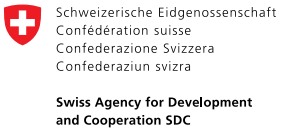
POVERTY, HEALTH, & ENVIRONMENT

Placing Environmental Health on Countries' Development Agendas

Poverty-Environment Partnership
Joint Agency Paper

This publication is a joint product of staff from Asian Development Bank, Austrian Development Agency, German Federal Ministry for Economic Cooperation and Development, Ministry of Foreign Affairs of Denmark, Department for International Development, European Commission, Finland Ministry of Foreign Affairs, International Institute for Environment and Development, Irish Aid, London School of Hygiene and Tropical Medicine, Norwegian Agency for Development Cooperation, Swedish International Development Cooperation Agency, Swiss Agency for Development and Cooperation, United Nations Development Programme, United Nations Environment Programme, Water Aid, World Bank, World Health Organization, and World Resources Institute, and while consultations have been considerable, the judgments do not necessarily reflect the views of their respective governing bodies, or where applicable, the countries they represent.



POVERTY, HEALTH, & ENVIRONMENT

Placing Environmental Health on Countries' Development Agendas

Poverty-Environment Partnership
Joint Agency Paper

June 2008

Cover Photo: World Bank, *Above:* Curt Carnemark

FOREWORD

Environmental risk factors play a role in more than 80 major diseases and injuries around the world. Diarrhea, lower respiratory infections, various forms of unintentional injuries, and malaria are largely the result of environmental risk factors. These are precisely the diseases that most affect the poor in the poorest countries. As the world's climate changes, these existing health impacts are expected to worsen, particularly for the poor and in developing countries.

However, despite its direct link with poverty reduction in most developing countries, environmental health is often a forgotten agenda. Why is this? This report tries to understand the answers to this question. It then moves forward with some suggestions on how public officials in planning or finance departments at the national, state, or city level can play a role in raising the profile of environmental health issues linked with poverty reduction efforts, as well as how nongovernmental agencies (NGOs) and bilateral and multilateral institutions can support them in their efforts.

As the climate changes and environmental health effects felt by the poor further intensify, we urge countries to respond to the challenges described in this paper. A concerted and continuous effort on the part of all of us is important to ensure that this important agenda is highlighted and implemented. We urge you to join us in this effort, which directly affects the health and quality of life of poor families, particularly of their women and young children.

Ursula Schaefer-Preuss
Vice President for Knowledge Management and Sustainable Development
Asian Development Bank (ADB)

Stefano Manservisi
Director-General of the DG Development and Relations with African, Caribbean and Pacific States
European Commission (EC)

Camilla Toulmin
Director
International Institute for Environment and Development (IIED)

Poul Engberg-Pedersen
Director General
Norwegian Agency for Development Cooperation (NORAD)

Kemal Dervis
Administrator
United Nations Development Programme (UNDP)

Katherine Sierra
Vice President for Sustainable Development
World Bank

Ambassador Brigitte Walchshofer-Öppinger
Managing Director
Austrian Development Agency (ADA)

Ritva Koukku-Ronde
Director General, Department for Development Policy
Finland Ministry of Foreign Affairs

Ronan Murphy
Director General
Irish Aid

Göran Holmqvist
Director General
Swedish International Development Cooperation Agency (SIDA)

Achim Steiner
Executive Director
United Nations Environment Programme (UNEP)

David L. Heymann
Assistant Director-General – Health Security and Environment
World Health Organization (WHO)

Ambassador Ib Peterson
State Secretary
Ministry of Foreign Affairs of Denmark (DANIDA)

Adolf Kloke-Lesch
Director-General, Global and sectoral policies
German Federal Ministry for Economic Cooperation and Development (BMZ)

Sir Andy Haines
Director
London School of Hygiene and Tropical Medicine (LSHTM)

Walter Fust
Director General
Swiss Agency for Development and Cooperation

Henry Northover
Head of Policy
Water Aid

Manish Bapna
Executive Vice President and Managing Director
World Resources Institute (WRI)

ACKNOWLEDGMENTS

This report has been prepared by a team consisting of: Peter Furu, Henning Nohr and Jan Reimer (Danida); Helen O'Connor (DFID); Simon Bibby, Sandy Cairncross, Chris Church, Nina Iszatt, Chris Pell and Carolyn Stephens (London School of Hygiene and Tropical Medicine); Anjali Acharya, Kulsum Ahmed, Maria Fernanda Garcia, Mikko Kalervo Paunio and Pia Rockhold (World Bank); and Carlos Dora, Eva Rehfuess, and Michaela Pfeiffer (World Health Organization).

The team benefited greatly from comments and suggestions by the following people: David McCauley (Asian Development Bank); Erwin Kuenzi (Austrian Development Agency); Douglas Sheil (CIFOR); Anne Marie Sloth Carlsen (Danish Ministry of Foreign Affairs); Palle Lindgaard-Jørgensen (DHI- Water & Environment); Simon Le-Grand (EC); Tara Shine (Irish Aid); Joshua Bishop, Sue A. Mainka (IUCN); François Droz (Swiss Agency for Development and Cooperation); Phil Dobie, Peter Hazlewood, Charles McNeill, and Paul Steele (UNDP); Jan Bojö, Peter Hawkins, Sunanda Kishore, Andreas Knapp, Pete Kolsky, Samuel Dawuna Mutono, Eduardo A. Perez, Ernesto Sánchez-Triana, Laura Tlaiye, and Kate Tulenko (World Bank).

The preparation of this paper has been funded by DFID, Danida, the World Bank and the Government of the Netherlands through the Bank-Netherlands Partnership program. Publishing and printing of this paper has been funded with contributions from Asian Development Bank and the World Bank. The translation, publishing and printing of the French version of this paper have been funded by the Swiss Agency for Development and Cooperation.

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS

ARI	Acute respiratory infection
CEA	Country Environmental Analysis
COPD	Chronic obstructive pulmonary disease
CRA	Comparative Risk Analysis
CSO	Civil society organizations
DALY	Disability-adjusted life years
DFID	Department for International Development
DHS	Demographic and Health Surveys
EH	Environmental health
EIA	Environmental impact assessment
GDP	Gross domestic product
GIS	Geographic information system
HELI	Health and Environment Linkages Initiative
HIA	Health impact assessment
HIPC	Highly Indebted Poor Countries
HLY	Healthy life years
IAP	Indoor air pollution
LSMS	Living Standard Measurement Surveys
MDG	Millennium Development Goals
MDGR	Millennium Development Goals Report
NDP	National Development Plans
NGO	Nongovernmental organization
OECD	Organisation for Economic Co-operation and Development
PEAP	Poverty eradication action plan
PEN	Poverty-environment nexus
PEP	Poverty Environment Partnership
PPA	Participatory poverty assessment
PRSP	Poverty Reduction Strategy Paper
PYLL	Potential years of life lost
SEA	Strategic Environment Assessment
SSP	Slum Sanitation Program
TSP	Total suspended particles
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
WHO	World Health Organization

Note: All dollars are U.S. dollars unless otherwise noted.

GLOSSARY

Acute	Occurring over a short time, usually a few minutes or hours. An acute exposure can result in short-term or long-term health effects. An acute effect happens within a short time after exposure.
Attributable risk	The amount of disease risk in the population that can attributed to a given risk factor
Biomass fuel	A renewable fuel derived from plants, animals or their byproducts. Biomass fuels include wood, dung, charcoal, and grain alcohol
Burden of disease	The total significance of disease for society beyond the immediate cost of treatment. It is measured in years of life lost to ill health as the difference between total life expectancy and disability-adjusted life expectancy.
Chronic	Occurring over a long period of time—several weeks, months, or years. Used to describe recurring symptoms or disease.
Climate change	Refers to the buildup of man-made gases in the atmosphere that trap the sun's heat, causing changes in weather patterns on a global scale. The effects include changes in rainfall patterns, sea-level rise, potential droughts, habitat loss, and heat stress. The greenhouse gases of most concern are carbon dioxide, methane, and nitrous oxides. If these gases in our atmosphere double, the earth could warm up by 1.5 to 4.5 degrees Celsius by the year 2050.
DALY	Disability-adjusted life year: A method of calculating the global or worldwide health impact of a disease or the global burden of disease (GBD) in terms of the reported or estimated cases of premature death, disability, and days of infirmity due to illness from a specific disease or condition.
Exposure	Radiation or pollutants that come into contact with the body and present a potential health threat. The most common routes of exposure are through the skin, mouth, or by inhalation.
Hazard	Something that could plausibly cause a risk (an increased probability) of disease.
Health outcome	Changes in health status (mortality and morbidity) that result from the provision or lack of provision of health (or other) services.
Hygiene	Practices, such as handwashing at key times, which help ensure cleanliness and good health.
Indoor air pollution	Chemical, physical, or biological contaminants in indoor air, principally from burning solid fuels for cooking and heating purposes.
Morbidity	Illness or disease. A morbidity rate for a certain illness is the number of people with that illness divided by the number of people in the population from which the illnesses were counted.
Mortality	Number of deaths or expected deaths in a population; the death rate
Risk	Possibility of injury, disease, or death
Respiratory tract	
Lower respiratory tract	The trachea and lungs
Upper respiratory tract	The mouth, nose, and throat
Risk factor	An agent that when present increases the probability of disorder expression. A risk factor can be due to environmental exposure.
Sanitation	Formulation and application of measures designed to protect public health or disposal of sewage.
Vector control	Any method to limit or eradicate the vectors of diseases such as malaria, dengue, etc, for which the pathogen (that is, virus or parasite) is transmitted by a vector. The vector can be mammals, birds or arthropods, especially insects, and mosquitoes.

