks on poor and vulnerable groups or enhance their ability to cope. Intervention strategies need to be based on the realities of the poor and the kind of environmental risks they face. For example, government attempts to improve storm-water drainage and relieve flooding in the slums of Indore, India, involved replacing open drains with closed drainage channels, which meant residents could no longer predict the severity of the flood. Also, the closed drains were more easily blocked by rubbish and could no longer be used to wash away excreta—thus the residents preferred the old system (WRI, 1996).

In many environmental disasters, the majority of fatalities occur in the first 24 hours—long before national and international agencies arrive on the scene. So engaging local residents in disaster preparedness, mitigation, and coping strategies is the only practical solution.

While natural hazards in general cannot be prevented completely, their impacts and sometimes their magnitude can be managed. There are four key approaches (ICRC, 2001):

- Address the causes of environmental hazards through measures discussed elsewhere in this report. For example, floods are strongly influenced by land and water management in upper catchments of watersheds. Good land use planning and zoning can prevent a natural cycle of water flows from becoming a catastrophe. Fire breaks and early response can to some extent prevent wildfires from spreading. Diverse crop varieties can reduce exposure to pathogen attacks.
- Focus more on participatory risk reduction, risk mitigation, and disaster preparedness. Building codes for houses and other infrastructure can ensure that

buildings are equipped to withstand natural hazards to a reasonable degree. Early warning systems that effectively provide local people with adequate information to minimize impacts can be very effective. Countries that have taken this approach have had a major impact. In Bangladesh, following the 1991 cyclone when 140,000 people died, a major effort was put into local-level disaster preparedness; since then fatalities have dropped substantially (although thousands are still made homeless). Even in the terrible 1999 Orissa super-cyclone—when an estimated 10,000–40,000 people died—an additional 40,000 were saved by locally constructed and managed shelters.

- After disasters have happened, improve response and relief efforts and ensure that they include a focus on improving livelihood opportunities that can withstand future disasters. While the coordination of humanitarian relief has improved somewhat, it can improve further with greater involvement of well-informed groups on the ground. Funds are often more useful than flying in foreign supplies and experts, which may be time-consuming and have lower benefits for the local economy Relief efforts should focus on longer-term recovery through, for example, the introduction of more income-earning opportunities. This is constrained by both government and development agencies which still tend to separate disaster relief from long-term development—so that relief is not sufficiently development-oriented and development does not fully incorporate disaster mitigation.
- Ensure that funds are available for dealing with disasters. While the international community may provide some funds, countries may find it more predictable to set up their own contingency reserves. A number of countries in Latin America have already begun this process. There is also a need to increase private-sector insurance coverage.

Once a disaster has struck, emergency response management and delivery of rapid support to affected areas is critical to reduce human

losses. Economic recovery requires a well-managed response with quick-disbursing funds for clearing of disturbed sites, reconstruction, reseeding of damaged cropland, micro-credit for commercial activities, and so forth.[33]

Addressing chronic long-term environmental vulnerability such as drought and pest infestations is even more complex and, as it is less visible, receives much less attention. Long-term solutions require addressing the reasons for environmental decline. In the short term, the key is to understand the poor's own coping strategies and motives. In rural areas, coping strategies of the poor may include the introduction of drought-tolerant species, integrated pest management, and reduced dependence on declining natural resources through shifting to off-farm employment or in some cases migrating.

In urban areas, there is some evidence that the poor make short-term tradeoffs to accept certain environmental hazards—such as polluted slums—in order to improve their economic opportunities (WRI, 1996). However, a wealth of evidence point to the possibilities of mobilizing the urban poor to upgrade their environment.[34]

Improving the quality of growth

Key areas for policy action:

- **Integrate poverty-environment issues into economic policy reforms**
- **Increase the use of environmental valuation**
- **Encourage appropriate private-sector involvement in pro-poor environmental management**
- **Implement pro-poor environmental fiscal reform.**

More environmentally sound and equitable patterns of economic growth are needed to protect the environmental assets of the poor and to expand sustainable livelihood opportunities. Environmental problems often arise because effective market mechanisms do not exist or are insufficient. Hence, there is an important role for government to complement economic policy reforms with measures to promote pro-poor environmental management. This includes the need to take better account of the economic values of environmental goods and services ignored by markets, in order to make rational and enlightened choices possible. However, it is also important that governments correct the failures of their own policies. This refers to reform of environmentally harmful subsidies and the use of market-based instruments to improve environmental practices, as well as providing an enabling environment for private-sector involvement in environmental management when this can be done efficiently and in the best social interest.

Integrate poverty-environment issues into economic policy reforms

To promote macroeconomic stability and enhance growth, many countries have undergone structural adjustment reforms that include exchange rate realignment, public-sector reform and priva-

tization, reduction of tariffs, and subsidy reform. The effect of these reforms on the environment is controversial and mixed.[35] Positive environmental impacts can occur when, for example, an overvalued currency is adjusted so that domestic nature-based tourist services are promoted, or when public subsidies to polluting industries are dismantled. Adverse environmental effects can occur when these reforms are undertaken in the context of unchanged institutional and market failures. Trade liberalization can enhance export opportunities for natural resources such as forests, fisheries, and minerals. If these resources are open-access, however, and if environmental regulation and management regimes are ineffective, the repercussions may be quite negative from both an environmental and a poverty reduction perspective.

Many countries have had to adjust unsustainable economic polices, but there is a need to complement such adjustment in two important ways. First, economic policy reforms need to be complemented with assessments of their poverty-environment impacts. Traditional environmental impact assessment is now being adapted to address economic policy changes. Strategic environmental assessment can be applied to sectoral and regional policies and programs to identify potential impacts and design mitigating measures. Major deficiencies in environmental management can be identified and mitigation can be designed. For very broad macroeconomic reforms, however, it becomes difficult to predict what the ultimate impact on the environment will be. As numerous case studies have shown, the impacts often can be traced through chains of both positive and negative repercussions, but quantifying the impacts remains extremely difficult. Even after the implementation of an economic adjustment program, it remains a challenge to define the "without scenario"—that is, what would have happened in the absence of the reform program.[36]

Traditional economic models can include environmental components—for example, finding out the effect of timber trade liberalization on forest cover. But both traditional economic and environmental analyses need to be adapted to our current concern: that greater attention be given to the impacts that disproportionately affect the poor. In some cases, countries are already starting to experiment with poverty-social impact analysis of policy changes, and there is a need to ensure that relevant poverty-environment issues are also captured.

This leads to the second important point: there is no substitute for targeted support to environmental management capacity in a reforming country. While not every impact of reform can be foreseen, certain environmental standards and monitoring capabilities can respond to and mitigate negative impacts that occur.

Increase the use of environmental valuation

Markets form the backbone of the global economic system, but they fail to capture many important environmental values. This warrants attention both at the macroeconomic level, where social planning occurs, and at the microeconomic level, where households and individuals make

small, everyday decisions that, taken together, profoundly affect environmental quality.[37]

To make rational choices when environmental and economic values are to be compared, it is essential that accounting systems and market prices reflect the relevant values. At the macroeconomic level, this means that the traditional system of national accounting needs to be amended to better reflect environmental values.

Two main types of amendments are needed from an environmental perspective. First, the national income accounting system needs to differentiate between income derived from sustainable use of resources and income derived from liquidation of natural capital.[38] Second, water, soil, and air pollution affect the level of environmental quality and sometimes the productive capacity of the economy directly. In the latter case, the traditional income account already incorporates the negative impact of pollution. While no further adjustment to income is necessary, it is still of policy relevance to trace the magnitude of the impacts. When pollution does not directly affect current productivity, however, but instead nonmarketed environmental services or future productivity by inflicting long-term health damage, an amendment in national income accounting is needed.

