

Environment and human well-being: a practical strategy

Summary version



Achieving the Millennium Development Goals

The UN Millennium Project is an independent advisory body commissioned by the UN Secretary-General to propose the best strategies for meeting the Millennium Development Goals (MDGs). The MDGs are the world's quantified targets for dramatically reducing extreme poverty in its many dimensions by 2015 – income poverty, hunger, disease, exclusion, lack of infrastructure and shelter – while promoting gender equality, education, health, and environmental sustainability.

The UN Millennium Project is directed by Professor Jeffrey D. Sachs, Special Advisor to the Secretary-General on the Millennium Development Goals. The bulk of its analytical work is performed by 10 task forces, each composed of scholars, policymakers, civil society leaders, and private-sector representatives. The UN Millennium Project reports directly to UN Secretary-General Kofi Annan and United Nations Development Program Administrator Mark Malloch Brown, in his capacity as Chair of the UN Development Group

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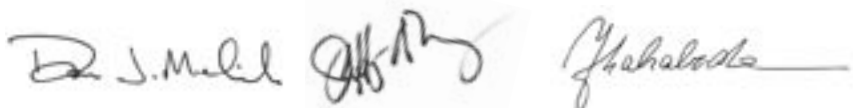
Preface

In 1971, Maurice Strong, Secretary General of the UN Conference on the Human Environment, commissioned a report on the state of the planet. Entitled “Only One Earth”, the report summarized the findings of 152 leading experts from 58 countries in preparation for the first UN meeting on the environment, held in Stockholm in 1972.

The 1972 meeting was followed by a second in 1992, in Rio de Janeiro, and a third in 2002, in Johannesburg. Over these three decades, forests disappeared, greenhouse gasses accumulated, air and water pollution rose, and zoonotic and vector-borne diseases exploded. Land degradation worldwide led to grinding poverty, hunger, and abandonment of the village for the city. All of this continues today.

So why will this latest incarnation of environmental analysis, the UN Millennium Project Task Force on Environmental Sustainability, be any different? Very simply, our final report, summarized here, is an action plan, and the task force, whose members are listed in this summary, is committed to seeing that the plan’s recommendations are endorsed by heads of state, and implemented by all sectors, from government ministries to private business to civil society.

The community of nations has talked enough. We encourage you to read this summary and act on its recommendations in ways that make sense in your own context. Lead the way and others will follow you to a world that is environmentally more sustainable, economically more stable, and socially more just.



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The ten recommendations of the Task Force on Environmental Sustainability

1. Improve small-scale agricultural production systems

- Increase the use of sustainable agriculture techniques
- Restore and manage desertified lands
- Protect surrounding natural habitat

2. Promote forest management for protection and sustainable production

- Increase real income in informal forest sector activities by at least 200 percent
- Integrate ecosystem management of 90 percent of river basin systems
- Protect and restore representative areas of all major ecosystems

3. Combat threats to freshwater resources and ecosystems

- Reduce demand for freshwater, especially in cropping systems
- Minimize pollution levels in surface water and groundwater sources
- Maintain aquatic biodiversity by ensuring minimum environmental flow

4. Address the threats to fisheries and marine ecosystems

- Implement an ecosystem-based approach to fisheries management
- Restore depleted fish population levels to at least minimum target levels of biomass
- Establish a network of representative, fully protected marine reserves

5. Address the drivers of air and water pollution

- Reduce exposure to toxic chemicals in vulnerable groups
- Significantly reduce the under-five mortality and morbidity rates caused by pneumonia and acute respiratory infection

- Significantly reduce the under-five mortality and morbidity rate caused by waterborne diseases
- Reduce the atmospheric levels of the six key pollutants and methane

6. Mitigate the anticipated effects of global climate change

- Invest in cost-effective and environmentally sustainable energy
- Promote and engage climate-friendly carbon and technology markets
- Mainstream responses to climate change and variability

7. Strengthen institutions and governance

- Train, recruit, and retain environment experts
- Secure sufficient funding for environmental institutions
- Reform governmental institutions and improve interagency coordination
- Improve governance and gender equality

8. Correct market failures and distortions

- Account for the cost of environmental degradation in national accounts
- Introduce payments for ecosystem services
- Reform tax structures
- Phase out environmentally harmful subsidies
- Develop trade regulations to promote legal, sustainable harvesting of natural resource products
- Strengthen property and land-tenure rights
- Improve national and international regulatory frameworks

9. Improve access to and use of scientific and indigenous knowledge

- Mobilize science and technology on a national scale
- Establish mechanisms for science and technology advice to policymakers
- Train civil servants and political decisionmakers in environmental management
- Provide public access to information
- Improve extension training and services so that they are based on locally-derived solutions
- Strengthen global scientific assessments

10. Build environmental sustainability into all development project proposals

- Ensure that all project proposals and poverty reduction strategies submitted to funding agencies include an assessment of their environmental impacts
- Establish a system of targeted incremental funding of national environmental programs
- Increase funding to countries in support of implementing existing multi-lateral environmental agreements

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The task force wishes to acknowledge, with deep gratitude, the numerous contributions of people and organizations, through their comments and revisions on both the interim and the final report. In particular we are grateful for the contributions by the authors of the research papers commissioned by the task force.

We acknowledge the insightful comments of panelists at two public events that we held at international meetings: the annual meeting of the Society for Conservation Biology in New York City (August 2004) and the IUCN World Conservation Forum in Bangkok (November 2004).

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In all, nearly 100 experts had direct input into the deliberations of the Task Force on Environmental Sustainability, though the members of the task force assume sole responsibility for the contents of the report.

Environment and human well-being: a practical strategy

Our lives on this planet depend on nature's provision of stability and resources. Current rates of human-engendered environmental destruction threaten those resources and leave death and misery in their wake. But we can avoid this. To do so, we must act in concert and with a sense of urgency to make the structural and policy changes needed to maintain ecosystems and their services, control water and air pollution, and reverse the trends leading to global warming. This must be done if we are to achieve the level of environmental sustainability necessary to meet the UN Millennium Development Goals addressing poverty, illiteracy, hunger, discrimination against women, unsafe drinking water, and environmental degradation.

Environmental sustainability is essential to achieving all of the other Millennium Development Goals.

By *environmental sustainability* we mean meeting current human needs without undermining the capacity of the environment to provide for those needs over the long term. Achieving environmental sustainability requires carefully balancing human development activities while maintaining a stable environment that predictably and regularly provides resources such as freshwater, food, clean air, wood, fisheries, and productive soils and that protects people from floods, droughts, pest infestations, and disease. Therefore,



environmental sustainability is necessarily a fundamental objective in the pursuit of the seven other Millennium Development Goals. As stated in the UN Millennium Declaration, we must “spare no effort to free all of humanity, and above all our children and grandchildren, from the threat of living on a planet irredeemably spoiled by human activities, and whose resources would no longer be sufficient for their needs.”

Achieving environmental sustainability requires dramatic changes in the ways societies and citizens manage biodiversity and the wastes and by-products of production and consumption. It also requires changes in the consumption patterns themselves. Direct investments and structural changes are required at local, national, regional, and global levels to address the underlying causes of environmental problems.

The problems

Achieving a healthy, sustainable environment first requires understanding the drivers of environmental change, assessing the state of the environment and identifying people’s dependence on it, and identifying the obstacles to ameliorating environmental degradation.