EXECUTIVE SUMMARY

Environmental health matters greatly to those living in poverty. Recent opinion polls have found that poor income groups tend to mainly raise issues linked with clean air and water as national environmental concerns, suggesting that environmental health concerns directly affect their quality of life and therefore are a priority for them (World Bank 2006c, Miller 2004).

Official data provide a consistent message. Prüss-Üstün and Corvalán (2006) estimate that environmental risk factors currently play a role in more than 80 of the major diseases and injuries around the world. Africa and Asia (excluding China) are most affected by environmental health-related diseases. Furthermore, Prüss-Üstün and Corvalán (2006) estimate that 24 percent of the global disease burden and 23 percent of all deaths can be prevented through environmental interventions. On the whole, the impact of traditional hazards—that is, health risks that are a consequence of lack of access to clean water, inadequate sanitation, poor waste disposal, indoor air pollution, and vector-borne diseases such as malaria—is three times higher globally compared to modern hazards, which include urban air pollution and problems arising from industrial chemicals and wastes. The absolute impact of traditional risks is even larger in the poorest areas (Ezzati et al. 2004).

More than one-third of disease in children under the age of five years is caused by environmental exposures. The top killers of children under five are acute respiratory infections (from indoor air pollution), diarrheal diseases (mostly from poor water, sanitation and hygiene), and malaria (from inadequate environmental management and vector control) (Prüss-Üstün and Corvalán 2006). Strikingly, the mortality rate in children under five years of age from environmentally mediated disease conditions is 180 times higher in the poorest performing region, as compared with the rate in the best performing region (Prüss-Üstün and Corvalán 2006).

Emerging issues such as climate change will further increase poverty reduction challenges and the health burden as the IPCC predicts that the poor and most vulnerable will be hit the hardest (IPCC 2007). WHO notes that currently important health burdens, in particular, are likely to be worsened by climate change (Campbell-Lendrum et al. 2007), thus suggesting that children in poor countries are most likely to be affected.

There are several reasons why environmental health is an important concern for the poor (Cairncross and Kolsky 2003). Poor people often live in areas with the worst environmental conditions; they have lower resistance to infection; they pay more for environmental health services; and when they fall ill, they lose income and even their jobs. Better environmental health conditions go beyond directly improving health outcomes. Additional benefits often include saving time, lowering the cost of living, gender equality (security and dignity), increasing convenience through service provision (recycling, building latrines, etc.), and reducing the burden of daily life.

The main objectives of this report are:

1. To illustrate that—despite efforts to emphasize the importance of environmental health to poverty reduction and sustainable development in partner countries—there has been limited success in countries placing environmental health issues that matter to the poor high on their development agendas.

2. To provide practical guidance on how to raise the profile of environmental health issues important to the poor and integrate them more successfully in (a) national and local strategies and plans, and (b) development cooperation activities that support these strategies and plans.

This report is intended primarily for officials in finance and planning departments at the national, state, or city level in developing countries. It will also be of interest to various sector officials in national and local governments in developing countries, nongovernmental organizations (NGOs) and private sector representatives, and development agency staff and sector advisors in development cooperation agencies.

This report was produced by several bilateral and multilateral development agencies and NGOs with an interest in enhancing the quality of life of the poor through improvements in environmental health.

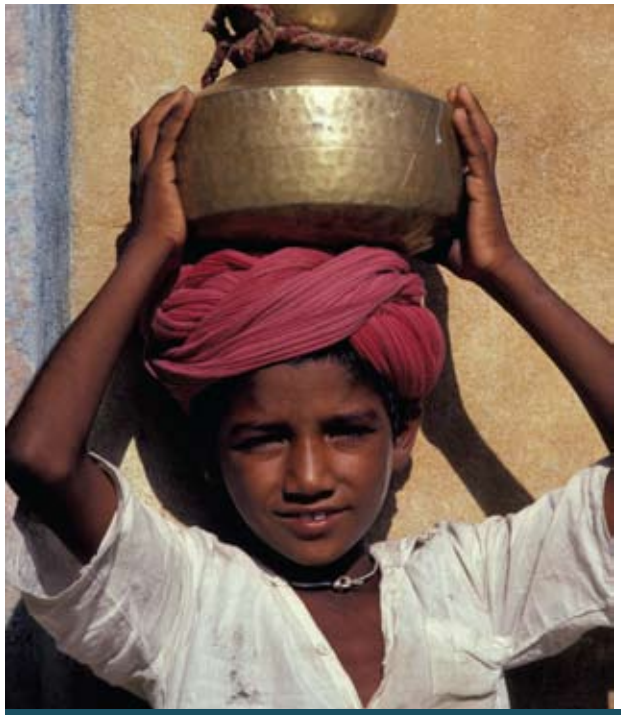


Photo: Ray Witlin

Photo: Tran Thi Hoa

Improving environmental health can help contribute to reducing poverty, both directly and indirectly. This is acknowledged in several Millennium Development Goals, including (a) Goal 4, which emphasizes reductions in child mortality; (b) Goal 6, which mentions combating HIV/AIDs, malaria, and other diseases; and (c) Goal 7, which emphasizes environmental sustainability. It also indirectly contributes to (a) eradicating extreme poverty and hunger, (b) achieving universal primary education, and (c) promoting gender equality.

Despite its importance for poverty reduction, environmental health issues that are important for the poor are rarely a high priority on the development agenda. A special report by UNDP assessed how countries are progressing on the MDG-7 target of environmental sustainability, and found low reporting of data on targets. Reviews undertaken by WHO and the World Bank have assessed how health broadly—and environmental health more specifically—has been addressed in Poverty Reduction Strategy Papers (PRSP), which are one key vehicle for countries to address poverty reduction and achieve the MDGs. Overall, the findings reveal some progress in the incorporation of environmental health issues within PRSPs. However, concerns remain that environmental health issues are not being systematically addressed within conventional health sector interventions, and that good practice examples, especially scaled up, are still scarce.

Why is this? A multitude of reasons potentially explain this lack of progress. First, environment is typically perceived as a global public good, rather than one that is also closely linked with the well-being of the poor. Many development agencies are trying to change this perception, but it is still widely held. So, as a result, issues that matter to the more well-off (and politically powerful groups) dominate. If there is an overlap between the environmental health issues that matter to both vulnerable and more powerful groups, action may often be vis-

ible, as is the case with urban air pollution in many large cities. Indoor air pollution, on the other hand, is closely related to access to cleaner fuels and therefore only impacts the poor. It is responsible for over 1.5 million deaths per year, significantly more than in the case of urban air pollution (WHO 2006), yet there has been less progress in placing this issue high on the development agenda.

Second, at a sectoral level, incentive structures in institutions are often not set up to place environmental health issues that matter to the poor high on the agenda. There are several reasons for this. First, environmental health is rarely placed on the agenda of many conventional health sector programs. This may be because, in order to address environmental health, both a preventive and a rapid treatment approach are important. This means that solutions arise from multiple sectors—such as water, sanitation and hygiene, energy, education, and health—rather than primarily one sector. Often, the roles and responsibilities of different agencies related to addressing public environmental health services are not well-defined, including who takes the lead in coordinating such efforts. Encouraging coordination and creating a sense of ownership and accountability are frequently big challenges. Second, actions to tackle environmental health issues often do not require large budgets at least initially, but do require continuous effort; however, capacity is often weak in developing countries. Third, the indicators available for measuring environmental health impacts are notoriously difficult to collect, and comprehensive data collection efforts—such a national demographic health surveys—may not include all the necessary information for decision making. For example, in the case of energy the survey may include questions on energy source, but not on pricing, connection fees, seasonal variation, or quantities of fuel and electricity consumed, among others (Sullivan and Barnes 2007). Thus results can be difficult to measure and disseminate, again leading to accountability challenges.

So how can poverty-related environmental health issues be placed on the development agenda? This report suggests a two-pronged strategy. The first relates to governments putting institutional mechanisms in place so that the environmental health priorities that matter to the poor can be constantly identified, acted upon, and monitored. The second relates to external actors—such as those in the Poverty-Environment Partnership—playing a role with respect to supporting governments in these efforts through utilizing existing financial and knowledge instruments to highlight environmental health issues that matter to the poor.

Within governments, environmental health issues that matter to the poor can be incorporated into development plans or poverty reduction strategies at the country level at different stages. The institutional process of preparing and implementing such plans varies greatly among developing countries, with differing types of governments, enabling environments, and circumstances. Therefore, rather than give specific recommendations, this report provides guidance on how environmental health may be incorporated at the different stages of the institutional process of preparing and implementing such development plans or poverty reduction strategies (see figure on page 6) and how external actors (development organizations, NGOs, universities, think tanks, and so on) can support them to do this.

Governments can include environmental health content in their development and poverty-reduction strategies by taking the following steps:

1. Analyzing the linkages between environmental health and poverty

2. Prioritizing environmental health issues within the larger poverty reduction objectives

3. Assessing the country's enabling environment specifically in terms of institutional mandates and related capacity, regulations, and budgets relating to environmental health

4. Selecting and ensuring adequate financing of environmental health interventions based on the above assessments

5. Monitoring process and outcome indicators to track progress and to learn and continuously improve policy design and implementation.