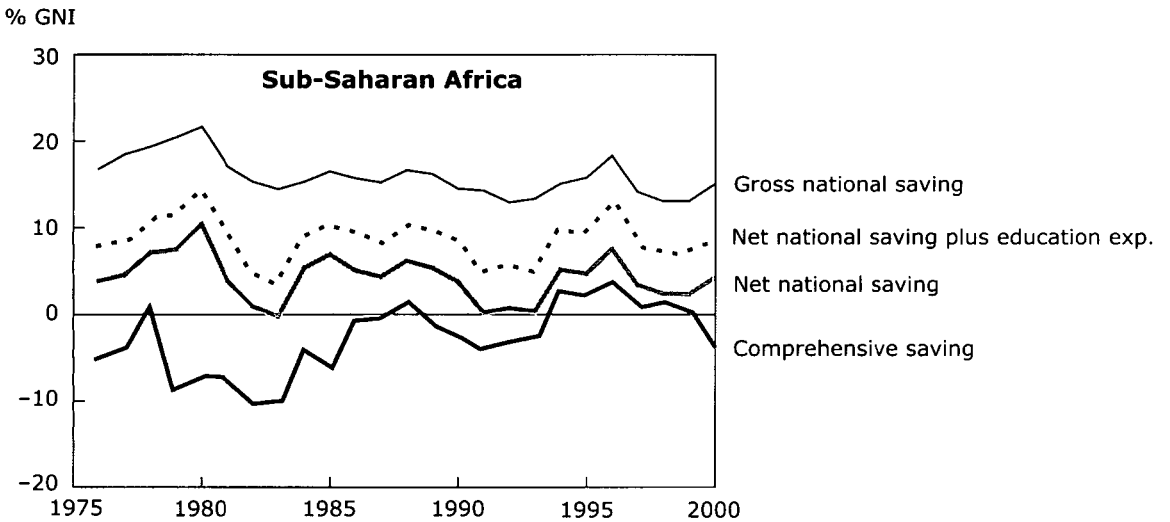
The policy signals emerging from national accounting data can be quite different if adjustments for subtractions or additions of human and natural capital are taken into consideration. One method is to derive an adjusted measure called Comprehensive Savings. Starting with the standard concept of net domestic savings, the current expenditures on education are added as an approximation of investment in human capital. Next, the depletion of nonrenewable energy sources, minerals, and forests are deducted. Finally, the damages from carbon dioxide emissions (as a proxy for overall air pollution) are deducted (World Bank, 2001e). This is illustrated in Figure 6, which shows a pronounced difference between the net domestic savings measure and the calculation of comprehensive savings for sub-Saharan Africa.[39] From a poverty reduction perspective, this type of macro-level analysis needs to be complemented with a distributional analysis—how do environmental degradation and investment in human capital affect the poor?

Environmental valuation also has a role to play in assessing the costs and benefits of public reforms affecting the environment. This is particularly so when the benefits of improved health must be compared with financial expenditure.[40]

Moving on from the perspective of society as a whole and down to the micro level of individual and household decisions, poor people—like everyone else—will be influenced considerably by market prices. If market prices for environmental goods and services are not available, they need to be derived, using techniques of environmental economics. In summary, the incentives for people to make rational choices need to be improved. This is borne out in an example from Cambodia, where it was shown that local fisheries were damaged by the destruction of mangroves to make room for shrimp farms. Furthermore, the shrimp farms polluted the water, which further brought down catches for the traditional fishers. The economic analysis showed

Key areas for policy action to improve poverty-environment outcomes

FIGURE 6



Source: World Bank, 2002c.

that local communities in general would benefit from conserving the mangroves (Bann, 1997). Results from environmental economic analysis should be translated into policy and implemented if they are to have an impact on people's actions. This could be done, for example, through imposing fees on the harmful activities (clearing of mangroves, establishment of shrimp farms). This will not only discourage such activities, it may also be a vehicle to compensate those who suffer the consequences.

Encourage appropriate private-sector involvement in pro-poor environmental management

With increasing liberalization in many countries, the role of the private sector has expanded, making it an important player in terms of its ability to implement sustainable practices, as a source of expertise and funding, and as a potentially potent advocate for sound environmental management (particularly where private-sector interests may coincide with those of the poor). The impacts on poverty-environment issues are mixed, but are heavily dependent on the way the private sector is managed and regulated.

Governments need to maximize the efficiency gains from the private sector while safeguarding the interests of the poor. For example, while privatization can improve the economic efficiency of environmental services such as waste management, sanitation, and wastewater treatment, governments may need to provide safeguards to ensure that access by the poor is protected and improved. At the same time, governments need to increase their capacity for environmental regulation of private-sector operations and

enforcement of compliance. Particular attention should be given to ensuring that private-sector operators integrate environmental considerations into their operations. This can include promotion of environmental management systems, environmental auditing and reporting, and adherence to internationally agreed codes of conduct.

A number of private companies in developing countries are now certified as meeting the international standard ISO 14000 for environmental management. A review in 2000 found that about 3,700 companies in the developing world had achieved this (ISO, 2001). China and Korea each had over 500 accredited companies; Brazil, Thailand, and Taiwan had more than 300 companies; India had over 250 companies; and Argentina, Mexico, Hong Kong, Malaysia, Singapore, and South Africa each had more than 100 accredited companies. While many of these companies are affiliates of foreign firms, some are locally owned industries.

Full privatization of environmental services may not be desirable or possible, however. A private company may not find it profitable to invest in potable water or sewage services for the poor, and strong trade unions may oppose private-sector involvement if they fear heavy job losses. A promising approach to bringing in private-sector investment is the establishment of public-private partnerships. In these, a government (national or local) enters into an agreement with a private enterprise to deliver investment and services within a jointly agreed regulatory framework that safeguards the interests of the population to be served. Public-private partnerships are an increasingly common approach to expanding and seeking to improve environmental services such as potable water supply, sewage services, efficient transport, and efficient energy production.

There has been an increase in private-sector participation in the water services sector (water supply, irrigation, and hydropower) in recent years (see Box 12). Still, private-sector water services only account for about 5 percent of all services worldwide (World Bank, 2002b). The impact is the subject of a major controversy.[41] However, experience to date indicates that public authorities will need to ensure that the service providers do not use their market power to exploit customers and that they internalize public health and environmental externalities. Public authorities also need to ensure that water consumption is at a sustainable level, provide mechanisms to ensure that water supplies are efficiently allocated between alternative uses, and serve as a guarantor of a level of service provision that is consistent with a basic standard of living (Johnstone, Wood, and Hearne, 1999).

Implement pro-poor environmental fiscal reform

Environmentally harmful subsidies are a key area for policy reform. These are subsidies that are both financially quite costly and lead to the overuse of natural resources and other unintended side effects, such as increased pollution. It is important to acknowledge that the largest such subsidies are handed out in industrial countries (as discussed in the next section).

BOX 12

Public-private partnerships for water services in South Africa

In 1994, South Africa's first post-apartheid government produced a policy paper on Community Water Supply and Sanitation, in 1997 it passed the Water Services Act, and in 1998 it passed the National Water Act. South Africa's legislation provides an enabling framework for local action through the decentralization of powers, rights, and responsibilities to the local level, as well as guidelines and regulations to help promote social equity and environmental sustainability. This flexibility at the local level has led to innovation and experimentation with public-private partnerships to develop water systems for the poor. The government funds basic infrastructure services, while users must pay for higher levels of service such as household connections and maintenance through a fee-based system for water services. A substantial volume of work was also undertaken by water boards that are public-sector bulk suppliers of water acting as implementing agents for government. The boards, in turn, contracted with the private sector to provide project management and specialist services to projects. The construction was undertaken by private contractors using local labor who were contracted to the water users. The water users are organized as for-profit organizations.