Operationalizing environmental sustainability

The pursuit of environmental sustainability is an essential part of the global effort to reduce poverty because environmental degradation is inextricably and causally linked to problems of poverty, hunger, gender inequality, and health (Box 1). Protecting and managing the natural resource base for economic and social development and changing consumption and production patterns are fundamental requirements for poverty eradication. Integrating the principles and practices of environmental sustainability into country policies and planning programs is therefore key to successful poverty reduction strategies.

Environmental sustainability issues arise at all levels, from local land use practices to global consumption and production patterns. Thus responsibility for natural resource management, waste management, and biodiversity protection must be shared among all nations. Every country must work toward environmental sustainability by defining concrete and quantifiable objectives and implementing the process targets of multilateral and regional environmental agreements (Box 2).

Environment and human well-being

The environment comprises a diversity of ecosystems: from forests, grasslands, and agroecosystems to freshwater systems and coral reefs. Each provides a set of benefits that contribute to human health, well-being, and livelihoods, ranging from the direct provisioning of goods to more indirect benefits, such as through regulating or supporting ecosystem services. The world’s poor depend

Box 1
Key links between environmental sustainability and other Goals

Sources: DFID et al. 2002; UNDP 2002.

Millennium Development Goal

Examples of links to the environment

1. Eradicate extreme poverty and hunger	<ul style="list-style-type: none"> • Livelihood strategies and food security of the poor often depend directly on functioning ecosystems and the diversity of goods and ecological services they provide. • Insecure rights of the poor to environmental resources, as well as inadequate access to environmental information, markets, and decisionmaking, limit their capacity to protect the environment and improve their livelihoods and well-being.
2. Achieve universal primary education	<ul style="list-style-type: none"> • Time that children, especially girls, spend collecting water and fuelwood can reduce study time.
3. Promote gender equality and empower women	<ul style="list-style-type: none"> • Time that women spend collecting water and fuelwood reduces their opportunity for income-generating activities. • Women's often unequal rights and insecure access to land and other natural resources limit opportunities for accessing other productive assets.
4. Reduce child mortality	<ul style="list-style-type: none"> • Water and sanitation-related diseases and acute respiratory infections, primarily caused by indoor air pollution, are leading causes of mortality in children under the age of five.
5. Improve maternal health	<ul style="list-style-type: none"> • Indoor air pollution and carrying heavy loads during late stages of pregnancy put women's health at risk before childbirth.
6. Combat major diseases	<ul style="list-style-type: none"> • Environmental risk factors account for up to one-fifth of the total burden of disease in developing countries. • Preventive environmental health measures are as important, and at times more cost-effective, than health treatment.
7. Develop a global partnership for development	<ul style="list-style-type: none"> • Since rich countries consume far more environmental resources and produce more waste than poor countries, many environmental problems (such as climate change, loss of species diversity, and management of global fisheries) must be solved through a global partnership of developed and developing countries.

disproportionately on ecosystem services to provide for their systems of small-scale agriculture, grazing, harvesting, hunting, and fishing. Without access to infrastructure providing safe drinking water, electricity, fuel, and transportation, poor people rely on natural sources of clean air and water, fertile soil, renewable energy, and biodiversity to meet their needs. Although 1.3 billion people live on marginal lands and one-fifth of all people lack access to safe water, the need for environmental sustainability is not adequately addressed in most countries' poverty reduction strategies.

Box 2 Immediate regional environmental concerns

While all regions face the global problems of climate change, biodiversity loss, and fisheries decline, each region faces distinct immediate concerns, and overall progress toward environmental sustainability varies considerably.

- In *Latin America*, home to half the world's species of plants and animals, the most pressing issues are deforestation, pollution, and damage to coastal and marine ecosystems.
- In *small island developing states, including Caribbean and Pacific islands*, key problems are climate change, marine ecosystem health, alien invasive species, and pollution.
- In *sub-Saharan Africa*, the major environmental issues are soil and land degradation, depletion of forests and freshwater resources, and poor indoor air quality.
- The *Middle East and North Africa* suffer most from declining per capita water resources, loss of arable land, pollution-related health problems, and weak environmental institutions and legal frameworks.
- *South Asia's* most pressing environmental problems are freshwater scarcity and pollution, and soil and land degradation, whilst in *Central Asia* they are land cover change and freshwater degradation.
- *East and Southeast Asia* suffer mostly from soil and land degradation, deforestation, and poor urban air quality.

Environment and poverty

Environmental degradation is a product of the activities of both rich and poor. Deforestation, for example, is partly caused by local demand for agricul-



tural land or construction materials, but is even more fundamentally driven by the industrialized world's demand for timber and the growing international trade in forest products. Greenhouse gas emissions in the world's developed countries have largely driven global climate change, which threatens human well-being, ecosystem functioning, and biodiversity. If developed countries do not reduce

emissions, and economic growth in newly emerging economies contributes equivalent per capita quantities of greenhouse gases, climate change will accelerate sharply.

Environment and food security

All food ultimately derives from ecosystem services. In Africa, bush meat is the main source of animal protein, while in Southeast Asia fisheries provide the main source of protein. Sustainable management of terrestrial and marine ecosystems is thus a prerequisite to global food security. Inappropriate intensive and extensive agricultural techniques cause loss of biodiversity, soil erosion, salinization of irrigated areas, agrochemical leaching, increased withdrawals of ground- and surface water, and pesticide resistance. These forms of environmental degradation can cause irreversible losses in food availability on land and in rivers, lakes, and the sea.



Environment and health

Environmental degradation adversely affects human health through exposure to bacteria, parasites, and disease vectors (mosquitoes and snails, for example); chemical agents (such as pesticides and heavy metals); and physical and safety hazards. Gastrointestinal diseases, strongly linked to unsafe water and environmental degradation, are the leading killer of children under five. Polluted air, indoors and out, kills more than 2 million people a year. Many of today's emergent or resurgent diseases, such as encephalitis, dengue fever, and malaria, are on the rise because of human disruption of ecosystems (Box 3).

Driving environmental change

We are living in an era of unprecedented environmental change. In every region of the world human actions have affected the natural environment, resulting in rapidly diminishing forests and coral reefs, increased consumption of scarce water and energy resources, desertification, the spread of invasive alien species, loss of biodiversity, and global climate change. If left unmanaged, the environment will continue to deteriorate, impeding efforts to achieve the Millennium Development Goals.

Direct drivers

The five most significant direct drivers of environmental deterioration are:

1. *Land cover change*, resulting from logging, urbanization, conversion to agriculture, road construction, and human habitation, among other factors, can impair the delivery of vital ecosystem services, such as the water-retention and flood-attenuation capacity of soil.

Box 3
Relationships
between infectious
disease and
environment

Source:
 Millennium Ecosystem
 Assessment 2004
 (chapter 14).