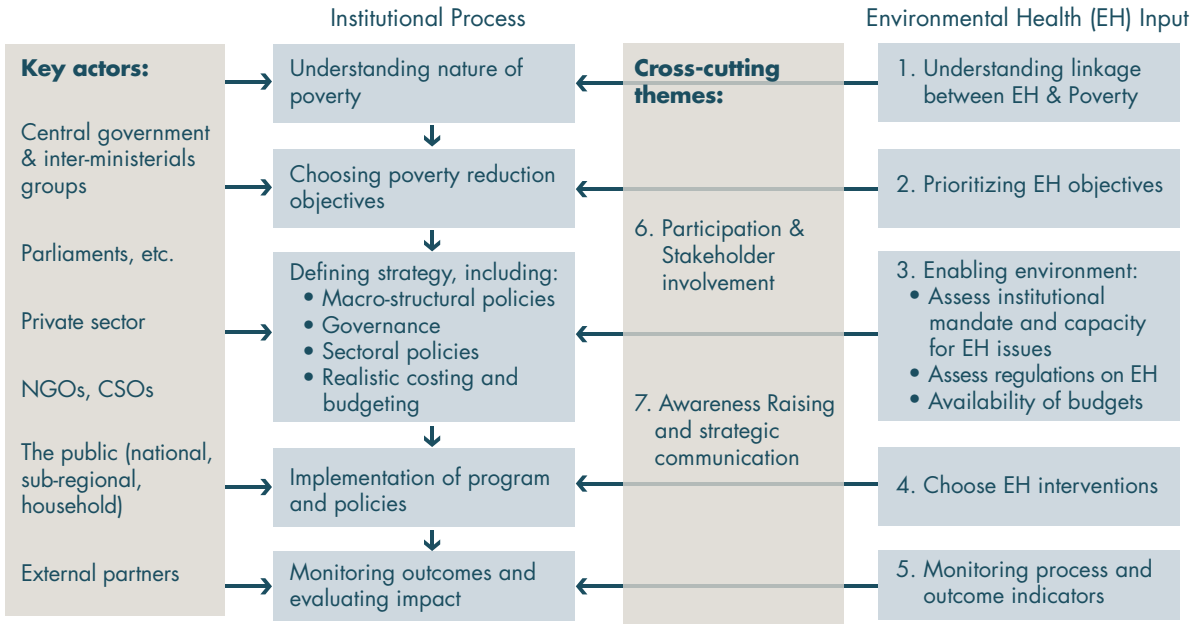
In addition to these direct inputs, environmental health interventions also benefit from cross-cutting issues that come into play through the entire process of preparing and implementing these plans, including:

6. Stakeholder involvement and participation that give voice and influence to weak and vulnerable stakeholders

7. Awareness raising and communication to help civil society hold governments accountable for continuous progress on this agenda.

At each of the first five stages, there are many tools that public officials can draw upon to help them incorporate environmental health into the planning and decision-making process, and the related monitoring system to evaluate progress. These tools include data gathering surveys (Census, DHS, LSMS); economic assessment methodologies (cost-benefit analysis, cost-of-degradation studies); environmental and health impact and institutional assessments (EIA, SEA, CEA, HIA); and participatory exercises (participatory assessment, beneficiary assessment).

Incorporating Environmental Health into Institutional Processes Aimed at Enhancing Development and Poverty Reduction



Source: Adapted from Klugman 2002 PRSP Sourcebook, World Bank 2005, Ahmed and Sánchez-Triana 2008.

Different steps can be carried out at different levels of government. Communication channels between local and national levels of government are also crucial to ensure that local information is translated into policy action, and equally that national policy can be implemented at the local level. In that regard, government departments—such as finance or planning at a national or state level or a mayor's office—are particularly well-suited to play a coordinating role and need to take a more active part in addressing this agenda.

Equally important are the creation of long-term constituencies within a country to help continually raise attention to environment-health-poverty issues and to promote social accountability among public officials for effective action on these issues (Ahmed and Sánchez-Triana 2008). These not only cut across the entire development planning and implementation cycle discussed above, but are also important from the perspective of enhancing results on environmental health issues by facilitating results on this agenda, as environmental health often requires both technology change as well as behavioral change to achieve improved environmental health outcomes.

In order to build constituencies, the first step is making poverty-related environmental health information available in order to raise awareness, both in terms of holding the state accountable but also to promote behavioral change within. Effective means of communicating this information and making people aware of how they can access the information is equally important. A second important step is involving the public in decision making. Encouraging participation of weak and vulnerable stakeholders is particularly important, so that all views are taken into account, rather than only the views of the more powerful and vocal stakeholders. A third step is providing access to justice for all citizens in order to promote social accountability among public officials. These three

aspects—namely public disclosure of information, public participation in decision making linked to these issues, and access to justice on environmental matters—are highlighted in Principle 10 of the Rio Declaration and more recently in the Aarhus Convention.

Clearly government, at both the national and local levels, has an important role to play in facilitating the formation of constituencies. However, the role of civil society organizations (CSOs) and other NGOs, as well as the private sector, is equally important in order to design effective solutions with affected stakeholders. Working through the media for effective communication and using the education system are two important ways to share information effectively and promote greater social accountability. Legal reforms that facilitate sharing of information, public participation, and ultimately recourse to justice are another important venue.

The Poverty Environment Partnership (PEP)—a network of multilateral and bilateral development partners as well as major NGOs—is well-positioned to help support governments in efforts to address environmental health issues. At a broad level, PEP members can make the case for linking environmental health and poverty reduction by highlighting the related economic case and evidence base. In addition, they can incorporate environmental health interventions into existing tools, programs, and investments to support governmental efforts to improve the quality of life of the poor.

There is an immediate need to tackle environmental health issues as part of all development plans or strategies that address poverty reduction. Problems such as unsafe water, sanitation, and poor hygiene; air pollution; and inadequate vector control are major contributors to the worldwide disease burden. Poor communities are disproportionately affected by these issues, which seem likely to worsen with climate variability and change. Ill-health resulting from these problems affects school attendance, incomes, and communities' efforts to improve their long-term quality of life. Progress on this important agenda and in the quality of life of the poor is essential for sustainable development.

Photo: Prabir Mallik

1. WHY IS ENVIRONMENTAL HEALTH IMPORTANT IN POVERTY REDUCTION?

Environmental health matters greatly to those living in poverty. In an opinion poll carried out in Colombia in 2004, 71 percent of low-income households placed environmental health as their top environmental priority, compared to only 30 percent of the highest income group. The poll also found that poor income groups tend to mainly raise issues linked with clean air and water as national environmental concerns, suggesting that environmental health concerns directly affect their quality of life and therefore are a priority for them (World Bank 2006c).

"A better life for me is to be healthy, peaceful and live in love without hunger. Love is more than anything. Money has no value in the absence of love."

– a poor older woman in Ethiopia

At a global level, a poll by GlobeScan Inc. found that public opinion in poor countries considered "very serious" environmental priorities to include shortage of freshwater, air pollution, automobile emissions, water pollution, and depletion of natural resources. All of these issues are related to environmental health. In contrast, public opinion in countries with high GDP considered the loss of rainforest and wilderness, water pollution, and depletion of natural resources as the most serious environmental issues (Miller 2004). Similar responses between low-income and high-income groups were found in Colombia (World Bank 2006c). For the poor, the main environmental concern was air pollution (74 percent), whereas for the rich it was poor management of global resources (78 percent). Environmental health clearly matters to the poorest and most vulnerable people and countries. In the context of increasing awareness of the local consequences of global issues (such as climate change) there is clearly an opportunity to link the two better.

Emerging issues such as climate change will increase challenges in poverty reduction. Projected changes in the incidence, frequency, intensity and duration of climate extremes (heat waves, heavy precipitation, and drought) will, for example, aggravate water scarcity in some countries; negatively affect public health, especially of the poor; and will pose a real threat to food security in many countries. The impacts of climate change will disproportionately affect the poor, particularly in sub-Saharan Africa.[1]

AUDIENCE AND OBJECTIVES

This report is the product of efforts of several bilateral and multilateral development agencies and NGOs with an interest in enhancing the quality of life of the poor through improvements in environmental health. It is written primarily for officials in finance and planning departments at the national, state, or municipal level in developing countries. It will also be of interest to other sector officials in national and local governments in developing countries, NGOs and private sector representatives, and development agency staff and sector advisors in development cooperation agencies.

The main objectives of the report are:

(a) To illustrate that—despite efforts to emphasize the importance of environmental health to poverty reduction and sustainable development in partner countries—there has been limited success in countries with placing environmental health issues that matter to the poor high on their development agendas; and

(b) To provide practical guidance on how to raise the profile of environmental health issues important to the poor and hence integrate them more successfully in (i) national and local strategies and plans, and (ii) development cooperation activities that support these strategies and plans.

The first chapter shows there is ample evidence that environmental health is important in poverty reduction. The second chapter goes on to describe the limited success of national efforts to prioritize environmental health in development agendas and the challenges associated with this. The third chapter describes the roles that officials in a planning or finance ministry can play to better integrate environmental health issues into national development plans and/or poverty reduction strategies. The roles described are also equally applicable at a subnational level; for example, within a planning department in a state or province or within a mayor's office in the context of city development planning. The fourth chapter then goes on to describe how government

Box 1. Environmental Health and Sustainable Development

WHAT IS ENVIRONMENTAL HEALTH? By adopting the principles of the Rio Declaration and Agenda 21 as a route to sustainable development in the 21st century, the world's leaders recognized the importance of investing in improvements to people's health and their environment. Health outcomes that are a result of environmental conditions are classified under the category of "environmental health." The World Health Organization (WHO) has defined environmental health as those "aspects of human health, including quality of life, that are determined by chemical, physical, biological, social and psychosocial factors in the environment."