A European Commission review in 1999 found that this approach had provided 5 million people with water, completed 205 water projects, and created 310,000 jobs. The most recent figures are 7 million people provided with clean water. While the scheme has not been without problems, it has demonstrated the potential for developing water systems through innovative collaborations between all spheres of government, the private sector, civil society organizations, and the users themselves.

Source: Personal communication from H. Muller, Acting Chief Director of Water Services, DWAF, South Africa, 2002; EU, 1999.

Environmentally harmful subsidies also are common in developing countries, particularly in the agriculture and infrastructure sectors. While many subsidies have been reduced or eliminated as part of structural adjustment and other policy reform processes (see Box 13)—for example, the removal of pesticide subsidies in Indonesia—the underpricing of natural resources such as water for irrigation and various forms of fossil energy continues in many countries.[42] Cost-recovery for irrigation water is only 10–25 percent in some of the major developing countries. Subsidies to gasoline and diesel in developing countries are on the order of US$13 billion, and subsidies to electricity amount to more than US$100 billion (IMF, World Bank, and UNEP, 2002).

Subsidies to electricity can also be environmentally beneficial, as they encourage replacement of dirty fuels. These subsidies are often regressive, however, as the rich benefit much more than the poor—for example, the poorest often are not served by subsidized electricity, water, and waste collection. Even where the poor do get some benefit, subsidy reform can be structured to increase significantly its 'pro-poor' effect

BOX 13

Energy subsidy reform and the poor in China

China has made major strides in reforming its energy subsidies, particularly those to the coal industry, with significant benefits in terms of reduced pollution. Total economic subsidies for fossil fuels fell from US$25 billion in 1990/91 to US$10 billion in 1995/96. The remaining subsidies still benefit the wealthier households, however, as most of the subsidized coal goes to urban areas. In rural areas, households depend on biomass and coal for cooking bought on the free market. Even where subsidized coal is distributed in rural areas, such as Western Xiushui, it primarily benefits higher-income households. Rural energy is also consumed by town and village enterprises, but where prices have risen, as in Changsha County, this has encouraged non-energy-intensive production with higher value-added.

Source: World Bank, 1996a; World Bank, 1997.

and to be less environmentally damaging. For example, tariffs for water or electricity can be differentiated to ensure the poor a basic supply at a "lifeline" rate while raising the marginal cost for large-volume consumers. There are other ways to target the poor directly to raise their standard of living in general without subsidizing specific commodities that the rich also consume. The potential impacts on the poor and the environment of alternative approaches to subsidy reform should be reviewed through environmental and social impact assessments and be subject to public comment before they are adopted.

The environment can also be a major source of revenue, and thereby contribute to financing poverty reduction measures. The potential for additional rent capture is substantial in the forest sector of many countries, and has been estimated to amount to US$9 billion per year.[43] Not all of this can reasonably be captured, due to illegal logging and poor data availability. However, moving toward better rent capture for forestry would dampen the rapid depletion of tropical forests and could be particularly important for small, forest-rich countries in terms of their fiscal revenue (IMF, World Bank, and UNEP, 2002).

Charging visitors fees in protected areas is another underutilized form of rent capture. Some US$1-3 billion per year could probably be raised in developing countries if fees were increased to levels of visitors' actual willingness to pay. Some of these areas already charge, but many refrain from charging visitors, especially foreign visitors, fees that approach their appreciation for the environmental services provided by protected areas (IMF, World Bank, and UNEP, 2002).

Rent taxes are more common for countries with rich fisheries that are exploited by other countries' fishing fleets—such as Japan, South Korea, Taiwan, and Spain. While most countries in this position do charge for licenses or have joint venture agreements, they are often not receiving the full amount. The size of fishery rent tax revenues from other countries' fleets is significant for certain countries—in particular, for small islands in the Pacific and some African countries. Between 1993 and 1999, Mauritania received 15 percent of its total budget revenue from European Community fishing agreements, while in Sao

Tome the figure was 13 percent and in Guinea Bissau, 30 percent (IFREMER, 1999).

It is also important, where possible, to adjust market prices to include the nonmarketed environmental effects. Examples include "green taxes," effluent/emissions fees, deposit refund schemes, and tradable permits. The poverty relevance of these instruments lies primarily in their ability to signal the full social cost of pollution and environmental damage, thereby providing an incentive to limit damaging activities that generally tend to affect the poor most (World Bank, 2000a).[44] The impact on the poor of market price adjustments should also be considered, however, particularly if they are significant and sudden.

These ideas have been vigorously put into practice in many countries. For example, China earned US$600 million in 1999 from emission charges. Most of these funds went to finance pollution abatement measures (IMF, World Bank, and UNEP, 2002). In the longer run, high pollution charges should result in a shift to less-polluting industry practices and hence falling revenues from emission charges. The main purpose, however, is not to raise revenue, but to correct for externalities.

Using market-based instruments to ensure that environmental costs are incorporated in market prices is institutionally demanding. A gradual and flexible approach is necessary. Environmental levies are often met with stiff opposition from

the polluters who must pay, but earmarking the revenue from environmental fees can improve public acceptance of such levies. A review of the experience of 11 Latin American countries emphasizes that revenues must be channeled to local authorities so that they can build the institutional capacity required for effective implementation (Huber, Ruitenbeek, and Seroa da Motta, 1998).

Price reform is important in correcting market signals, but there will always remain some environmental issues that require direct regulation of activities, including outright prohibition, in order to protect the environment and the poor. Examples include the banning of particularly harmful pesticides and the regulation of allowable applications of others. These measures create an incentive for private producers to find new and more environmentally friendly products that can achieve the same objectives.

Reforming international and industrial-country policies

Key areas for policy action:

- **Reform international and industrial-country trade policies**
- **Make foreign direct investment more pro-poor and pro-environment**
- **Enhance the contribution of multilateral environmental agreements to poverty reduction**
- **Encourage sustainable consumption and production**
- **Enhance the effectiveness of development cooperation and debt relief.**

Because of the growing globalization of the world economy and the transboundary nature of many environmental problems, efforts to reduce poverty and improve the environment cannot succeed on a sustainable basis through domestic action alone. There is a growing recognition of the need for greater coherence in international economic and environmental policymaking—including the international policies of industrial countries—in order to support the poverty reduction and sustainable development strategies of developing countries more effectively. In particular, this includes support for domestic policies that enhance sustainable development and create an economic environment conducive to environmentally sustainable trade, investment, and economic growth. And it requires international economic and environmental frameworks that provide sustainable growth opportunities for developing countries, including market access for their exports.

Reform international and industrial-country trade policies

International trade can boost economic growth and make a decisive contribution to poverty reduction and sustainable development by promoting the equitable integration of developing countries and the poor into the global economy.[45] However, to maximize the benefits to developing countries of global economic and trade integration (and to minimize potential social and environmental costs), reforms are needed to make the current global trading regime more inclusive and balanced in terms of developing

country needs (Third World Network, 2001; Rodrik, 2001). At the national level, a sound and supportive domestic policy and regulatory framework is needed—including pro-poor economic policies—in tandem with sound environmental management.

In agriculture, many developing countries are still unable to realize their comparative advantage because agricultural trade policies in industrial countries depress world prices for farm products. Protection in rich countries costs developing countries more than US$100 billion per year (World Bank, 2002a). The OECD countries subsidize their agriculture with almost US$1billion per day, much of it encouraging use of agrochemicals and planting of lands that otherwise would have been left fallow.[46] These subsidies also have the effect of creating barriers to export of agricultural commodities from poorer countries, making poverty reduction more difficult. Similarly, subsidies for marine fisheries have been estimated to total about US$25 billion per year, or about one-third of the value of the catch. This contributes significantly to the global pressure on this natural resource (Myers and Kent, 2001).