A range of biological mechanisms are responsible for altering the incidence of infectious disease. Key examples of this disease–ecosystem relationship are described here:

- Dams and irrigation canals provide ideal habitat for snails, the intermediate reservoir host species for schistosomiasis; irrigated rice fields enlarge the extent of mosquito breeding areas, increasing transmission of mosquito-borne malaria, lymphatic filariasis, Japanese encephalitis, and Rift Valley fever.
- Deforestation increases the risk of malaria in Africa and South America, while its effect in Southeast Asia is uncertain.
- Natural systems with preserved structure and characteristics are not receptive to introduction of invasive human and animal pathogens brought by human migration and settlement (this is the case for cholera, kala-azar, and schistosomiasis).
- Uncontrolled urbanization in forest ecosystems is associated with mosquito-borne viruses (arboviruses) in the Amazon and lymphatic filariasis in Africa. Tropical urban areas with poor shelter and lacking closed-pipe sanitation promote transmission of dengue fever.
- Habitat fragmentation, with subsequent biodiversity loss, increases the prevalence in ticks of the bacteria that causes Lyme disease in North America.
- Zoonotic pathogens (defined by their natural life cycle in animals) are a significant cause of both historical infectious diseases (such as HIV and tuberculosis) and newly emerging ones (such as SARS, West Nile virus, and Hendra virus); in addition, zoonotic pathogens can result in high fatality rates and are difficult to vaccinate against since the primary reservoir hosts are nonhuman (for example, Nipah virus).
- Intensive livestock agriculture, treated with subtherapeutic doses of antibiotics, can lead to the emergence of antibiotic-resistant strains of *Salmonella*, *Campylobacter*, and *E. coli* bacteria; overcrowded and mixed livestock practices and bush-meat trade have facilitated interspecies host transfer of disease agents, leading to dangerous novel pathogens, such as SARS and new strains of avian influenza.

2. *Overappropriation or inappropriate exploitation of natural resources* can reduce even the stock of renewable resources below sustainable levels. Overfishing is an example.
3. *Invasive alien species* are non-native organisms that become established and spread in new environments. They can choke out native species, clog waterways, and threaten human health.
4. *Pollution* of air, soil, and water by chemical and organic wastes affects human health, reduces agricultural production, and damages ecosystems.
5. *Climate change* may be the single greatest driver of environmental change at a broad scale. The warming trend of the past 30–50 years has had such diverse effects as altered precipitation patterns, greater frequency of extreme weather events, rising sea levels, increased ranges for some disease vectors, and changes in ecological systems, including migration and reproduction patterns.

Indirect drivers

The causes of environmental change are complex and synergistic and include indirect as well as direct factors that lead to deterioration of ecosystems and the pollution of our air, water, and land. The task force considers the most powerful indirect drivers of environmental deterioration to include:



1. *Demographic change.* Population growth, rural-to-urban migration, and shifts in household economic status have important implications for the environment because they tend to increase pressure on the environment.
2. *Economic factors.* Economic growth intensifies resource consumption, drives land cover change, and generates waste. But rising incomes can also bring investments in environmental improvement and cleaner technologies. Extreme poverty can drive environmental degradation, in turn reinforcing poverty.
3. *Market failures and distortions.* Environmentally damaging subsidies can encourage overproduction or overexploitation of resources such as fisheries and forests. Failure to account for resource depletion may result in a misleading picture of economic conditions. Increased trade flows may facilitate the movement of alien species and pathogens, causing damages that further strain national accounts.
4. *Scientific and technological change* can exert both positive and negative effects on environmental change. Some new technologies can, for example, enable more effective pollution abatement, whereas other technologies might drive overexploitation by increasing resource extraction efficiency.
5. *Institutional gaps.* Malfunctioning or absent political and regulatory institutions allow overexploitation of resources, and weak enforcement regimes fail to deter damaging forms of extraction, such as illegal logging. Insufficient participation of key stakeholders in the planning and management of sustainable resource use reduces the effectiveness of policies and their implementation.
6. *Sociopolitical factors.* Differences in culture and social behavior yield varying consumption and production patterns, and social change can produce unpredictable shifts in resource use. Also, countries in conflict

are unlikely to invest in environmental protection or other public goods.

Six key elements of the environment affecting health and economic well-being

Given these principal direct and indirect drivers of environmental change, the next step in designing appropriate interventions is to identify how these drivers influence key elements of the world's environment that affect human health and economic well-being. The six key elements discussed in this report are:

Agricultural production systems

Production systems (crops, grazing land, orchards, plantations, and freshwater aquaculture) cover almost a third of the Earth's land surface. They were carved out of natural ecosystems that formerly provided a wide range of services, including maintaining an extensive soil biota whose health is critical to land productivity and to water availability. Among the direct drivers of degradation of agricultural production systems are land cover changes, such as extensification, that disrupt the soil's natural regulatory functions; inappropriate exploitation, such as inefficient irrigation; and climate change, causing such problems as more frequent droughts and flooding. The major indirect driver of land and soil degradation is demographic change – particularly population growth. Another is market distortions driving farmers to extensify production to compensate for falling global prices for crops. Extreme poverty prevents people from investing in maintenance of soil fertility.

Forests

The Earth's 3.4 billion hectares of forest directly contribute to the livelihoods of 90 percent of the world's 1.2 billion people living in extreme poverty, by providing food, fuel, shelter, freshwater, fiber, bush meat, and genetic resources. Over the last decade the world has annually lost forests equivalent in area to Portugal (9.4 million hectares).



More than 70 percent of forest destruction is driven directly by the expansion of agriculture, with urbanization, energy production, and mining contributing significantly as well. In many cases indiscriminate logging has catalyzed this destruction by providing the infrastructure for human expansion. Much of the destruction and degradation of forests could be avoided if access and tenure rights were fairer to local people, especially marginalized groups and women, who depend on forests for

their livelihoods. Governments and markets have failed so far to understand and support the true value of forests to human development, thus opening opportunities for illegal forest activities and violent conflict. Regulations and law enforcement regimes have been powerless to stop illegal logging, which accounts for at least half of all timber extraction. Invasive alien species are another direct driver of forest degradation, and pollutants such as acid precipitation, tropospheric ozone, and elevated levels of carbon threaten forests by changing physiological processes and altering the behavior of plant pests. Climate change is profoundly affecting the function and dynamics of the world's forests. Indirect drivers of forest habitat deterioration include demographic changes, economic factors, and institutional gaps.

Freshwater resources and ecosystems

Freshwater resources are fundamental to human survival. They support life by enabling food and energy production and serving as a transport medium. In addition, wetlands, lakes, and rivers mitigate floods. The current per capita availability of water varies considerably globally, but overall has fallen by half during the past 40 years, and more than half the world's natural wetlands have disappeared. Irrigated agriculture accounts for 70 percent of water withdrawals worldwide, and about a third of water use depends on unsustainable withdrawals, mostly in Asia, the Middle East, and Africa.

Direct drivers of degradation include dams for energy generation, channelization and flow diversion for irrigation and flood control, wetland drainage, and groundwater withdrawal. Overappropriation of water takes the form of excessive water diversion for irrigation and urban use, which create shortages and lead to salinization. Biological pollution of water is responsible for 2.2 million deaths a year. Chemical pollution also jeopardizes human health. Climate changes in the form of increased droughts and floods affect surface water availability for human needs. Major indirect drivers of freshwater deterioration are demographic



change, economic factors, and institutional gaps. Population growth and urbanization increase demand. Inappropriate water pricing policies and agricultural subsidies undervalue water and weaken incentives to manage it sustainably, and poorly integrated management across sectors causes shortages, pollution, conflict, and inefficiently allocated claims on limited resources.

Fisheries and marine ecosystems

Oceans comprise about 70 percent of the planet's surface and are by far the largest habitat for life on Earth. They supply billions of people with food and mineral resources. Fisheries supply 16.5 percent of the animal protein consumed worldwide – significant considering that undernutrition is the major cause of human mortality, accounting for 30 percent of deaths. Some 25 percent of all wild fish stocks are underexploited or only moderately exploited. Although coral reefs provide fish and seafood for a billion people in Asia alone, 80 percent of reefs are at risk from coastal development, fishing-related pressures, and climate change. Marine biodiversity provides critical services to our planet through climate control, carbon sequestration, and oxygen generation. Coastal waters support tourism and recreation as well as fisheries.