In general, environmental health risks are grouped into two broad categories: **Traditional hazards** are closely linked with poverty. They refer to health risks that are a consequence of lack of access to clean water, inadequate sanitation, poor waste disposal, indoor air pollution and vector-borne diseases such as malaria. **Modern hazards** include urban air pollution and problems arising from industrial chemicals and wastes.

Source: Authors.

officials can work closely with other stakeholders, such as civil society organizations and the private sector, to build longer-term constituencies to place environmental health issues on the development and poverty reduction agenda. Finally, the last chapter describes how donors and NGOs can support government efforts on this agenda in the context of existing development aid.

WHY ENVIRONMENTAL HEALTH MATTERS

The World Health Organization (WHO), The United Nations Children's Fund (UNICEF), and many other agencies have comprehensively shown that tackling environmental health issues is important. Environmental risk factors play a role in more than 80 of the major diseases and injuries worldwide (Prüss-Üstün and Corvalán 2006). Developing countries disproportionately carry the environmental burden of disease, with the total number of healthy life years lost per capita as a result of environmental burden per capita being 15-times higher in developing countries than in developed countries (Prüss-Üstün and Corvalán 2006).[2] Diarrhea, lower respiratory infections, other unintentional injuries, and malaria are the diseases with the largest environmental contribution (Figure 1). Furthermore, Prüss-Üstün and Corvalán (2006) estimate that 24 percent of the global disease burden and 23 percent of all deaths can be attributed to environmental factors, which can be prevented through environmental modification (such as through provision of safe water, improved sanitation, and adequate hygiene).

Available global evidence suggests that (a) lack of access to clean water and sanitation[3] and (b) indoor air pollution are the two principal risk factors of illness and death, mainly affecting children and women in poor families. The impact of such environmental health risks on men and women is substantial when measured in millions of deaths and disability-adjusted life years (DALYs).[4] This underscores the need to design and implement environmental health interventions in poor countries to improve access to safe water, provide adequate sanitation, and improve air quality, both indoors and outdoors.

With 1.1 billion people lacking access to safe drinking water, and 2.6 billion without adequate sanitation, the magnitude of the water and sanitation problem remains significant (WHO/UNICEF 2005). Each year contaminated water and poor sanitation contribute toward the 5.4 billion cases of diarrhea worldwide per year and the 1.6 million deaths, mostly among children under the age of five (Hutton and Haller 2004). Intestinal worms—which thrive in poor sanitary conditions and in the poorest communities of the developing world—have infected 2 billion people and, depending upon the severity of the infection, may lead to malnutrition, anemia or retarded growth, and subsequently diminished school performance (Ivanov et al. 2004). About 6 million people are blind from trachoma, a disease caused by the lack of water combined with poor hygiene practices. A further 200 million people are infected with schistosomiasis; of these, 20 million suffer severe consequences (UNICEF 2006). The most affected are the populations in developing countries living in extreme conditions of poverty, either in urban slums or peri-urban or rural areas.

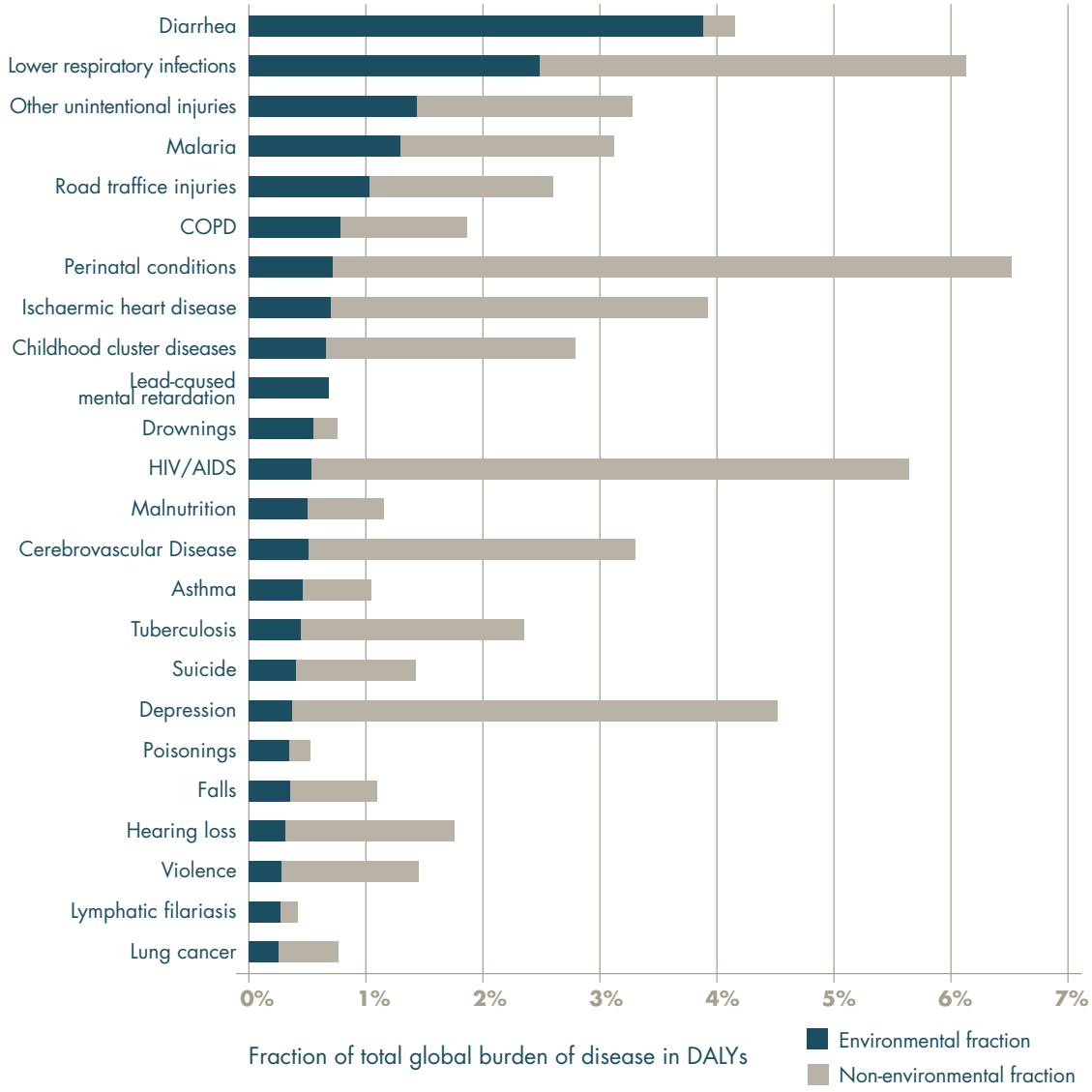
Indoor air pollution—a much less publicized source of poor health—is responsible for over 1.5 million deaths from respiratory infection per year and for 2.7 percent of the global burden of disease (WHO 2006). In developing countries, indoor air pollution is largely attributed to smoking and the use of biomass for cooking. It is estimated

that half of the world's population use solid fuels (biomass and coal) for household cooking and space heating, mainly in developing countries (Rehfuess et al. 2006). The burden of poor environmental health falls on the most vulnerable of the poor, mainly children under the age of five, women, and the disabled and elderly. As many as half of the deaths attributable to indoor use of solid fuel are of children under the age of five years (Smith et al. 2004). In the 21 worst-affected countries, most of them located in sub-Saharan Africa, approximately 5 percent or more of the total burden of disease is caused by indoor air pollution. In 11 countries—Afghanistan, Angola, Bangladesh, Burkina Faso, China, the Democratic Republic of the Congo, Ethiopia, India, Nigeria, Pakistan, and the United Republic of Tanzania—indoor air pollution is responsible for a total of 1.2 million deaths a year (WHO 2007b). Generally, men suffer more from outdoor air pollution. Women are exposed more to indoor air pollution, since they traditionally spend more time indoors and near the stove. By far the greatest burden of disease falls on children under the age of five (Smith et al. 2004); they are especially susceptible to environmental risks when both risk factors are considered (Ezzati et al. 2004).

ENVIRONMENTAL HEALTH AND MALNUTRITION LINKAGES

Recent studies show that contrary to the popular myth, malnutrition is not only the result of lack of food intake, but more often a consequence of bad sanitation and repeated infections (World Bank 2006d). Environmental health risks such as inadequate water, poor sanitation, and improper hygiene practices affect children's health through diarrheal diseases and (indirectly) through malnutrition. This in turn affects future cognitive learning and productivity.

Figure 1. Diseases with the Largest Environmental Contribution



Source: Prüss-Üstün and Corvalán 2006.