The overall impact of industrial-country agricultural trade liberalization on the environment and natural resources of developing countries is not clear, as the issues are complex and the possible effects are mixed.[47] More conclusive impacts arise from international fisheries agreements (for example, by many European and African states) that often have had adverse development and resource depletion impacts on local fishery communities who depend on fish for their food security (MRAG, 2000). These agreements need to be reviewed and reformed.

Furthermore, the trade-related standards of most industrial countries can affect developing countries and smaller-scale producers. For instance, legislation on sanitary and phyto-sanitary (SPS) measures can create challenges for developing countries that often lack the scientific expertise and technical capacity to comply with regulations set by importing industrial countries. In effect, SPS measures can create (at least in the short run) non-tariff barriers that potentially limit the ability of developing countries to gain access to foreign markets for their agricultural and fisheries exports. Yet by increasing the assurance that exports are produced in sustainable ways and that SPS standards are met, such measures can also add value and marketability to products.[48]

This is the case of organic shade-grown coffees, which continue to earn fairly high prices despite generally depressed global market prices for lower-grade coffee. The application of certification standards for forest management practices is another promising area (Bass et al, 2001). An example of successful adoption of certified sustainable forest management and market access is provided by Portico S. A. of Costa Rica. The company manufactures high-end mahogany doors that command a premium price. Thanks to its certified management practices, the product can be exported worldwide without controversy at a time when tropical deforestation is an increasing concern (Diener, 1998). These environmental standards need to be combined with capacity development in developing countries, in particular among small and medium-sized

producers, to allow them to meet requirements effectively and to turn them into a market advantage rather than an obstacle (see Box 14).

Make foreign direct investment more pro-poor and pro-environment

Foreign direct investment and foreign portfolio flows amounted to more than US$160 billion by the end of the last decade and now dwarf official development assistance (IMF, World Bank, and UNEP, 2002).[49] Even though these flows are focused on only a handful of countries, foreign investment is still a key part of resource inflows in the remaining developing countries. Indeed, in order to promote poverty reduction, many countries are seeking to encourage foreign investment. This is particularly important to the poverty-environment agenda in countries where foreign investment is concentrated in resource extraction, infrastructure, and manufacturing sectors.

The overall environmental impact of multinational enterprises in developing countries is mixed—while there is no evidence of a "race to the bottom" in terms of environmental standards (World Bank, 2002a), there is mixed evidence that foreign firms are cleaner than domestic ones once firm size is included (Zarsky, 1999).[50] However, multinational firms operating in developing countries are increasingly trying to improve environmental performance, supported by a number of important initiatives. In 2000, OECD members agreed on a revised voluntary Code of Conduct for Multinational Enterprises, which has a significant environmental component (OECD, 2000). The UN has been promoting a Global Compact with the private sector that has nine principles, including on the environment. The Global Reporting Initiative, with the support of UNEP, is a multistakeholder international undertaking that is drawing up an international standard for reporting on the economic, social, and environmental dimensions of a firm's activities, products, and services (GRI, 2000).

Foreign direct investment is particularly linked to poverty-environment issues through the

BOX 14

Successful adjustment to environmental health standards

In 1989, Germany—the leading export market for Indian leather products—banned the import of consumer goods containing PCPs and a large number of dyes, citing concerns over health impacts on consumers. These chemicals were routinely used in leather tanning in India. It came as a shock to this important export industry, which ranked fourth in revenue at the time.

The export ban prompted a quick regulatory action by the Indian government to prohibit manufacturing of the banned chemicals; the application of standardized methods for testing, so as to ensure compliance; and rapid development of low-cost substitutes. Surprisingly, this example shows that even highly dispersed, traditional small-firm clusters can meet strict environmental standards successfully in a relatively short time and stay competitive.

Source: Pillai, 2000.

oil, gas, and mining sectors (see Box 15). Many of the world's poorest countries—Papua New Guinea, Chad, Mozambique—are the site of major investments, with the minerals often located in isolated regions. However, the contribution of an oil, gas, or mining corporation to a country's wealth through tax and royalty revenues is frequently not matched by the influence that company has over revenue management. Companies with long-term investments have an incentive to improve relations with local residents. In some cases, this has led to investments in local schools, clinics, and infrastructure. Generally, the companies would prefer to see this as the role of national and local governments. The problem arises where governments do not make these investments, and the private companies are reluctant to apply pressure on the host government for fear that they will lose out—for example, by not being awarded future contracts.

Targeted partnerships between investors, the host-country national and regional governments, development agencies, and local communities can begin to address these problems (IIED and WBCSD, 2002). An example is the Lihir gold mine in Papua New Guinea, where participation by local residents as shareholders was financed by a private investment bank. Furthermore, a closer alignment of social investment practices among oil companies, municipal governments, and development agencies can provide the political incentive to redirect revenues back to the regions where minerals are extracted. Greater complementarity between community development activities of corporations and the regional development plans of municipal authorities can

BOX 15

Mining companies and the environment in Latin America

Detailed studies of the mining sector of Chile, Peru, Brazil, and Bolivia during a period of privatization found that environmental damage was not evenly distributed within the minerals sector of each country. Rather, it seemed to vary according to factors such as type of mineral, vintage of technology, stage of investment, stage of operation, level of integration, effectiveness of environmental regulation and its enforcement, and socioeconomic context (including poverty in local communities and workforce education and training). Most of all, environmental performance varied according to the firm's capacity for technology development and innovation—which did explain the generally better performance of foreign firms over state-owned ones.

In the Chilean industry, several international mining firms adopted environmental practices in advance of legislated norms and institutional recommendations. The state-owned companies face massive challenges in dealing with past difficulties in terms of accumulated environmental problems, combined with other factors such as the state companies' history, culture, and resource constraints. In Brazil, however, while foreign firms did sometimes have environmentally proficient practices due to their greater technological capacity and financial resources, others have lagged in the implementation of practices already adopted in the companies' more stringently regulated home countries.

Source: Warhurst, 1998.

improve the responsiveness of government to community needs and increase the perceived legitimacy of public office (Warner, 2000).

Enhance the contribution of multilateral environmental agreements to poverty reduction

Globalization and global environmental change have focused international attention on the role of global public goods such as biodiversity, the atmosphere, international waters, and global agricultural research in achieving sustainable development. Two of the major environmental global public goods—a stable climate and maintenance of biodiversity—have many benefits for the poor.

The main historic responsibility for climate change lies with the industrial countries, and strong efforts should be made to reduce their greenhouse gas emissions. At the same time, the developing world includes countries where emissions of greenhouse gases and related pollutants are unsustainable and where being locked into high-emitting technologies is less and less likely to be the least-cost option for development. So there is a need to ensure that whenever technically feasible and cost-efficient, development assistance is used to implement solutions that advance several development goals at once—such as public health, biodiversity conservation, and climate change mitigation and adaptation—all of which should contribute to poverty eradication.

Despite uncertainties about where, when, and by how much changes in climate will occur, there is little debate on some basic issues of significance in a poverty-environment context. First, because of the rapid build-up of greenhouse gases, the earth's overall temperature will warm significantly, precipitation patterns will change, and sea levels will rise, leading to food insecurity, lack of access to potable water, and loss of livelihoods. Second, the adverse impacts of projected changes in climate conditions will pose major development challenges for most developing countries in the tropical and subtropical zones. It is therefore of major importance to enhance the capacity of developing countries to adapt to future climate change.[51]

The causes of biodiversity loss are more complex than climate change. As the whole world benefits from maintaining biodiversity, and as developing countries lack resources, it is incumbent on the industrial world to bear a fair proportion of the costs of global biodiversity conservation, both through direct assistance and through more careful assessment of the impact of their trade, investment, and other interactions with the developing world.[52] A major instrument for direct assistance is the Global Environment Facility. Negotiations are currently ongoing for the GEF's next financing period, with a significant increase required to help protect the world's climate and biodiversity and other global environmental goods that benefit all, but often the poor most of all.