Direct drivers of the deterioration of fisheries and marine ecosystems include overappropriation – destructive and nonselective fishing practices, which damage ecosystems, massively deplete fish stocks, and pose a major threat to biodiversity. Other important direct drivers are pollution from ocean dumping and downstream effects of land-based activities; invasive alien species introduced to estuaries and bays by the exchange of ballast water (some 3,000 species each day); and climate change, with rising sea-surface temperatures affecting the sea level, ice cover, salinity, and ocean circulation, and leading to coral reef bleaching. Indirect drivers are demographic change, economic factors, institutional gaps due to increased demand arising from population growth, damaging subsidies that cause overexploitation of fisheries, and poor policies and enforcement coupled with insufficient attention to scientific advice. Taken together, these drivers are resulting in the global and local collapse of key marine populations.

Air and water pollution

Clean water and air are preconditions for human life and healthy ecosystems. Pollutants (such as carbon monoxide, lead, nitrogen dioxide, particulates, sulfur dioxide, and ozone) can cause brain damage, respiratory illness, cancer, endocrine disorders, and even death. In cities in developing countries, ambient levels of such pollutants often exceed World Health Organization guidelines. Indoor air pollution generated by cooking fuels causes respiratory disease, birth defects, and other illnesses among the estimated 2.4 billion people who burn biomass and coal in their homes, killing nearly 2.5 million children each year. Marine and freshwater pollution from household, industrial, and biological waste causes coral reef bleaching, eutrophication, and bioaccumulation of toxic substances in marine and freshwater animals. Over half the world's major rivers and associated lakes, wetlands, and groundwater areas are contaminated by pollutants from untreated sewage, chemical discharge, petroleum leaks and spills, mining residue, and run-off of sediment and nutrients from agricultural fields.

Direct drivers of water pollution include land cover change, with new agricultural development resulting in the transmission of organic compounds, chemical fertilizers, and pesticides into bodies of water. Overappropriation of fossil fuels for expanding vehicle fleets significantly increases airborne pollutants, especially where leaded fuel is permitted. Indirect drivers are demographic change, economic factors, institutional gaps, and sociopolitical factors. Rural-to-urban migration has increased demand for energy and transportation; local economic realities thwart pollution prevention, mitigation, and abatement technologies; and attempts to improve air and water quality are frustrated by weak regulatory and enforcement regimes.

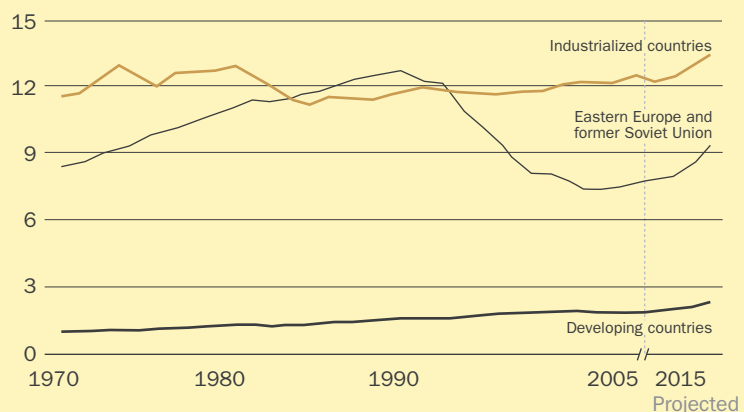
Global climate change

A stable climate provides the critical regulating services on which all ecosystems depend, affecting weather, human health, agricultural and marine productivity, the distribution and health of species, and energy consumption (for heating or cooling technologies). Since the advent of the industrial era (around 1750), greenhouse gases have increased substantially. Carbon dioxide, for example, has risen from 280 to 370 parts per million over that time and is projected to increase to 540–970 parts per million by 2100 because of energy and land-use practices, even without accounting for additional climate-induced releases of carbon dioxide from the biosphere. Industrial countries currently emit about 10 times more carbon per capita than do developing countries (Figure 1).

Human activities are causing climate change, and although industrial countries are primarily responsible, developing countries and poor people are the most vulnerable. The global mean surface temperature has increased over the past century, with the 1990s being the warmest decade on record. Temporal and spatial patterns of precipitation have changed, and the sea level has risen 10–25 centimeters. These trends are expected to continue, and the variability of climate patterns and the incidence of extreme weather events

Figure 1.
Carbon dioxide emissions, 1970–2015, per capita
Metric tons of CO₂

Source: EIA 2004 (fig.19).



are projected to increase, resulting in the inundation of low-lying small island developing states and deltaic regions, particularly in the South Pacific and the Indian Ocean. Tens of millions of people are expected to be displaced, and rates of malaria, dengue fever, and other diseases are expected to rise. Other anticipated effects include lower agricultural productivity, greater water scarcity and ecosystem disturbances. Unless mitigated, climate change may undermine efforts to achieve the Millennium Development Goals.

Direct drivers of climate change include pollution through fossil fuel combustion and land cover change, primarily tropical deforestation. The indirect drivers are demographic change, economic factors, market failures and distortions, scientific and technological change, institutional gaps, and sociopolitical factors. Most are related to the demand for energy and changes in land use, which affect emissions of greenhouse gases and, in turn, result in climate change.

Eight obstacles to ameliorating environmental degradation

Since the 1972 Stockholm Conference on the Human Environment first focused international attention on environmental degradation, most environmental trends have worsened, despite three decades of political arrangements, high-level pronouncements, public exhortations, and over a dozen major multi-lateral environmental agreements.



There have been some improvements. The Montreal Protocol has successfully curbed emissions of ozone-depleting substances, many countries have improved air and water quality, and large shares of land ecosystems have been placed under protection. Yet most regions are not on track to halt environmental degradation, and some have even experienced dramatic declines in environmental quality, despite the existence of tools and policies to attenuate or mitigate direct and indirect drivers of environmental change.

The task force identifies and describes eight factors it considers obstacles to the enactment of policies and actions known to ameliorate environmental degradation:

1. *Lack of clear operational objectives.* If environmental strategies cannot be monitored, they become difficult to implement.
2. *Insufficient direct investment in environmental management.* In most low-income and some middle-income countries, domestic resources may be insufficient to cover the full range of investments needed in social services, infrastructure, and improved environmental management.
3. *Poor integration into sector policies.* Too often, national environmental strategies are developed in isolation from other sectoral strategies that strongly affect environmental sustainability.
4. *Inadequate institutional capacity, misalignment of goals, and poor governance.* In most countries environmental ministries lack the technical expertise and equipment needed to conduct effective work, follow strategies that are not congruent with those of other ministries, and are often impeded by poor governance, high-level corruption, and lack of enforcement.
5. *Widespread market failures and distortions.* Market failures can create environmental degradation by misaligning the incentives of individuals or corporations with the interests of society at large.
6. *Underinvestment in science and technology.* Science and technology are critical for achieving environmental sustainability by improving the understanding and monitoring of the state of the environment and by developing means to mitigate environmental degradation. However, most developing countries do not invest sufficiently in science and technology.
7. *Difficulties of regional and international cooperation.* National environmental policies and investments have been stalled by inadequate regional and global management and cooperation.
8. *Limited public awareness.* The public's awareness of the consequences of human-induced changes to the environment is insufficient to build a broad-based constituency for environmental sustainability (Box 4).

Suggested solutions

Achieving environmental sustainability requires dramatic changes in the ways societies and citizens manage biodiversity and the processes of production and consumption. Direct investments in environmental management and structural changes are required at local, national, regional, and global levels to address the underlying causes of environmental problems.