In large populous areas in South Asia and sub-Saharan Africa with high rates of malnutrition, there are also severe environmental health problems. Given the linkages among environmental health, malnutrition, and disease, WHO in 2007 recalculated the burden of disease estimates, taking into account the indirect (through malnutrition) health risks associated with inadequate water and sanitation provisions and improper hygienic practices (Fewtrell and Prüss-Üstün et al. 2007). WHO estimates that almost 7 percent of the total burden of disease is attributable to inadequate water supply, sanitation, and hygiene when considering the direct and indirect linkages through malnutrition (Fewtrell et al. 2007). A forthcoming study builds on this analysis to assess the economic costs of environmental health risks (including those through malnutrition) at a country level. These linkages between environmental health and malnutrition have important implications for child survival strategies in developing countries (World Bank 2008).

ENVIRONMENTAL HEALTH AND POVERTY

This section first explores the concept of poverty and then relates poverty to environmental health. The burden of disease due to environmental factors is highest in the poorest countries and to the poorest people within those countries. Building on previous PEP papers on poverty reduction and the environment (DFID, EC, UNDP and World Bank 2002 and ADB, CIDA, DANIDA, EC, GTZ, Irish Aid, IUCN, SEI, Sida, SIWI, SDC, UNDP, UNEP, and WHO 2006), this paper postulates that poverty needs to be understood as a complex and multidimensional process in which environmental health can contribute to reducing different dimensions of poverty. The UN (2005:ii) refers to "extreme poverty in its many dimensions—income poverty, hunger, disease, lack of adequate shelter and exclusion—while promoting gender equality, education and environmental sustainability relates to…basic human rights—the right of each person on the planet to health." The PEP poverty reduction framework (DFID, EC, UNDP, and World Bank 2002) is based on four key factors that need to be addressed in any poverty reduction strategy:

- Enhanced livelihood security: the ability of the poor to use their assets and capabilities to make living conditions of greater security and sustainability.
- Reduced health risks: the mitigation of factors that put the poor and most vulnerable (especially women and children) at risk from different diseases, disabilities, poor nutrition, and untimely death.
- Reduced vulnerability: the reduction of threats from environmental, economic, and political hazards, including the impact of both sudden shocks and long-term adverse trends.
- Pro-poor economic growth: enhanced economic growth is essential for poverty reduction in most parts of the world, but the quality of growth, and in particular the extent to which it creates new opportunities for the poor, also matters.

Cairncross and Kolsky (2003) highlight several reasons why environmental health is important to the poor and can have an impact on poverty reduction. They include the following:

- Poor people live in areas with the worst environmental conditions.
- The burden of environmental disease falls more harshly on the poor. The poor are more vulnerable and exposed to environmental disease and have lower resistance to infection. Interventions in environmental health would reduce health risks.

"The waste brings some bugs; here we have cockroaches, spiders and even snakes and scorpions."

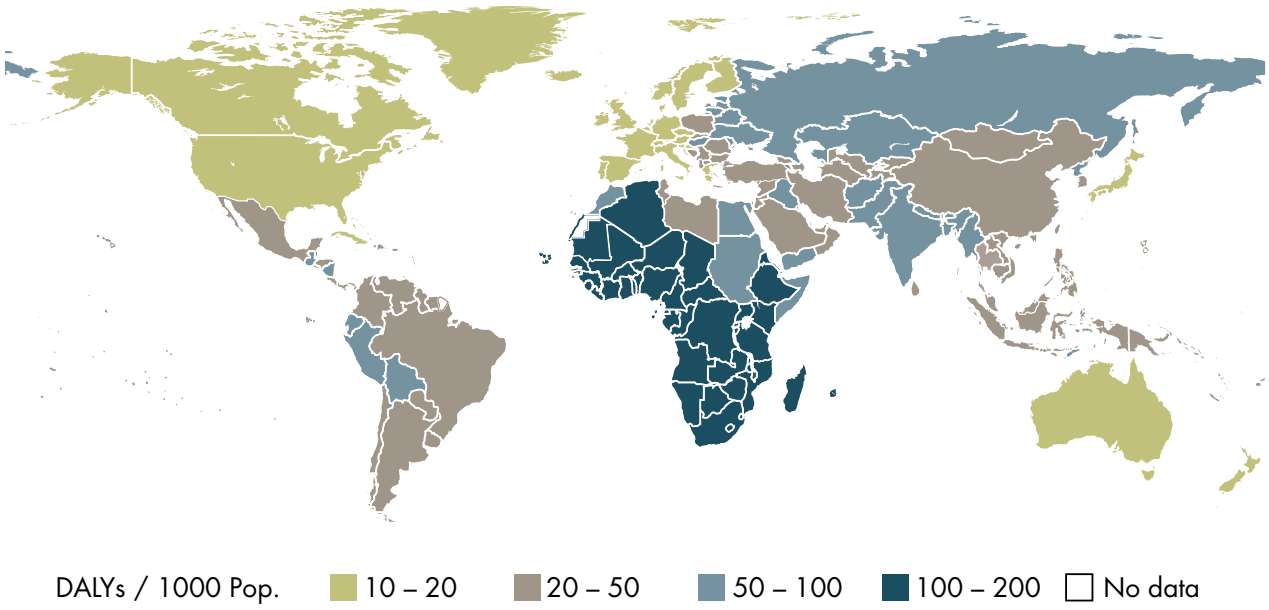
– Nova California, Brazil

- The poor often pay proportionately more for environmental health services. Many people in low-income areas buy their water from vendors, who sell it for 10 to 20 times more than the official water tariff charged to people with house connections. For example, better access to water would enhance livelihood security as they will have more income.
- Disease contributes to poverty. When the poor fall ill, they lose income and even their jobs. Children with intestinal worms may be stunted in their growth or impaired in their intellectual performance. Improving environmental health would also reduce vulnerability. For example, a hygienic environment and adequate sanitation are key factors related to reducing opportunistic infections associated with HIV/AIDS, and to the quality of life of people living with the disease. Improved sanitation and hygiene also helps to reduce the burden on households caring for AIDS-affected family members.
- Better environmental health conditions go beyond health outcomes. The main benefits often include (a) saving time, (b) lowering the cost of living, (c) increasing gender equality (security and dignity), (d) increasing convenience through service provision (recycling, building latrines, etc), and (e) reducing the burden of daily life. These benefits contribute toward better health and indirectly to improved productivity and economic growth.

Regionally, environmental health affects the poor in Sub-Saharan Africa and South Asia the most. As Figure 2 shows, the poorest countries in these subregions have the highest environmental disease burden, measured as DALYs (also see Figure 3). In 2002, sub-Saharan Africa, with only 10 percent of the global population, accounted for 24 percent of the entire global burden of disease (DALYs) and for 29 percent of the world's environmental burden of disease (Prüss-Üstün and Corvalán 2006). Children under five years of age are disproportionably exposed to and affected by health risks from environmental hazards. In large populous areas in South Asia and sub-Saharan Africa, where environmental health problems are especially severe, malnutrition in young children is also rampant. In low-income countries, more than 147 million children under the age of five remain chronically undernourished or stunted, and more than 126 million are underweight (World Bank 2006d, Svedberg 2006, Fewtrell et al. 2007)

A Poverty-Environment Nexus (PEN) study on Cambodia, Lao PDR, and Vietnam found that a shared feature of the three countries is that poverty and environment issues fall into one of two broad categories: environmental health and natural resource use (World Bank 2006).[5] The most important aspects of environmental health are the effects of inadequate water supply and sanitation in rural and urban areas; air and water pollution from industrial activities in cities, towns, and villages; indoor air pollution, especially in the upland areas of Lao PDR and Cambodia; and occupational hazards of pesticide use in agriculture (World Bank 2006).[6] Another of the study's main findings was that even when the poor were as aware as the nonpoor were of pollution risks, their communities did not have the capacity or local institutions to access services or minimize risks.

Figure 2. Environmental Disease Burden (DALYs per 1,000 people)



Source: Prüss-Üstün and Corvalán 2006.

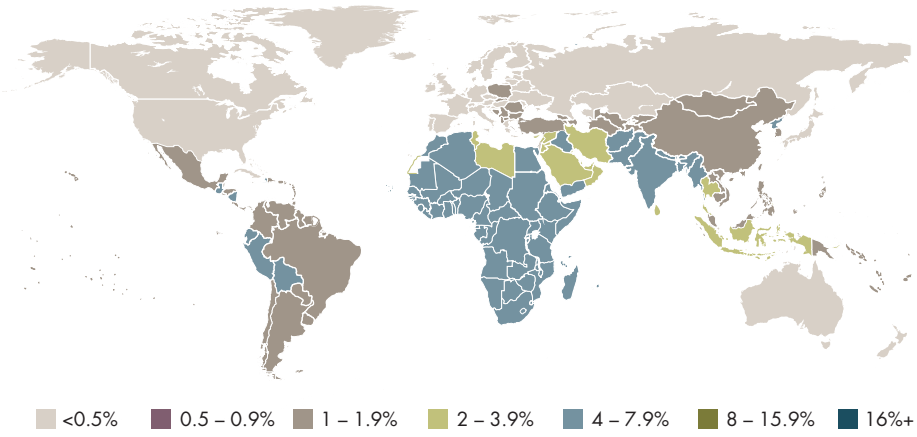
CITIES AND URBAN SLUMS

By 2030, it is estimated that urbanization in poor countries will result in more than 60 million new urban inhabitants annually. The United Nations estimates that nearly all of the population growth in the coming generation will be in cities in low- and middle-income countries. Asia and Africa, the most rural continents today, are projected to double their urban populations from 1.7 billion in 2000 to about 3.4 billion in 2030.[7]