Over the past 50 years, international environmental policies have been agreed in the context of numerous multilateral environmental agreements (MEAs). Each agreement has been designed to address a pressing environmental issue and has its own structure and processes

plementation. While some steps have been take to improve coordination in the negotiation and implementation of MEAs, progress has been limited and there is a need for better coordination and harmonization to improve efficiency and to ensure that MEAs are mutually supportive (OECD, 2002). Equally important is the need to integrate MEA principles and policies into global economic policies and decisionmaking in order to avoid conflicts and to maximize potential synergies—in particular, to ensure that trade and environmental policies are mutually supportive.

Developing countries should be enabled to take on increased responsibilities under global agreements to which they are party, and to ensure that these agreements reflect their concerns adequately. Effective participation in international negotiations, however, requires capacity and resources that the poorest countries often lack. It also requires political will for the interests of the poor to be made central to both the negotiation and implementation of these MEAs. For example, it is important to ensure that the Clean Development Mechanism promotes investments that benefit the poor and the environment (IIED, 2000). Industrial countries should assist others in implementing the objectives of the MEAs to which they are each party, and they should ensure that they do not unilaterally, or through multilateral operations, support actions of developing countries that are not in compliance with MEAs to which they are party.

Encourage sustainable consumption and production

Through their trade, investment, pollution emissions, and other activities, industrial-country consumers and producers affect the environmental conditions of developing countries. While this section focuses primarily on specific steps relevant to trade, investment, and global public goods, there is a broader underlying issue—the level of production and consumption in the industrial world.

Making rich-country consumption and production more sustainable will require a complex mix of institutional changes—addressing market and government failures as well as broad public attitudes. As in developing countries, it will also require working with many different stakeholders in government, civil society, and the private sector. And also as in developing countries, it is not just a technical process but a political one—certain groups will welcome change, while others will resist it. One interesting example of the new alliances being forged between stakeholders in industrial countries and their partners in developing ones is the recent Memorandum of Understanding between Indonesia and the UK on Indonesian forestry exports (see Box 16).

The rich countries of the world recently acknowledged their responsibility to reduce environmental pressure in the OECD report *Sustainable Development, Critical Issues* (OECD, 2001b): "OECD countries have a key role to play in addressing the pressures on the environment from human activities. With 18 percent of the world's population, they account for over half of today's

BOX 16

Curbing industrial-country imports of illegal timber from Indonesia

Indonesia is a major exporter of timber to Europe. Much of this timber is illegally or unsustainably harvested. In 2001, a conference in Asia on forest law enforcement and governance examined how developing-country producers and industrial-country consumers could work together to promote sustainable logging. In 2002, this led to a Memorandum of Understanding between the Indonesian Minister of Forestry and UK Ministers for the Environment and International Development to cooperate on forest law enforcement and combat illegal logging and trade in illegal timber and wood products.

This agreement will help set up legal compliance for Indonesian forest exports, which will eventually allow all UK imports to be only from legal sources. This would require amending UK customs law, which may also require EU legislation. In the meantime, the UK Timber Trade Federation has already drawn up a voluntary code of practice to work with Indonesian suppliers to source their timber from legal logging. The Group of Eight (G-8) partners, including the US, Germany, and Japan, are interested in such voluntary agreements, and the European Commission (EC) will be issuing a Communication to bring wider regional involvement of the European Union. An African conference on forest law enforcement and governance is now being planned between the heads of state of African timber-producing countries and the G-8, including the US, France, the UK, and the EC.

Source: Internal DFID documents.

total energy consumption, over 60 percent of cereals consumption, 31 percent of consumption of food fish, 44 percent of consumption of forest products and a large fraction of the cumulative damage imposed on the environment globally."

The OECD report goes on to identify steps in the energy, transport, agriculture, and manufacturing sectors to reduce environmental damage—which will benefit both OECD members and developing countries. For each of these key sectors, the OECD report provides a detailed list of institutional, regulatory, and economic policy reforms to reduce environmental damage in its 30 member-states. The OECD also carries out regular "peer reviews" of its member-states to assess environmental performance. These are ministerial-level reviews, and the final reports are public documents that provide constructive suggestions for improvement.

The EC also has been explicit in its strategy for the 15 members of the European Union: "Industrialized countries have important responsibilities in promoting sustainability initiatives—first and foremost by putting their own house in order, and by supporting a move to sustainable production and consumption patterns; in addition by ensuring more consistent market opening, increased public and private financing of development cooperation, as well as better functioning and greater stability in the international financial system" (EC, 2002).

Enhance the effectiveness of development cooperation and debt relief

Achieving the Millennium Development Goal of halving absolute poverty by 2015 will require at least a doubling of official development assistance (Devarajan, Miller, and Swanson, 2002; Zedillo et al., 2001). Yet this would only bring the total level of aid to less than half a percent of GNP in OECD countries, still far below the internationally accepted goal of 0.7 percent of GNP. Eradicating poverty will demand a much more ambitious effort, and the financial flows must be received with efficiency and accountability to be effective—international aid works in a supportive domestic policy environment.[53]

Many developing countries are burdened by unsustainable levels of debt. This hampers economic growth and undermines their ability to provide health, education, and other basic services for their people. When unsustainable debt leads to budgetary cuts, environmental administration and services often are a target, leading to a slackening of environmental management. The Heavily Indebted Poor Country Initiative aims to tackle the problem of unsustainable debt, and to ensure that the benefits from debt relief are used to reduce poverty and to avoid entering into a renewed spiral of indebtedness.[54]

Debt-for-nature swaps are another potential means for addressing poverty reduction and environmental management objectives.

Aid and debt relief can be provided to help governments make many of the policy changes recommended in this paper. As in developing countries, development cooperation agencies are seeking to improve their governance structures and operational effectiveness by:

- Adopting a more explicit commitment to poverty reduction as the overriding objective of development cooperation
- Strengthening developing-country ownership of the development process through support of nationally owned processes and improved aid coordination
- Ensuring greater transparency, and greater engagement with civil society, at both policy and operational levels
- Making development cooperation more results-based and accountable by focusing more strongly on development outcomes, in particular by strengthening capacity to help countries achieve the Millennium Development Goals
- Decentralizing operations and empowering country-level staff to be more flexible and responsive to country needs.

To help move the poverty-environment agenda forward, development agencies must learn from past mistakes and incorporate these lessons into the new context for development cooperation.[55] The shift in development cooperation to focus more explicitly on poverty reduction and greater country ownership provides new opportunities for improving environmental management. While our agencies have committed themselves to better environmental management as a tool for poverty reduction, this now has to be operationalized throughout our respective organizations—both in headquarters and in country offices.[56] Continued efforts are needed to strengthen agency procedures for evaluating the environmental risks and performance of development aid. However, much more emphasis is needed on helping to develop country capacity to formulate, implement, and monitor policies and programs to reduce poverty through better environmental management.

Putting these commitments into practice requires major changes in the way development agencies do business. To take this message forward will require improved agency staff training and staff skills, and more emphasis on learning approaches. New tools and procedures need to be implemented. The shift in aid toward more upstream work and greater emphasis on sector and budget support present new challenges. The traditional project-based environmental impact assessment approach needs to focus more on sectors and policies, and in particular on environmental issues that affect the poor. There is a need to provide incentives to program managers to mainstream poverty-environment issues. Senior management needs to provide strong leadership—not just in policy statements, but also in the way resources and staff are allocated. Finally, there is a need for effective and transparent monitoring of progress and results in helping countries determine and implement their own agenda for reducing poverty through better environmental management.