Investing in environmental management: a call for action

To integrate environmental sustainability into national development strategies, the task force recommends taking an ecosystem-based approach to environmental management. This approach integrates social, ecological and economic

Box 4
Pollution control
in Mexico
through public
involvement

Source:
 Cristina Cortinas,
 personal communication.

Public awareness and involvement helped to advance environmental sustainability in pollution control in Mexico through multiple strategies:

Stronger legislation. Establishment of a state-wide intersectoral waste management network (www.reqmar.org) helped the government develop state and local waste regulations and promote research projects on environmental standards in managing nonhazardous waste. Citizens, through collective action, helped to fill regulatory gaps by developing, disseminating, and investigating the application of regulations.

Public participation. Knowledgeable citizens can receive support from the federal Environment and Natural Resources Ministry to conduct training courses for various sectors of society on application of the new legislation.

Waste minimization. The new legislation offers incentives to link waste management projects with poverty alleviation projects (involving waste scavengers in formal productive recycling chains, for example) and sustainable agriculture (using organic wastes as compost and establishing management plans for empty pesticide containers).

Education. An ideal opportunity for educating students is presented by involving them in the design and implementation of school waste management plans.

Demonstration projects. Following a community approach and working through the intersectoral network on environmental waste management, projects focus on activities at the community level, though involve key actors at all government levels.

Knowledge networks. Because government lacks the capacity to guide citizens in all aspects of preventing and managing waste in an environmentally sound manner, it is critical to establish mechanisms for providing citizens with access to information on how to solve concrete problems.



concerns in strategies for securing the restoration and sustainable use of fisheries, freshwater, forest, and soils, coupled with actions to reduce the production of chemical and organic wastes, and greenhouse gases (Box 5).

The ecosystem approach, the framework for implementation adopted by the Convention on Biological Diversity, emphasizes the links between human activity and the sustainable functioning of ecosystems at a full range of spatial scales. Inherent in this approach are three

major conditions to achieving long-term environmental sustainability:

- Biodiversity conservation and environmental management must not be confined to protected areas.
- Solutions must be integrated across sectors so that advances in one sector do not preclude advances in others.
- And investments must be implemented in an enabling environment of sound institutions and policies, market equity for the poor and women, and access to information and technologies for all.

Box 5
Ecosystem
approach:
framework for
implementation

The ecosystem approach to landscape and resource management seeks to maintain ecosystem functions and services, enhance equitable sharing of benefits, promote adaptive management strategies, implement management actions through decentralization to the most appropriate level, and foster intersectoral and interdisciplinary cooperation. The approach recognizes the complex nature of ecosystems and their relationship to the human populations they benefit. It includes relevant sectors of society in decisionmaking and resource management responsibilities and moves away from discrete, sector analyses of the environment toward a more holistic view of interactions between ecosystem components. It is based on the application of scientific methods appropriate to each level of biological organization and recognizes that humans are an integral component of many ecosystems.

Sustainable forest management, integrated water resource management, and ecosystem-based fishery management are examples of effective emerging models that move from narrowly defined sector models toward more inclusive and holistic strategies for environmental sustainability.

The IUCN Commission on Ecosystem Management has identified five steps, encompassing 12 principles, to guide environmental managers at all levels in their implementation of the ecosystem approach (Shepherd 2004):

- Determine the main stakeholders, define the ecosystem area, and develop the relationship between them.
- Characterize the ecosystem structure and function and establish mechanisms to manage and monitor them.
- Identify key economic issues that will affect the ecosystem and its inhabitants.
- Assess the ecosystem's likely effects on adjacent ecosystems.
- Determine long-term goals and flexible ways of reaching them.

Within an ecosystems-based approach, the task force recommends direct investments in integrated environmental management in six key elements of the environment, which are summarized here and detailed in Box 6.

- *Agricultural production systems.* Around the world agricultural systems are increasingly vulnerable to overuse, inappropriate practices, and altered weather patterns. The task force recommends increasing the use of sustainable agriculture techniques to preserve natural assets, restoring and managing desertified lands, and protecting surrounding natural habitat.
- *Forests.* To confront the negative drivers of land clearing for agriculture and logging, as well as pollution and global climate change, the task force recommends increasing real income in informal forest sector





activities by at least 200 percent by harnessing the entrepreneurial spirit of harvesters of forest products, integrating ecosystem management of 90 percent of river basin systems, and protecting and restoring ecologically viable representative areas of all major forest, shrubland, and pasture vegetation types and their biodiversity.

- *Freshwater resources and ecosystems.* Increasing water scarcity in dry areas and flooding in wet ones, exacerbated by climate change, threaten household subsistence activities, agriculture, and aquatic ecosystems. Pollution and salinization pose risks to irrigated agriculture and human and wildlife health. To combat these drivers, the task force recommends reducing demand, especially in cropping systems; maintaining pollution levels in surface water and groundwater sources below maximum allowable levels for individual pollutants; and maintaining aquatic biodiversity by ensuring minimum environmental flow and protecting aquatic environments.
- *Fisheries and marine ecosystems.* Increasing demand for marine products and services, coupled with degradation of inland habitat, is resulting in irreversible losses in fish stocks, coral reefs, and the productivity of all aquatic ecosystems. The task force recommends managing fisheries sustainably, restoring depleted fish population levels, and establishing a network of representative, fully protected marine reserves.
- *Air and water pollution.* Current energy practices, mismanagement of toxic chemicals, and the conversion of natural habitats and related patterns of overproduction, overconsumption, and mismanagement of ecosystems have resulted in unsustainable levels of air and water pollutants. The task force recommends reducing vulnerable groups' exposure to toxic chemicals; reducing significantly the under-five mortality and morbidity rates caused by pneumonia, acute respiratory infection, and waterborne diseases; and reducing the atmospheric levels of the six key pollutants (carbon monoxide, lead, nitrogen dioxide, particulates, sulfur dioxide, and ozone) and methane.
- *Global climate change.* Human activities such as fossil fuel combustion and deforestation are changing the Earth's climate by releasing greenhouse gases. To mitigate the anticipated increase in extreme weather events and the rise in sea level, the task force recommends investing in cost-effective and environmentally sustainable energy, promoting and engaging climate-friendly carbon and technology markets, and taking adaptation measures.

Box 6
Task force
recommendations
for direct
investments
in integrated
environmental
management

Agricultural production systems

Increase the use of sustainable agriculture techniques to preserve natural assets:

- Protect and improve soils, including enhanced carbon sequestration.
- Use water sustainably.
- Maintain crop genetic diversity.
- Mobilize local knowledge and experience.
- Improve crop research, management storage, and use.

Restore and manage desertified lands:

- Adopt prevention strategies to protect arid ecosystems.
- Mobilize information and technology.

Protect surrounding natural habitat:

- Rationalize land-use planning.
- Set up systems of communal ownership and management rights.

Forests

Increase real income in informal forest sector activities by at least 200 percent, by harnessing and channeling the entrepreneurial spirit of harvesters of forest products, illegal loggers, pit sawyers, wood carvers, bush meat hunters, and traders:

- Provide outreach to informal users from government agencies, civil society organizations, and certification organizations.
- Rationalize institutional and regulatory frameworks.
- Create incentives for conservation and sustainable management.

Integrate ecosystem management of 90 percent of river basin systems – including those that span national, state, or provincial boundaries:

- Increase regional coordination.
- Provide technical assistance.
- Implement best practices for natural resource use.