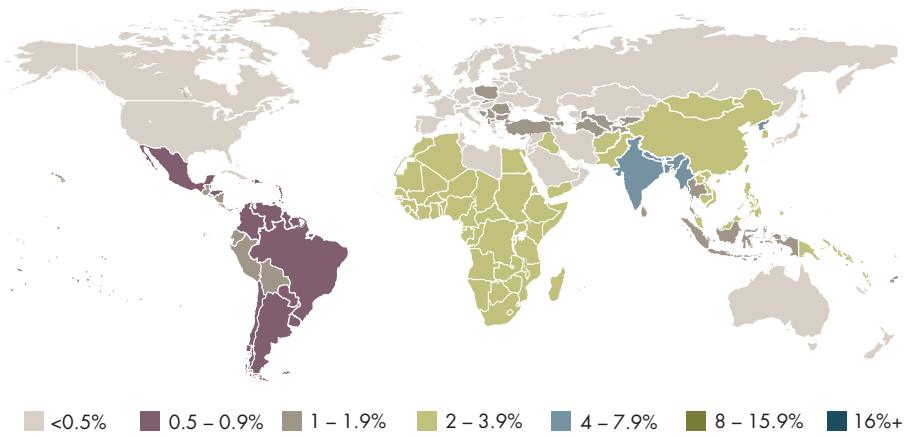
Physical locations where multiple poverty-environment-health linkages overlap are a particular challenge, such as in slums. Very soon and for the first time, the world's urban population will be equal to the world's rural population, with a large percentage of city dwellers living in slums (Lee 2007).[8] Asia has the largest number of slum dwellers overall with 581 million, while sub-Saharan Africa has the largest percentage (about 71 percent) of its urban population living in slums (United Nations Centre for Human Settlements Programme 2006). The urban poor living in slums are exposed to multiple environment health risks,

Figure 3. Burden of Disease Attributable to Childhood and Maternal Undernutrition (Proportion of DALYs attributable to selected risk factors)

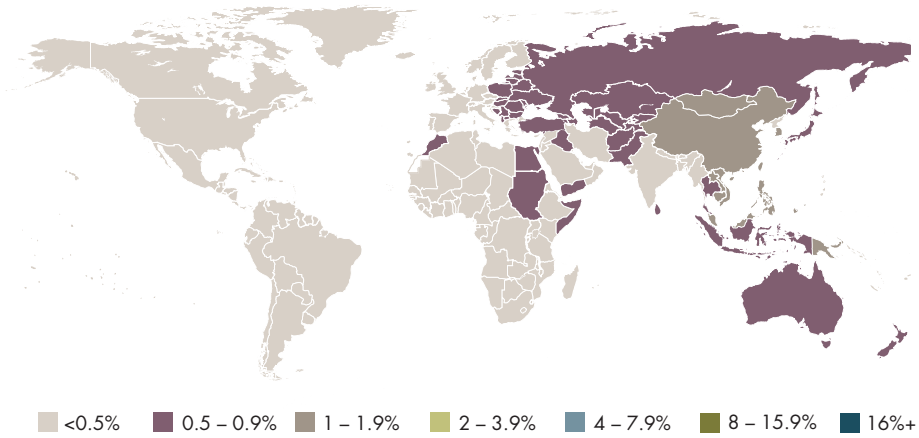
A. Unsafe water



B. Indoor smoke from solid fuels



C. Urban air pollution



Note: The values presented here are averages by subregion; variations occur within these subregions but are not shown here. For an explanation of subregions see the List of Member States by WHO Region and mortality stratum.

Source: WHO 2002.

including poor ventilation and inefficient cooking stoves, lack of access to water and sanitation, poor housing structures and construction, dirt floors, overcrowding, and poor and unsafe access to transport (Parkinson 2007).

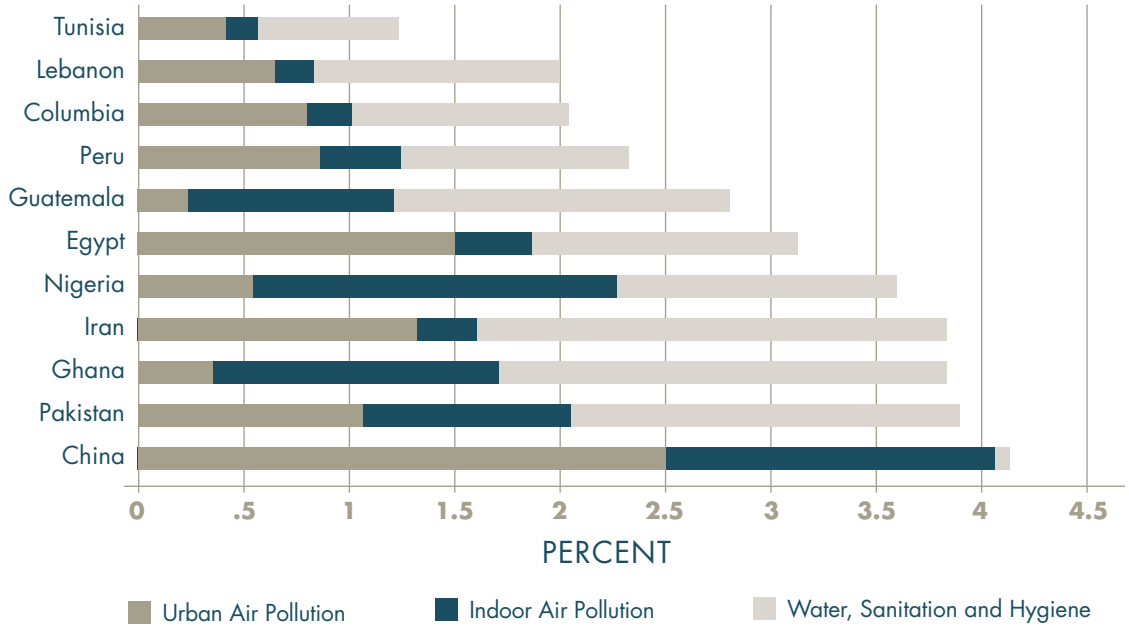
Rapid urbanization and the uncontrolled growth of urban slums are now creating a double environmental health burden for the urban poor. They are exposed not only to risks from indoor air pollution, crowding, and poor access to water and sanitation (generally linked with rural populations), but also to modern risks associated with transport and industrial pollution (Satterthwaite 2007). In some parts of the world, malaria (and dengue) is increasingly becoming an urban issue (Breman et al. 2004), which will be further exacerbated by the effects of climate change (Campbell-Lendrum et al. 2007).

Environmental health is increasingly an urban issue. The concentration of population in cities is an opportunity to provide access to services and hence dramatically improve health outcomes in a cost-effective and rapid manner. Conversely, ignoring the growing slum settlements—with dismal environmental conditions and almost negligent access to environmental services—can derail attempts by city governments to provide healthy environments and improve health outcomes.

ENVIRONMENTAL HEALTH AND ECONOMIC GROWTH

Economic growth is essential if poverty is to be reduced and welfare is to be improved. However, in order to realize the full impact of economic growth on poverty reduction, reducing inequity is essential (World Bank 2006b).[9] Reducing environmental risks through investment and other means can improve the health of current and future generations and help alleviate inequities

Figure 4. Economic burden associated with poor environmental health (as percentage of GDP)



Notes: economic burden includes the burden from mortality, morbidity and cost of illness; morbidity is usually valued using the "human capital value" approach; adult mortality is valued averaging the "value of a statistical life" approach and "human capital value" approach; with the exception of Iran, China and Nigeria, child mortality is valued using human capital value only; with the exception of China, "value of a statistical life" is obtained through benefit transfer of international studies; WSH mortality is estimated only for children; WSH in China excludes lack of sanitation and hygiene costs.

Sources: Lebanon and Tunisia (Sarraf, Maria, Björn Larsen, and Marwan Owaygen. 2004 "Cost of Environmental Degradation: The Case of Lebanon and Tunisia." Environment Department Papers. World Bank: Washington, D.C.); Columbia, Ghana, Guatemala, Nigeria, Pakistan, Peru (Country Environmental Analysis); Egypt (World Bank. 2002. "Arab Republic of Egypt: Cost Assessment of Environmental Degradation." Sector Note. Report 25175-EGT. Washington, D.C.), Iran (World Bank. 2005. "Iran, Islami Republic of: Cost Assessment of Environmental Degradation." Sector Note. Report 32043-IR. Washington, D.C.); China (World Bank 2007. "Cost of Pollution in China: Economic Estimates of Physical Damages", World Bank: Washington, D.C.).

Photo: Masaru Goto

Economic growth is inextricably linked with the productivity and performance of a nation's people. This productivity is often constrained by poor environmental health conditions—resulting in illness and consequently lost earnings, and increased medical costs. This economic burden on society placed by poor environmental health can be quantified at the national level as a percentage of Gross Domestic Product (GDP) (Figure 4). For example, the estimated annual costs of environmental damage in Colombia (including water, sanitation and hygiene, urban air pollution, indoor air pollution, agricultural land degradation, and natural disasters) amounts to more than 3.7 percent of GDP per year (World Bank 2006c). Two important categories contributing to this measure are inadequate water supply, sanitation, and hygiene; and outdoor and indoor air pollution. Similarly, the annual losses associated with mortality and morbidity from air pollution alone in India and China range between 2 and 3 percent of each country's GDP. Figure 4 illustrates that environmental degradation threatens economic growth, accounting for economic losses equivalent to between 2 and 4 percent of GDP, and these costs are felt most severely by the poor. In some cases in South Asia and sub-Saharan Africa, when the impacts of environmental health and malnutrition-related linkages are further factored in, these damage costs increase significantly to almost 9 percent of a country's GDP (World Bank 2008).