Conclusion

This paper set out to articulate ways to reduce poverty in a sustainable manner through better environmental management. We have mapped out the key relationships between environment and poverty. Specifically, we have pointed to the enormous burden of disease that affects the poorest through polluted water and air. We have also illustrated how directly and heavily dependent the poor are on natural resources and ecosystem services, and how their degradation can undermine people's livelihoods. Related to this point is the vulnerability to environmental disasters that the poor are exposed to, and their limited ability to cope with such shocks. We know this not only because of empirical evidence, but most compellingly through what the poor themselves say.

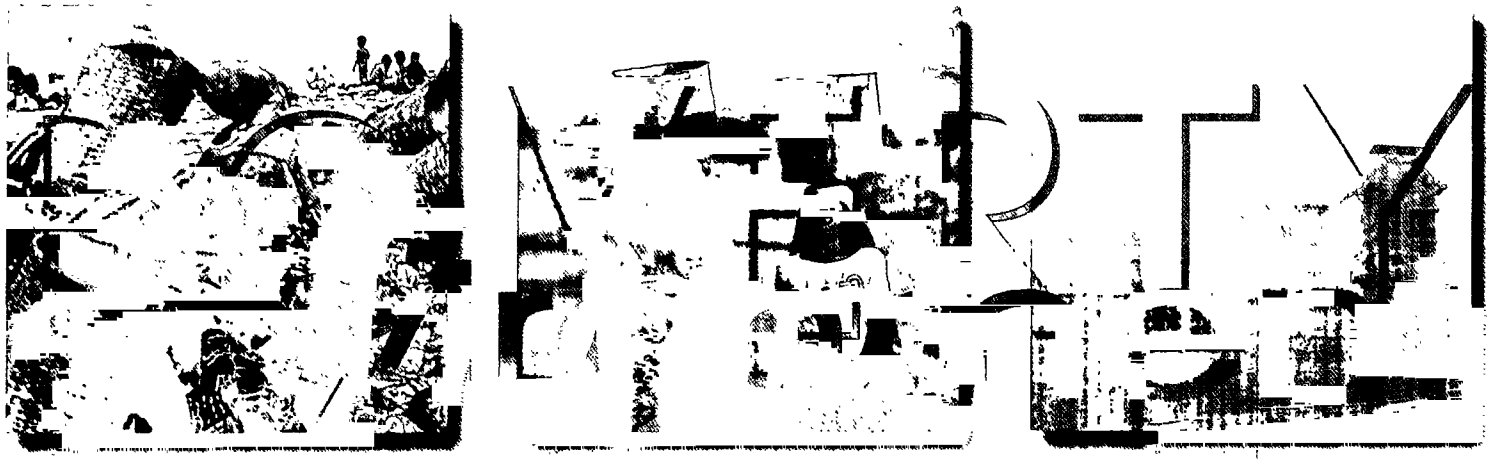
While many links between environment and poverty are reasonably clear, we have also held up relationships that are controversial. Environment and growth, environment and population, and natural resource degradation and the poor are all themes that have been subject to much generalization and oversimplification. Effective solutions must be guided by a nuanced understanding of the specifics of these relationships, often determined by local institutions and policies.

While we share a sense of urgency in combating environmental degradation, we have not dwelled at length on descriptions of problems that are generally, albeit not universally, agreed. Instead, we have

emphasized links between poverty and environment and, above all, what lessons we can learn for the future. Hence, this paper is one that looks ahead with some degree of hope and optimism for the future: there are sometimes win-win opportunities, and there are rational ways of dealing with tradeoffs. Environmental degradation is not inevitable, nor is it an unavoidable sacrifice on the altar of economic growth. On the contrary, better environmental management is key to poverty reduction.

In that spirit, this paper has discussed a large set of measures at both the national and the international level that can be taken to reduce poverty and enhance environmental quality. This has taken us outside the realm of narrowly conceived "environmental management," as the links between poverty and environment are complex and crosscutting. We have not attempted to be comprehensive and provide detailed recommendations. The details are best left to inclusive national processes for shaping poverty reduction and sustainable development strategies. Rather, we have tried to be selective and strategic, focusing on the key items around which we hope to stimulate debate and action.

The World Summit on Sustainable Development is an opportunity for us all to focus on what is most important and to forge agreements that can lead the way forward. There can be no more important goal than to reduce and ultimately exterminate poverty on our planet.



Notes

1. Quotes are from Participatory Poverty Assessments in each country, which attempt to find out the views of the poor on poverty issues. See Brocklesby and Hinshelwood, 2001; Narayan et al., 2000.

2. The study measured the nature and extent of "environmental income"—livestock fodder, fuelwood, natural fertilizers, wild fruits, vegetables and insects, gold from panning, wood for carpentry, grasses for baskets, and so forth—all of which added up to about 100 items in total. Cavendish collected his data during two separate agricultural years and in four villages in Zimbabwe. Close to 200 households were interviewed in 29 villages.

3. Definitions of environmental health differ. The data presented here are based on an analysis of the following health risks that make the largest contributions to the burden of disease: poor water quantity and quality, inadequate sanitation and waste disposal, indoor air pollution, urban air pollution, malaria, and agro-industrial chemicals and waste (including occupational hazards). Some reviewers of the Consultation Draft argued that HIV/AIDS should also be considered in this context. There is no dispute about the importance of HIV/AIDS, which is the number one cause of death in sub-Saharan Africa and the fourth largest killer worldwide. An estimated 40 million people live with this disease, and about half that number already have died (World Bank,

2002c). However, in the classification used in our main source (Lvovsky, 2001), this disease fell outside the definition of environmental hazards.

4. In a study of 1,000 randomly selected households in Accra, Ghana, Songsore and McGranahan (1993) analyze the links between local environment, wealth, and health. Wealth is measured in terms of possession of certain consumer durables and frequency of meat, poultry, or fish consumption. The poorest and the least poorest quintiles are singled out for comparison. The poorest households show higher incidence of diarrhea, especially among children: 22 percent of the children in the poorest quintile but only 9 percent in the least poor were subject to diarrhea in the two weeks prior to the interview. The poorest enjoy significantly fewer environmental services (safe water, sewerage). They lack knowledge or means to prevent diseases efficiently, are exposed to more health hazards, and are subject to more crowding (i.e., more people share pots, toilets, living quarters, etc).

5. For example, several interventions to diminish water-borne disease, limit indoor air pollution, and improve sanitation cost about US$20–120 per saved disability-adjusted-life-year (Bojö et al., 2001). The cost of saving a "statistical life" per year in Beijing through better sulfur dioxide abatement has been shown to be in the order of US$300 (World Bank, 2000a). Lvovsky (2001) provides data on the cost-effectiveness of a large number of measures to combat air pollution. Natural resources degradation can reach a stage where rehabilitation is economically infeasible, such as for highly degraded cropland that has lost a viable rooting depth for crops. The most extreme case of irreversibility is the loss of species.

6. Another example is that traditional coping mechanisms used by pastoralists are gradually being foreclosed by the establishment of sedentary agriculture in their traditional grazing lands.

7. Global Witness, a non-profit organization that works to highlight the links between natural resource exploitation and human rights abuses, provides a number of examples where natural resources such as timber, diamonds and oil are used to fund conflict. See www.oneworld.org/global witness.