Protect and restore ecologically viable representative areas of all major forest, shrubland, and pasture vegetation types and their biodiversity:

- Coordinate conservation strategies.
- Implement a mosaic of interconnected protected areas of a size commensurate with addressing the threats, such as climate change.
- Increase use of independently certified sustainable forest management practices.
- Address concerns of vulnerable populations.
- Compensate affected stakeholders.

Freshwater resources and ecosystems

Reduce demand, especially in cropping systems:

- Increase water-use efficiency.
- Identify new water sources, such as rainwater and recycled wastewater.
- Manage demand through a supportive regulatory environment and incentives.

Maintain pollution levels in surface water and groundwater sources below maximum allowable levels for any given pollutant:

- Establish and enforce pollution targets.

Maintain aquatic biodiversity by ensuring minimum environmental flow and protecting aquatic environments:

- Rationalize resource distribution by determining the amount of water that must remain in a river system to maintain ecosystem function.
- Control alien invasive species.

Box 6
Task force
recommendations
for direct
investments
in integrated
environmental
management
(continued)

Fisheries and marine ecosystems

Manage fisheries sustainably:

- Implement ecosystem-based fishery management based on sound research.

Restore depleted fish population levels:

- Eliminate unsustainable fishing practices and control overfishing.
- Align land and water conservation policies.
- Establish and achieve biomass targets in order to restore depleted fish populations to at least minimum target levels of biomass.

Establish networks of representative, fully protected marine reserves:

- Increase coordination and coverage of protected areas.

Air and water pollution

Reduce exposure to toxic chemicals by vulnerable groups:

- Adopt integrated pest management strategies to reduce pesticide pollution.
- Improve frameworks for chemical management.
- Implement standards for environmental management to stimulate the development of cleaner production technologies.

Reduce substantially the under-five mortality and morbidity rates caused by pneumonia and acute respiratory infection:

- Invest in cleaner technologies.
- Raise public health awareness, particularly among women.

Reduce substantially the under-five mortality and morbidity rate caused by waterborne diseases:

- Protect water sources from untreated runoff from housing and livestock.
- Develop new water-collection techniques.

Reduce the atmospheric levels of the six key pollutants (carbon monoxide, lead, nitrogen dioxide, particulates, sulfur dioxide, and ozone) and methane:

- Invest in cleaner energy technologies.
- Improve management of organic wastes to reduce methane generation.

Global climate change

Invest in cost-effective and environmentally sustainable energy:

- Develop no- or low-carbon energy technologies, including research and development, demonstration, and market scale-up.
- Eliminate market failures and distortions, such as fossil fuel subsidies, and internalize environmental externalities into energy prices so that environmentally friendly technologies can compete in the market.

Promote and engage climate-friendly carbon and technology markets:

- Support multilateral instruments, such as national and international tradable emissions systems.
- Establish and commit to long-term stabilization targets for atmospheric concentrations of greenhouse gases (450–550 parts per million of carbon dioxide equivalent, for example).
- Rationalize sustainable production and consumption patterns to mitigate carbon emissions, by reducing deforestation and burning and increasing afforestation and reforestation.

Take adaptation measures:

- Mainstream responses, integrating issues of climate change and variability into national economic and sector planning.
- Invest in adaptation strategies, such as helping farmers adopt alternative cropping and water management strategies in response to changing temperatures and precipitation patterns.

Four structural changes for environmental sustainability

While absolutely necessary, direct investments in environmental management will not succeed unless major structural changes are made to policies at the national, regional, and global levels. These changes are highly charged politically, but any inability to make them will stand as a major impediment to achieving environmental sustainability.

The task force recommends four fundamental changes in the way institutions and economies operate at national, regional, and global scales, so that countries can effectively integrate environmental concerns into all development and sector policies. These changes are described here and highlighted in Box 7.

To take action toward achieving environmental sustainability, countries must first reform and strengthen environmental institutions and governance.

Box 7
Task force
recommendations
for structural
changes

Strengthen institutions and governance

- Train, recruit, and retain environment experts.
- Secure sufficient funding for environmental institutions.
- Reform government institutions and improve interagency coordination.
- Improve governance and gender equality.

Correct market failures and distortions

- Account for the cost of environmental degradation in national accounts.
- Introduce payments for ecosystem services.
- Reform tax structures to promote environmentally beneficial actions.
- Phase out environmentally harmful subsidies.
- Develop trade regulations to promote legal, sustainable harvesting of natural resource products such as timber.
- Strengthen property and land tenure rights, including community management regimes.
- Improve national and international regulatory frameworks.

Promote science and technology for environmental sustainability

- Mobilize science and technology for sustainable development.
- Establish mechanisms for science and technology advice.
- Train decisionmakers in environmental management.
- Improve extension training and services.
- Expand education in science, mathematics, and environmental studies.
- Provide public access to environmental information.
- Strengthen global scientific assessments.

Build environmental sustainability into all development strategies across sectors

- Adopt quantified and time-bound environmental objectives.
- Incorporate environmental sustainability into poverty reduction strategies.
- Increase funding for national environmental programs.
- Increase funding to countries to support implementation of existing multilateral environmental agreements.

This will require improving the environmental expertise available within agencies and ministries for agriculture, energy, transport, water supply, and others. Such institutional strengthening requires increased investments, particularly in human resources, and reform of existing institutional arrangements, including management systems.

Second, policy instruments must be developed at all levels to correct market failures and distortions in ways that realign public and private sector incentives with the health and well-being of ordinary citizens. The most important policy instruments to address market failures are to account for the cost of environmental degradation in national accounts, introduce tax reform and payments for ecosystem services (Box 8), phase out environmentally harmful subsidies, develop trade regulations, strengthen property and land tenure rights, and improve the regulatory framework.

Box 8 **Environmental tax reform in Brazil**

Source:
May et al. 2002.

Starting in 1992, most Brazilian states have adopted an ecological value added tax (Imposto sobre Circulação de Mercadorias e Serviços, ICMS-E). The ICMS-E is a state levy on the circulation of goods, services, energy and communications, and it is the largest source of revenues in Brazil. The ICMS-E allocates 25 percent of the revenues derived from this value added tax to municipalities on the basis of their performance on environmental criteria. In Parana and Minas Gerais, for example, the distribution of ICMS-E revenues is based on the proportion of protected areas in the municipality weighted by a conservation factor related to the degree of protection of the area. Between 1992 and 2001 conservation areas in Parana grew by over 1 million hectares, a 165 percent increase. In Minas Gerais the area grew over 1 million hectares over five years, a 62 percent increase. Particularly in Parana, private natural patrimony reserves have also grown in number.

ICMS-E was originally intended as a way to compensate municipalities with large conservation areas for the resulting loss of revenue. The transfers have solved financial problems of several municipalities because of the revenue generation and prospect of development of ecotourism. This in turn has produced a change in the behavior of the community toward the environment.

This tax instrument is a valuable fiscal incentive to local governments to protect forests and biological resources because it encourages forest conservation through revenue reallocation rather than additional expenditures. The mechanism also fosters new partnerships between public and private actors for conservation purposes because it rewards those municipalities that have promoted the creation of private natural reserves.

The third structural change necessary is to mobilize science and technology for sustainable development and to improve access to scientific and technical knowledge. Research institutions can provide technical solutions for some of the problems of environmental degradation. Countries must gather data and develop indicators to understand current conditions and be able to translate data into actionable information to guide environmental decisionmaking by policymakers and the general public. While the needed skills, capabilities, and

information products differ in each case, the overarching principle is constant: better information and greater knowledge capacity can significantly improve the quality of decisions and their environmental outcomes.