Diseases and ill-health can constrain economic growth and impact the productivity of a country's working population. It has been estimated that malaria can reduce economic growth by more than 1 percent a year in highly endemic countries (World Bank undated). Furthermore, the perceived risk of infection has been shown to negatively affect investment, trade, and crop choice decisions. This imposes long-term costs by slowing economic growth and widens the gap between these countries and the rest of the world (Teklehaimanot et al. 2005).

Poor environmental health is also directly linked to human capital deficits that affect both present and future productivity. Children under five—facing over 40 percent of the global environmental burden of disease—are especially impacted by the cognition and learning impacts of environmental risk factors. An estimated 200 million children under the age of five fail to reach their potential in cognitive development because of poverty, poor environmental health and nutrition, and inadequate care. Additionally, repeated illness combined with cognition impacts also results in poorer educational performance in school-age children (Alderman et al. 2006). The UN Subcommittee on Nutrition reported increasing evidence to support an association between widespread iron deficiency, iodine deficiency, and helminth infection and poor school performance (Hunt and Peralta 2003). This failure of children to achieve satisfactory educational levels then impacts future work productivity, and plays an important part in the intergenerational transmission of poverty (Grantham-McGregor et al. 2007).

Healthy populations are more productive populations. Without a healthy and productive labor force, the economic growth that is necessary to break out of the cycle of poverty will not be achieved. Improving environmental health will contribute to the MDG targets and promote sustainable and responsible growth, as is explored in a later section.

CLIMATE CHANGE AND IMPACTS ON THE POOR

The poorest countries are often the ones that are most threatened by the degradation of the regional and global environmental commons. The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (2007) projected the impacts of future changes in climate by mid-century, including changes in freshwater availability, crop productivity, ecosystem structure and function, sea-level rise, and health. Specifically, the IPCC report notes that poor communities will be especially vulnerable due to their low adaptive capacity and their dependence on climate-sensitive resources, such as food and water. The IPCC report also notes that the health status of millions of people, especially those with low adaptive capacity, is likely to be adversely affected. This will be manifested by increased deaths, diseases, and injuries from extreme weather events (for example, floods, heat waves, and storms); an increased burden of diarrheal diseases; and an altered distribution of some infectious disease vectors.

A recently published article in the WHO *Bulletin* (Campbell-Lendrum et al. 2007) points out that currently important health burdens, in particular, are likely to be worsened by climate change. From both local and global perspectives, scaling up preventive environmental health interventions (such as clean water and sanitation services) to reduce the current burden of disease are wise investments as well as good "no-regrets" strategies. The authors also note that adaptation

to climate change is "essentially a matter of basic public health protection" and point to the need to refocus political and financial commitments to strengthen environmental management, surveillance, and response to safeguard health from natural disasters and changes in infectious disease patterns, and a more pro-active approach to ensure that development decisions serve the ultimate goal of improving human health.

TARGETING POVERTY REDUCTION

The Millennium Development Goals are a set of development targets endorsed by the international community that focus on halving poverty and improving the welfare of the world's poorest by 2015. The MDGs have become the driving force in establishing development targets and measuring outcomes.

Recognition that improving environmental health issues can directly help to contribute to reducing poverty is recognized in several MDGs. These include (a) reducing child mortality (MDG 4), (b) combating HIV/AIDs, malaria, and other diseases (MDG 6), and (c) ensuring environmental sustainability (MDG 7). It also indirectly contributes to (a) eradicating extreme poverty and hunger, (b) achieving universal primary education, and (c) promoting gender equality. Table 1 illustrates how each MDG goal has an environmental health element, which if addressed can help achieve the goal.

Photo: Curt Carnemark

Table 1. MDGs and Environmental Health

MDGs GOAL	EH DETERMINANT	EH INTERVENTION
GOAL 1: Eradicate extreme poverty and hunger	• Water resources management practices • Expenses incurred for informal sector delivery of water, and sanitation services; as well as costs of medical treatment imposes burden on family budgets (include for food)	• Improved hygiene and sanitation
GOAL 2: Achieve universal primary education	• Availability to water & energy sources • Hours spent gathering water or fuel • Unstable management of natural resources, including water & forests.	• Providing safe drinking water and latrines at school, taking gender into account • Access to improved sources of drinking water and cleaner household energy sources, saving time children spend collecting water/fuel.
GOAL 3: Promote gender equality and empower women	• Women disproportionately suffer from: (a) exposure to smoke from use of biomass for cooking, (b) drudgery and inconvenience from poor access to water, and (c) privacy and dignity issues relating to inadequate sanitation facilities • School attendance impacted by poor sanitation facilities	• Access to improved drinking water sources • Better sanitation facilities for both boys and girls • Cleaner household energy sources
GOAL 4: Reduce child mortality	• Leading causes of child mortality include diarrhea, acute respiratory infections, and malaria • Indoor air pollution impacts young children (immediate exposure) • Sickness and deaths from inadequate hygiene, water supply, and sanitation	• Cleaner household energy sources • Improved access to clean water; proper feces disposal, better sanitation. • Improved hygiene practices (including handwashing with soap) • Promote use of insecticide treated bed nets (ITNs); indoor residual spraying (IRS)
GOAL 5: Improve maternal health	• Poor delivery and birthing outcomes from inadequate hygiene, and availability of clean water • Malaria and helminthes affect pregnant women and can lead to malnutrition in child	• Safe water and sanitation • Proper hygiene practices during delivery
GOAL 6: Combat HIV/AIDs, malaria and other diseases	• HIV-infected have very special environmental health needs • Environmental conditions related to mosquito breeding, e.g. irrigation, poor drainage and stagnant water etc. • Inadequate water resources management practices	• Safe water and sanitation • Proper agricultural practices (intermittent irrigation, crop rotation, etc.); • Promote use of ITNs; IRS • Proper drainage
GOAL 7: Ensure env. sustainability Increase access to safe drinking water Increase access to sanitation Achieve improvements in slums	• Poor access to water & sanitation • Slum dwellers face dismal living conditions, congested settlements, and poor access to environmental services	• Improve access to improved sources of drinking water, sanitation, and hygiene • Improve quality of life among the urban poor through targeted slum upgrading projects
GOAL 8: Develop a global partnership for development	• Lack of multisectoral coordination on environmental health issues—both horizontal and vertical links needed	• Develop holistic, multisectoral approach with the coordination of multilateral, bilateral, national, and local institutions to implement them. • Develop global partnerships

Source: Cairncross et al. 2003, Prüss-Üstün and Corvalán 2006.

In order to address the MDG targets, countries are encouraged to report annually on progress made in the form of Millennium Development Goals Reports (MDGRs). These reports set country-specific targets and indicators and report on global targets and indicators so that they can integrate them into national planning and budgeting. Countries also develop different strategies and plans. For example, for low-income countries to qualify for concessional loans through the Poverty Reduction Growth Facility or to access debt relief under the Highly Indebted Poor Countries (HIPC) initiative, they must prepare Poverty Reduction Strategy Papers (PRSPs) (Klugman 2002). These documents are prepared by countries as a means of integrating sectoral priorities and poverty alleviation initiatives into a larger macroeconomic framework of development. The PRSPs have also to a large extent developed into a common strategic framework for supporting poverty alleviation programs by international donors and organizations.

All of the above instruments look toward targets, strategies, and plans for poverty reduction and sustainable development. However, they address environmental health issues in varying degrees and agree that reporting on environmental health issues is lagging. The next chapter assesses the extent to which environmental health issues are highlighted in these reports.

Links to initiatives and further information:

WHO: Health and Environment Linkages Initiative: http://www.who.int/heli/en/

Ecosystem Approaches to Human Health: http://www.idrc.ca/ecohealth/ev-68488-201-1-DO_TOPIC.html

DPSEEA model of health-environment interlinks: http://www.euro.who.int/EHindicators/Indicators/20030527_2

WHO: Health and MDGs: http://www.who.int/mdg/publications/MDG_Report_08_2005.pdf

WHO: "Preventing disease through healthy environments: towards an estimate of the environmental burden of disease": http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf

WHO: "Ecosystems & Human Wellbeing: Health Synthesis": http://www.who.int/globalchange/ecosys.pdf

WHO: "Climate change strategy, implications for international public health policy": http://www.who.int/bulletin/volumes/85/3/06-039503.pdf

WHO: "Water, Sanitation, and Health.": http://www.who.int/water_sanitation_health/publications/en/index.html

World Bank: Environmental health: http://go.worldbank.org/N81RJ0LX00

1. For more information on the effect of climate change on poverty please see: *Poverty and Climate Change: Reducing the vulnerability of the Poor through Adaptation:* http://www.oecd.org/dataoecd/60/27/2502872.pdf
2. Total number of healthy life years (HLY) lost refers to health expectancy, that it to say it combines information on mortality and morbidity and partitions the total years lived at any age into those spent in different "health" states.
3. The linkages between improved water management and poverty reduction have been made by a previous PEP paper: *Linking poverty reduction and water management.*
4. This is a health gap measure that extends the concept of years of life lost due to premature death to include equivalent years of healthy life lost due to poor health or disability (http://www.who.int/healthinfo/boddaly/en/).
5. This study looks at sustainable approaches to poverty reduction in Cambodia, Lao PDR, and Vietnam, placing particular attention on environmental health issues and poverty through a distributional analysis.
6. This is a finding consistent with global findings; see DFID, EC, UNDP, and World Bank (2002) and the World Bank (2003).
7. United Nations Population Division. 2005. World Urbanization Prospects: The 2005 Revision Population Database. New York: United Nations Population Division.
8. The United Nations Global Report on Human Settlements (2003) estimated that almost one-third of the world's urban population (or approximately 924 million) lived in slums in 2001.
9. The 2006 World Development Report (World Bank 2006b) notes that equity, defined primarily as equality of opportunity among people, is doubly good for poverty reduction since it tends to favor sustained overall development and delivers increased opportunities to the poorest groups in a society.
10. These reviews are intended to be indicative of how environmental health issues are being integrated into development planning processes, particularly in the absence of broader reviews of national sustainable development plans.
11. For more information see: http://www.unmillenniumproject.org/reports/reports2.htm
12. This is discussed further in Chapter 3.