8. The indicators for the index of environmental quality are: decline in average emissions of carbon dioxide per capita, comparing the 1980s with the 1990s; decreases in the average emission of organic water pollutants (kg/day/worker) between the 1980s and the 1990s; and the annual average rate of deforestation measured for 1980–2000. Each country is ranked according to each criterion. Each country's points over all the components are averaged and the averages are used to re-rank the countries. This rank is the index measured on the y-axis in the figure. The higher the figure, the better the change in environmental ranking of indices over this time period. See World Bank (2000c) for further details.

9. See Chapter 2 in World Bank (2002c) for additional examples and discussion.

10. The win-win approach is developed under the UNDP/EC *Poverty and Environment Initiative* (UNDP and EC, 2000), and in the *World Development Report* on *Development and Environment* (World Bank, 1992).

11. Ekbom and Bojö (1999) review the literature in relation to nine hypotheses related to links between poverty and environment. They show that often-conflicting empirical results should temper the tendency to oversimplify about these relationships. Nevertheless, they conclude that the poor tend to be major victims of environmental degradation, which opens up opportunities for win-win interventions. See also the Poverty and Environment Initiative (UNDP and EC, 2000).

12. Poverty Reduction Strategy Papers (PRSPs) were endorsed in September 1999 by the World Bank and the International Monetary Fund (IMF) as a new framework for poverty reduction. PRSPs are designed to be country-driven, with broad participation of civil society; based on an understanding of the links between public actions and poverty outcomes; and oriented to achieve outcome-related goals for poverty reduction. This is usually a two-stage process with an Interim PRSP followed by the more consultative and participatory full PRSP. For the latest versions of Interim and full PRSPs, see the World Bank or IMF websites at www.worldbank.org and www.imf.org. The *Poverty Reduction Sourcebook* (World Bank, 2001d) provides further detail on the design of PRSP. It also contains a chapter on Environment (Bojö et al, 2001). It is available at www.worldbank.org.

13. Of the 40 PRSPs reviewed, only 8 were "full" PRSPs, while the rest were Interim PRSPs. The latter were written more as roadmaps on the way to a more comprehensive PRSP. As more and more PRSPs become full PRSPs, the integration of environment is expected to improve.

14. The UN guidance defines a strategy for sustainable development as "a coordinated, participatory and iterative process of thoughts and actions to achieve economic, environmental and social objectives in a balanced and integrated manner. . . . . The particular label applied to a national sustainable development strategy is not important as long as the underlying principles . . . are adhered to" (UNDESA, 2002). For example, established frameworks such as a National Vision, National Agenda 21, or a nationally owned poverty reduction strategy can all provide a good basis for strategic action toward sustainable development.

15. One of the International Development Goals adopted by the UN General Assembly is to implement national sustainable development strategies by 2005. The Organisation for Economic Co-operation and Development (OECD) has defined such a strategy as "a coordinated set of participatory and continuously improving processes of analysis, debate, capacity strengthening, planning and investment, which integrates the economic, social and environmental objectives of society, seeking trade offs where this is not possible" (OECD, 2001c, p. 9).

16. Financial transfers from the Global Environment Facility (GEF) can contribute significantly to addressing four critical threats to the global environment: loss of biodiversity, climate change, degradation of international waters, and depletion of the ozone layer. But what about financial sustainability? The creation of Trust Funds in perpetuity has been one answer. These provide a means for ensuring long-term sustainability, but they also tie up substantial amounts of capital

for the long term. Other options include short-term financing of an investment phase to allow, for example, a protected area to begin to generate its own financial revenues that can ensure sustainability. See GEF (1998) for an evaluation of experience with Conservation Trust Funds.

17. The Environmental Sustainability Index (ESI) is a measure of overall progress toward environmental sustainability, developed for 142 countries. The ESI scores are based on a set of 20 core "indicators," each of which combines two to eight variables for a total of 68 underlying variables. The ESI permits cross-national comparisons of environmental progress in a systematic and quantitative fashion. The ESI is the result of collaboration among the World Economic Forum's Global Leaders for Tomorrow Environment Task Force, The Yale Center for Environmental Law and Policy, and the Columbia University Center for International Earth Science Information Network. See their website for more information at http://www.ciesin.org/indicators/ESI/.

18. Poverty-environment indicators can take a variety of forms. Some are more generic in nature, such as deaths from acute respiratory infection as a measure of environmental health. Others are more site-specific, such as livelihood dependence on different kinds of natural resources. Interpretation is always site-specific. For example, in some cases reduced dependence on natural resources will mean a reduction in poverty as the poor move to off-farm employment. Alternatively, this could indicate increased poverty as a result of a decline in the poor's access to resources. Even for more generic indicators such as environmental health, interpretation often will be context-specific—for example, acute respiratory infections may be lower in parts of Africa than India, as more cooking is done outdoors in Africa. For some indicators, such as losses from environment-related disasters, more quantitative data will be possible. For other measures, such as the percentage of poor fishers with access to adequate catches, more qualitative data may be required. Indicators can be final (focusing on impacts and outcomes) or intermediate (outputs or inputs). Final indicators are the most important, but often it is hard to isolate the effect of the intermediate input on the final outcome. As with all indicators, poverty-environment indicators must be specific, measurable, attainable (and, by implication, cost-effective), relevant, and time-bound.

19. For example, see Shyamsundar, 2002; Nunnan et al., 2001; Henninger and Hammond, 2000.

20. For a discussion of spatially disaggregated data in an urban context, see Hardoy, Mitlin, and Satterthwaite, 2001.

21. We have focused here on national-level monitoring and evaluation, but it is recognized that lower levels of monitoring may be quite valuable in informing local decisionmakers and the public at large.

22. See UNDP and EC (1999b, 1999e, 1999f, and 1999g) for discussion of property rights issues in rural and urban environments.

23. The importance of this issue is underlined in the context of the Millennium Development Goals. The fifth one contains Target 11: "By 2020 to have achieved a significant improvement in

the lives of at least 100 million slum dwellers" and Indicator 31: "Proportion of people with access to secure tenure."

24. Jodha (1986) has documented this process in the case of privatization of common property resources in India.

25. See IIED (2000) for several examples.

26. For example, in Mexico the government passed a new water law in 1992 that formalized property rights to water and established the principle of participation. In less than a decade more than 90 percent of the 3 million hectares in irrigation districts have been turned over to user associations, representing half a million farmers. Cost recovery has risen from 30 percent to 80 percent. Some associations are involved in groundwater management, and the example of Hermosillo shows that local empowerment can bring pumping and recharge into balance. Participation and establishment of trade in water markets have made this possible. See World Water Council, 2000.

27. See examples from Indonesia in Read and Cortesi, 2001.

28. Global sales of certified coffees (organic, fair trade, and shade brands) are estimated at about US$500 million annually and are growing rapidly (Giovannuci, 2001).

29. In their analysis for China and India, Boudri et al. (2002) show that the substantial switches to renewable energy sources are not only directly cost-effective, but can also reduce the cost of sulfur dioxide emission control considerably.

30. Venkata (1997) contains a number of articles documenting in considerable detail both the promise of renewable energy technology and the many technical, financial, and social difficulties these face in developing countries.

31. Many VIP latrines stand unused due to lack of awareness of their benefits or because of poor placement or construction. Similarly, provision of low-cost soap will not help if people do not use it to wash their hands. Such simple social and technological changes should not be belittled: some 2–3 million children die every year of diarrheal diseases. Handwashing could perhaps cut that number in half. See *Public-Private Partnership in Handwashing*, a coalition between the World Bank, governments, donors, the private sector, and NGOs, at www.worldbank.org/watsan/topics/handwashing.html.

32. The World Health Organization advocates four approaches to combat malaria: prompt access to treatment, especially for young children; prevention and control among pregnant women; vector control; and prediction and containment of epidemics.