Finally, countries must adopt quantified and time-bound environmental objectives to guide the design of environmental policies. National poverty reduction strategies should reflect an assessment of potential environmental impacts and development of strategies for avoiding or mitigating them. Countries will require increased funding for national environmental programs that are integrated in poverty reduction strategies.

Mainstreaming environmental sustainability: innovations in implementation

Many of the management actions and structural changes recommended by the task force are not new: they can be found in the major multilateral environmental agreements of the past three decades. But despite this long history of calls for action, most recommendations have not been systematically implemented. The task force, therefore, believes that it is in the implementation of recommendations and agreed upon actions that there is the greatest need for innovation.

While environmental challenges act at local, national, regional, and global scales, this report emphasizes the need for national-level implementation to

lay the foundation for successful regional and global implementation and to make the rapid progress needed to achieve the Millennium Development Goals. But because of the global context in which all countries have to work today, it is also necessary to establish a global framework of rules, regulations, and incentives.

Implementation must also bring together expertise from a broad range of fields, including representatives from most line ministries, civil society organizations, local communities, the private sector, and natural and social scientists (Boxes 9 and 10). A major challenge is to identify, evaluate, and address tradeoffs and synergies between sectoral strategies and environmental objectives. Finally, implementation mechanisms must address long-term environmental change, as well as short- or medium-term social and economic imperatives. For example, a challenge such as increasing the water efficiency of agriculture requires strategies



Box 9
What civil society
can do

Civil society organizations play a crucial role in achieving the goal of environmental sustainability as they both reflect and respond to the needs of a broad range of constituents and communities. At the national level, civil society organizations can contribute in at least three ways:

Public advocacy. Strategic alliances of civil society organizations with local authorities, national governments, and the international community can raise public awareness of their government's commitment to the Goals, highlight urgent development priorities for immediate action, and ensure that the needs of diverse groups are taken into account. For example in 1995, the Centre for Science and the Environment (CSE) in New Delhi, India, launched an advocacy campaign that successfully called for tighter controls on air pollution in major cities. The campaign began with publication of a research report on vehicular pollution, followed by a series of high-profile public meetings that convened scientific experts, politicians, artists, doctors, university students, and economists. Soon, India's supreme court directed the government to draw up an action plan for controlling air pollution; the resulting strategy introduced vehicular emissions tests, better mass-transit infrastructure, and buses fuelled by compressed natural gas (Pandita 2004).

Designing locally relevant solutions. Civil society is crucial in translating policies into practical solutions. In Kenya, for example, the Rehabilitation of Arid Environments Charitable Trust (RAE) has worked for more than 20 years to rehabilitate grasslands in the Lake Baringo watershed by setting up private and communal fields protected from grazing animals. Within three years, community management transformed severely degraded terrain into productive land.

Implementing scaled-up investment programs. The success of most large-scale interventions requires community involvement, including public education, dialogue, and national-scale action. In 2004, the Nobel Peace Prize was awarded to Wangari Muta Maathai, a Kenyan woman whose leadership of the Pan-African Greenbelt Movement demonstrates the power of community mobilization. Her efforts have helped poor women organize themselves to fight desertification and environmental degradation by planting more than 30 million trees.

and investments that must be pursued over many years if they are to show results. An investment to reduce greenhouse gas emissions imposes a cost on today's generation, with most of the the benefits of a more stable climate accruing at some future time. No tested institutional models yet exist to deal effectively with intergenerational tradeoffs, even though they lie at the heart of the implementation challenge.

National implementation mechanisms

Poverty reduction strategies, common in many low-income countries, tend not to address environmental sustainability in a systematic way. Those that do, focus only on providing access to water supply and sanitation, ignoring forest management, prevention of land degradation and desertification, pollution

Box 10
What the private sector can do

As a primary driver of economic activity and the key engine of innovation, the private sector plays a critical role in ensuring environmental sustainability. As key stakeholders in the environment, private sector companies can contribute to sustainable development in three ways:

New tools for environmental sustainability. The private sector's unrivalled capacity to drive technological and organizational innovation must be harnessed more effectively. Thanks to its expertise and dynamism, the private sector will play a critical role in creating cheaper technologies that use renewable energy sources and cleaner, more efficient technologies using fossil-fuel energy sources; improving and disseminating remote-sensing technologies; developing construction materials that are both human- and environmentally-friendly; and improving the efficiency of water use for agriculture. By designing appropriate incentives and developing markets for such products, government, in turn, can effectively mobilize private enterprises that want to move into new markets.

Moreover, companies can commit to environmentally responsible standards of practice, either individually, as Sony has in its Green Management Strategy, or in consortia, as demonstrated by the commercial banking sector's adoption of the Equator Principles. New models for social entrepreneurship, including fair trade, ecolabeling, and ecotourism, suggest novel strategies for the private sector to support sustainability and underline its capacity to develop innovative services.

Policy dialogue and design. The private sector can also advocate for more sustainable policies. Several companies act on the risks of environmental change. Munich Re and Swiss Re, both multinational re-insurance companies, and many other corporations, urge governments to implement strong, immediate reductions in greenhouse gas emissions, warning that global climate change will substantially increase the risk of natural disasters and substantially destabilize their profits. These companies are often far ahead of policy-makers in recognizing the urgency for action.

Active compliance. Private sector activities are a major driver of environmental degradation. Small and large companies alike can be part of the problem: extractive industries, heavy manufacturing, small-scale tanneries, or automobile repair shops can each drive the degradation of ecosystems and cause pollution. Businesses, driven by financial incentives, take a precautionary approach: it is cheaper to invest in prevention than pay for mitigation or compensation. The financial incentive is especially effective in situations where companies would be held responsible for the damages their activities cause. The private sector must commit to strict compliance with government-established rules. Together with consumers, those businesses that operate legally must pressure others that are not in compliance. Public accountability and transparency and enlightened self-interest of companies, labor, and civil society are key to success.

reduction, or other key elements outlined in this report. Poverty reduction strategies could be aligned with the Millennium Development Goals (MDGs); by covering the long term, rather than a short-term, three-year horizon; by integrating sectoral approaches to issues such as environment, gender equality, and urbanization; and by being adequately funded.

Integrated development framework

The task force endorses the UN Millennium Project recommendation that countries develop a single integrated development framework to meet all MDGs (UN Millennium Project 2005). This MDG-based poverty reduction strategy can be developed on the basis of existing Poverty Reduction Strategy Papers, national strategies for sustainable development, or other frameworks that provide an integrated operational plan for implementing and financing strategies to achieve all the Goals and ensure appropriate monitoring of progress over a 10-year horizon.

MDG planning group

The task force recommends that each country convene an MDG planning group, chaired by the national government and including all stakeholders – donors, UN agencies, provincial and local authorities, and civil society leaders, including indigenous and women’s organizations. This planning group can organize working groups, each with broad participation, for areas including health, rural development, and environmental sustainability. Each working group would include environment and gender equality experts. The environmental working group would be tasked with operationalizing Millennium Development Goals target 9 (integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources)



by establishing specific time-bound targets plus indicators for monitoring; identifying policy and investment needs to improve the management of environmental resources; and appraising the environmental effects of strategies proposed by other thematic working groups.

Operational targets

The task force further recommends that countries adopt operational targets for the environment in a process initiated by the environmental working group but inclusive of the highest level of decisionmaking, with all relevant line ministries and key stakeholders, including nongovernmental organizations, religious groups, and the commercial sector. Drawing on the best available science, the target selection team should begin with a long list of potential targets, treated as options with cost–benefit information for each. These preliminary targets should be reviewed by the MDG planning group and approved after an open discussion of tradeoffs between environmental objectives and exigencies in other sectors, so that a common position on the environmental objectives is

reached across all working groups. Once adopted, the environment objectives should guide the work of all thematic working groups, and each sector strategy should be carefully reviewed to assess its compatibility with the environmental objectives.

Needs assessment

In a second step, the working group on environmental sustainability would oversee the preparation of a detailed needs assessment to quantify the human and financial resources needed to meet each environmental objective agreed to by the MDG planning group (Box 11). In many countries this needs-based approach will mark an important departure from current practice, which focuses primarily on the marginal expansion of services and investments, with little regard for medium- and long-term objectives. To the knowledge of the task force, no national MDG needs assessment has been conducted for the environment. Industrial countries and international organizations should offer technical assistance to developing countries that wish to carry out such assessments.

Box 11 **Women's voices** **in environmental** **issues**

Source:
Makhambetova 2002.

At a presentation prior to the WSSD, Zannath Makhambetova, a young woman leader of the NGO Aral Tinesee, a civil society group whose objective is to improve conditions of the Aral Sea watershed, told delegates about the role of women in the initiative: "The initiators, the organizers, were us, the women. In post-Soviet countries, it is the women who are more adaptable to new things. . . . I would like to recommend . . . that sustainable development projects should always work with women in key positions" (Makhambetova 2002).

Financing strategy

Investment needs in environmental sustainability are likely to be high. A viable financing strategy for achieving environmental sustainability is required in all countries but is currently lacking in most. This report recommends making more funding available by reallocating resources to the environment, increasing domestic resource mobilization, and raising levels of development assistance and private sector investment where needed (Box 12).

Monitoring

Tied to financing is another imperative: monitoring progress toward achieving environmental sustainability goals. Indicators of progress are needed at global, regional, and national levels. At the global level these indicators could be linked with the MDGs, the 2010 biodiversity targets, and other globally accepted goals. At the national level the indicators could be linked to the poverty reduction strategies developed for national and local actions. Countries must generate relevant data and develop indicators that help them frame and

Box 12
Economic principles applied to integrated water resources management in Colombia

Source:
 Economic Analysis Group,
 Ministry of Environment,
 Housing and Territorial
 Development,
 Colombia.

Sound water use is central to natural resource policies in many countries around the world. Economic instruments such as prices, taxes, subsidies, and tradable permits can motivate public and private decisionmakers to pursue objectives that are in the best interests of society.

Under a policy of integrated water resources management, the Ministry of Environment, Housing, and Territorial Development in Colombia has promoted the use of water abstraction charges and water pollution charges. These tools were introduced to rationalize decisionmaking in the production and service sectors and to encourage more efficient use of water, both in the amount used and the amount of pollutants entering the water system.

The water abstraction charges and water pollution charges are designed to generate enough funds to send economic signals to users; pay for water resources planning, administration, and control; and invest in improving water availability and reducing pollution. The charges are also expected to improve understanding of the state of water resources, including water demand and usage trends both nationally and regionally, and to contribute to the formulation and implementation of river basin management plans, while minimizing costs and maximizing environmental benefits.

Regional environmental authorities (Corporaciones Autónomas Regionales) are responsible for the application, billing, and collection of water charges, which are based on a minimum national charge adjusted for region-specific characteristics of water availability and quality.

implement policies and monitor policy success. Many countries need technical and financial assistance to build capacity in primary data collection, data processing and management, and development of integrated databases and information monitoring systems. Most countries do not systematically monitor key environmental parameters such as air and water quality, biodiversity, or land degradation, let alone develop indicators from these data for use by decisionmakers and the public. MDG-based poverty reduction strategies must identify the investments needed to collect data and develop and monitor indicators.

Regional and global mechanisms

While the task force has focused on the country scale, regional and global scales are also important. At the regional level, mechanisms for improved environmental management are neglected and must be strengthened to support country level, MDG-based poverty reduction strategies. Some challenges, such as climate change, fisheries decline, illegal trade in forest and wildlife products, and ozone depletion, can only be managed through global implementation mechanisms.

To address such issues, the task force recommends setting up a coordinating mechanism among conventions and agreements related to environmental sustainability, such as the Convention on Biological Diversity, the Convention to Combat Desertification, the United Nations Framework Convention on Climate Change, the Ramsar Convention on Wetlands, the

United Nations Convention on the Law of the Sea, and those on chemical issues, to develop joint programs to find synergies and identify tradeoffs among actions taken under these conventions. A periodic synthesis of the findings of international assessments, including the Millennium Ecosystem Assessment, Intergovernmental Panel on Climate Change, and International Assessment of Agricultural Science and Technology for Development, would likely reveal such synergies and tradeoffs.

Many international agreements have excellent work plans and long lists of priority actions. Yet few have been implemented. The task force believes that here again innovations in implementation may be useful and recommends that conventions focus on effectively supporting national interventions to stem environmental degradation, mostly by making scientific knowledge and operational best practices available. The task force recommends that conventions strengthen their operational expertise and scientific capacity and focus on the enforcement, implementation, and design of national programs.

Conclusion

Environmental challenges are both complex and unique. Many institutions must act in concert to respond to them, and proposed solutions must be adapted to regional and local conditions. For this reason, this report provides neither a blueprint for achieving Goal 7 nor quantitative targets for every problem. Rather, the task force offers recommendations for how to organize the process of integrating the principles of environmental sustainability into all



policies and management strategies. It draws as much attention to implementation challenges as to needed management actions and structural changes. Neither structural changes nor technical interventions will succeed unless strong support for these changes comes from national governments, nongovernmental organizations, an informed citizenry, and the larger, multilateral community.

The long-term success in meeting all of the Millennium Development Goals depends on environmental sustainability. Without it, gains will be transitory and inequitable. The paramount importance

and clear urgency of environmental sustainability dictates immediate actions at all scales – and the political, social, and financial will necessary to sustain those actions.

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The Millennium Development Goals, adopted at the UN Millennium Summit in 2000, are the world's targets for dramatically reducing extreme poverty in its many dimensions by 2015—income poverty, hunger, disease, exclusion, lack of infrastructure and shelter—while promoting gender equality, education, health, and environmental sustainability. These bold goals can be met in all parts of the world if nations follow through on their commitments to work together to meet them. Achieving the Millennium Development Goals offers the prospect of a more secure, just, and prosperous world for all.

The UN Millennium Project was commissioned by UN Secretary-General Kofi Annan to develop a practical plan of action

to meet the Millennium Development Goals. As an independent advisory body directed by Professor Jeffrey D. Sachs, the UN Millennium Project submitted its recommendations to the UN Secretary-General in January 2005.

The core of the UN Millennium Project's work has been carried out by 10 thematic task forces comprising more than 250 experts from around the world, including scientists, development practitioners, parliamentarians, policymakers, and representatives from civil society, UN agencies, the World Bank, the International Monetary Fund, and the private sector.

This report lays out the recommendations of the UN Millennium

Project Task Force on Environmental Sustainability. It identifies key environmental challenges, such as degradation of land, watersheds and marine fisheries; deforestation; pollution; and climate change. The task force proposes specific interventions and policy changes required to improve environmental management at the country, regional and international level. These bold yet practical approaches will help countries make progress toward environmental sustainability by 2015.