33. For more details on the approach to disaster management, see ISDR Secretariat, 2002, and Gilbert and Kreimer, 1999.

34. For a multitude of examples, see the website maintained by the Massachusetts Institute of Technology in collaboration with the World Bank and the Global Cities Alliance: *Upgrading Urban Communities: A Resource for the Practitioners*, at www.mit.edu/afs/athena/org/u/urbanupgrading/index.html, and the website of the UNDP Public-Private Partnerships for the Urban Environment program at www.undp.org/pppue.

35. See, for example, Reed, 1992; Munasinghe et al., 1994; Munasinghe and Cruz, 1995; and Reed, 1996.

36. Iannariello et al. (2001) contains a basic framework for understanding the environmental consequences of macroeconomic reforms, and proposes a process for carrying out environmental impact assessment for such reforms.

37. The discussion in this section is kept at the domestic level. International considerations are dealt with later in the paper.

38. For example, there is a difference between sustainably harvesting the nation's forests up to their rate of growth ("living off the interest") and depleting the forest stock ("depleting the capital"). Similarly, the depletion of a mineral resource represents the liquation of a nonrenewable asset, which in traditional income accounting is registered only as an income, but not as a depreciation of savings. More precisely, the depreciation of savings is represented by the resource rent—that is, the difference between the world market price of the commodity in question and the extraction/harvesting cost (see World Bank, 1997, for details). This gives social planners and civil society less than a complete picture of the development of their economy. The United Nations Statistical Division, the World Bank, and the U.S. National Academy of Sciences have all developed and recommended forms of more accurate national economic accounting systems to include the environment (Nordhaus and Kokklenberg, 2001).

39. The graph is derived from World Bank staff calculations based on World Bank, 2002c.

40. Increasingly, willingness-to-pay measures are derived in developing countries to assess the value of, for example, enhanced water supply, sanitation services, and waste collection (Bojö et al., 2001). When benefits are difficult to assess, cost-effectiveness analysis to achieve certain environmental goals can be very useful; see Lvovsky, 2001, for examples.

41. See Nickson and Franceys (2001); ADB (2000); Loftus and McDonald (2001), and World Bank (2002b), for contrasting perspectives and examples of more and less successful interventions.

42. World Bank (1997) details how subsidies of almost US$180 million in 1995 dollars were phased out in Indonesia in the late 1980s. Milled rice production has continued to rise.

43. The concept of "rent" is used here to denote the difference between the market value and the full cost of resource extraction. The latter includes the normal market-based cost of capital. The excess is known as rent or profit.

44. World Bank (2000a) provides many examples of how economic instruments have been used successfully in developing countries. It also discusses how some countries, in particular Indonesia and the Philippines, have used public disclosure effectively, and how Mexico has successfully offered training to small and medium enterprises in pollution abatement.

45. The World Bank study on globalization, growth, and poverty (World Bank, 2002) details how more than 20 developing countries with some 3 billion people have doubled their ratio of trade to incomes of the past 20 years. They have also increased their growth rate to an average of 5 percent in the 1990s, which substantially exceeds the average for rich countries. However, some 2 billion people live in developing countries that have not successfully integrated them-

selves in the growing world economy, and whose aggregate growth rate was negative in the 1990s. The relationship between aggregate growth and inequality is varied across countries. In Latin America, global integration has widened wage inequalities, but in several populous countries, such as China, India, and Vietnam, the data show that growth has been closely related to poverty reduction.

46. Statistics from the official OECD website (www.OECD.org) on Total Support Estimate, which is an indicator of all gross transfers from taxpayers and consumers in support of agriculture , show a preliminary figure for 2000 of about US$327 billion, down from US$356 billion in 1999.

47. For example, more-profitable agriculture could lead to the intensification (including wider use of pesticides) and expansion of cropland, including into forest areas. At the same time, increased agricultural exports may stimulate environmentally beneficial practices, such as greater fertilizer use that results in better ground cover and less soil erosion.

48. An important example of adjustment to environmental standards comes from forestry. The Forest Stewardship Council (FSC) is an international nonprofit organization founded in 1993 to support environmentally appropriate, socially beneficial, and economically viable management of the world's forests. Members come from environmental and social groups, the timber trade and forestry profession, indigenous peoples organizations, community forestry groups, and forest product certification organizations from around the world. Forest certification is the process by which the performance of on-the-ground forestry operations is assessed against a predetermined set of standards. The FSC Principles and Criteria for Forest Management serve as the global foundation for the development of region-specific forest-management standards. Independent certification bodies, accredited by the FSC in the application of these standards, conduct impartial, detailed assessments of forest operations at the request of landowners. If the forest operations are found to be in conformance with FSC standards, a certificate is issued, enabling the landowner to bring product to market as "certified wood" and to use the FSC trademark logo. The total area certified to date is close to 28 million hectares at 390 sites in 54 countries. However, about two-thirds of those sites are in Europe. See the FSC website for additional information, at www.fscoax.org/principal.htm. Extending this type of initiative to developing countries will be important to secure access for their products, and can contribute to improving natural resource management practices (Bass et al, 2001).

49. About 75 percent of foreign direct investment accrues to only 10 middle-income countries, and the investments are heavily concentrated in a few sectors: automotive, chemicals, electronic, energy, petroleum and petrochemicals, and pharmaceuticals. Just a fraction goes to the poorest countries, with the 48 poorest receiving only US$3 billion, and Africa receiving about 1 percent of capital flows (IMF, World Bank, and UNEP, 2002).

50. Some developing countries have built up a more pollution-intensive industry, largely in response to domestic demand. While developing

countries do struggle with pollution, foreign-owned plants tend to be less polluting than domestically owned ones in the same industry. Furthermore, empirical studies have not found a pattern of developing countries lowering environmental standards to attract investment. This is not to write off the problems: environmental regulation is too weak to protect the poor from industrial pollution, but the cause is not foreign direct investment or globalization, but lack of domestic capacity.

51. This is the focus of a forthcoming Joint Agency Paper on "Climate Change and Poverty: Supporting Poor Countries and Poor People to Cope with Climate Change," expected to be released in October 2002.

52. Our concern here is primarily with the decline in populations of both flora and fauna important to the poor for a balanced diet and as sources of fiber and medication.

53. World Bank (1998) provide the empirical underpinnings for our general statements in an influential study on the effectiveness of aid.

54. The Heavily Indebted Poor Country Initiative was launched by the World Bank and IMF in 1996. A major extension was agreed in 1999 to expand debt relief to about US$50 billion, aiming at reducing the debt of more than 30 countries. Freed-up resources will be used to support poverty reduction measures, with an emphasis on education and health. To date, 24 countries have entered the Initiative. More information is available at www.worldbank.org/hipc.

55. A 2000 review of Department for International Development in the United Kingdom found that "environment as a potential development opportunity—rather than as a risk to be minimized and mitigated—has not been fully mainstreamed across the bilateral programme" (Flint et al., 2000). Similarly, a 1997 review of the environmental performance of European Community programs in developing countries found that "there is no institutional accountability for ensuring that environmental actions are fully integrated into country programming or that the support for environmental projects is based upon a broad strategy across regions" (ERM, 1997). A review by the Operations Evaluation Department of the World Bank's environmental policies and activities, the first since 1987, found that "Bank performance has substantially improved . . . but it has not yet integrated environmental concerns fully into its core objective or its country assistance and sector strategies" (Liebenthal, 2002). A 2000 review of the global program on environment of the United Nations Development Programme (UNDP) reached similar conclusions, and recent audits of UNDP have stressed the need for strengthened mechanisms to mainstream environmental considerations at both the policy and the operational levels. Other development agencies face similar concerns.

56. This is reflected in the environment strategies and policies of each of the four agencies—see DFID (2000a); EC (2001); UNDP (2001); and World Bank (2001c).

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