Photo: Eric Miller

2. TAKING STOCK OF ENVIRONMENTAL HEALTH IN POVERTY REDUCTION GOALS, TARGETS, AND STRATEGIES

Poverty Reduction Strategy Papers (PRSPs) for low-income countries and National Development Plans for middle-income countries are good entry points for dialogue and cooperation between and across agencies because poverty reduction strategies allow for, if not require cross-sectoral cooperation. National Development Plans and PRSPs allow countries to plan strategies and interventions to achieve development outcomes.

A special report by UNDP (2006) assessed how countries are progressing on environmental sustainability and found low reporting and incomplete data on targets relating to access to water and sanitation, among others. WHO and the World Bank reported similar results in assessing PRSPs in terms of how health broadly—and environmental health more specifically—has been addressed. National development plans have not been subjected to cross-country systematic analysis on environmental health issues. They can, however, be assessed at the country level in order to see to what degree they have incorporated environmental health as a development priority.

This section of the paper addresses how environmental sustainability has been addressed in MDGRs (UNDP 2006), how health has been incorporated into PRSPs (WHO 2004), and how environmental health issues have been dealt with in PRSPs (Kishore 2006).[10]

WHAT DO WE FIND IN MILLENNIUM DEVELOPMENT GOAL REPORTS (MDGRS)?

UNDP (2006) assessed the progress made on environmental sustainability from a review of MDG country experiences. Reporting on environmental sustainability (MDG-7) is low. Of the 158 countries that had submitted MDGRs as of November 2005, 54 percent have set at least one country-specific environmental target for achieving MDG-7. Through the Millennium Project's Task Force, UNDP also monitors results for each goal.[11]

UNDP found that indicators related to water (138 countries) and forests (133 countries) have the highest rates of reporting. Over half of the countries use the indicators on access to sanitation (116 countries) and carbon dioxide and ozone-depleting substance emissions (98 countries). However, only 72 countries report on energy use, 48 countries on solid fuel indicators, and 47 countries on slums. Africa is the continent where an indicator on slums is most addressed.

In many countries, monitoring MDG-7 progress has been more difficult. The report found that reporting on MDG-7 progress appears to be hindered by a real or perceived lack of data.[12] Apart from access to water, less than half of the countries report sufficient data for monitoring progress. The causal link between environment and poverty is not well-articulated, although primary links are made to health issues (MDG-6), where water contamination and air pollution are presented as risks to human health. Figure 5 illustrates improvement in sanitation and water access and use of solid fuels.

Photo: Curt Carnemark

The lack of progress toward environmental sustainability (MDG-7) is attributed to weak political will, pressure on environmental resources from high land use and natural disasters, insufficient governance and planning policies, social unrest, and inadequate financial resources. One of the main challenges mentioned in UNDP's analysis is a lack of coordination among internal authorities, stemming from an unclear definition of roles and responsibilities. Collaboration among members of the donor community also presents tension between country priorities and those of the donor community (UNDP 2006).

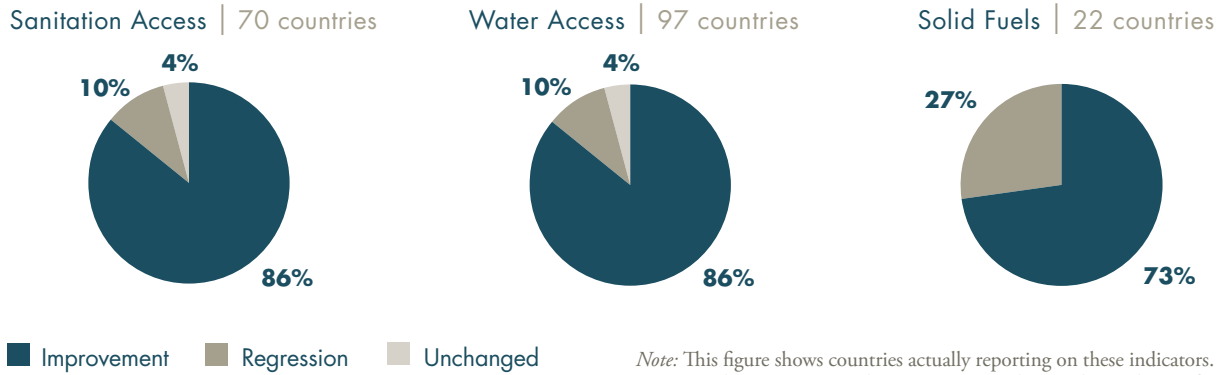
The Task Force Reports produced by the Millennium Project found similar results. Table 2 summarizes some of the findings and recommendations made with respect to key MDG goals.

By incorporating MDG targets into national development plans and PRSPs, countries have the opportunity to reestablish priorities, design new policies, and collect data that will facilitate the monitoring and targeting of MDGs. It must be recognized that this is a learning process that will take time, yet here lies an opportunity for poor countries to focus on poverty reduction through PRSPs and MDG targets.

WHAT DO WE FIND IN POVERTY REDUCTION STRATEGY PAPERS?

As previously discussed, PRSPs delineate comprehensive strategies covering a broad range of issues such as water, sanitation, health, energy, and education. Since 2000, about 68 PRSPs and 57 interim PRSPs have been carried out in 53 developing countries. Two recent reviews—one carried out by WHO in 2004, and another commissioned by the World Bank in 2006—have looked at a number of PRSPs and assessed the environmental health content.

Figure 5. Trends in Reporting Sanitation Access, Water Access, and Solid Fuels in MDGRs
(Percentage of countries showing progress and regression)



Note: This figure shows countries actually reporting on these indicators. For example, 116 countries have sanitation indicators but only 70 of those countries monitored progress on sanitation access.

Source: UNDP 2006.

A review of health issues in poverty reduction strategies undertaken by WHO in 2004[13] outlined gaps or limitations in the health care delivery system and provided an overview of child and maternal health issues, prevalent communicable diseases, and manifestations of malnourishment. The World Bank's commissioned 2006 review of environmental health in PRSPs highlighted a number of conclusions that illustrate how environmental health has been incorporated into PRSPs to date.[14] Overall, the findings revealed that there has been progress in the incorporation of environmental health issues within PRSPs. However, there are continuing concerns that environmental health is not being systematically addressed and that good-practice examples are still scarce (Kishore 2006).

IMPROVING BUT SKEWED COVERAGE

Both the WHO and World Bank reviews, as well as an assessment by WRI (World Resource Institute 2005), have found that water and sanitation issues feature more often in PRSPs than any other environmental health issue. The WHO study found that most PRSPs address water and sanitation independently, rather than as part of the health component. Reference is generally made to the health implications of drinking from an unsafe water source. However, problems related to access to water by the poor are usually confined to physical availability; PRSPs rarely mention poor maintenance of the facilities or user fees. Box 2 shows some good-practice examples of where environmental health has been incorporated in PRSPs.

The World Bank commissioned review also suggests that a better understanding of water and environmental health linkages could have possibly led to the inclusion of this issue within country PRSPs.[15] The review goes on to say that air pollution abatement and energy-related responses often focus on energy efficiency parameters rather than on health—thus possibly

Table 2. Findings and Recommendations Relating to Environmental Health (selected MDG targets)

SELECTED MDG TARGET WITH EH ISSUE	MAIN FINDINGS AND RECOMMENDATIONS
Child and maternal health	10.8 million children under the age of five die each year, 4 million in their first month of life.; 530,000 cases of maternal mortality each year • Simple practices that can prevent illness include (1) dispose of feces, including children's feces, and washing hands with soap after defecation, before preparing meals and before feeding children, (2) protect children in malaria-endemic areas by ensuring they sleep under insecticide-treated bed nets • Other sectors can complement the health sector and significantly reduce the incidence of common diseases by improving water supply and sanitation and reducing indoor air pollution
Controlling Malaria	Every 30 seconds an African child dies of malaria; more than 1 million children succumb to the disease each year; and in malaria-endemic countries 300 to 500 million fall sick, incapacitating the workforce, reducing productivity and output • Increase political commitment in proven solutions by key stakeholders • Implement full-integrated package of malaria control measures • Organize communities to participate in the fight against malaria • Train and deploy more skilled personnel to implement proven prevention techniques, accurate diagnosis and appropriate treatment, of malaria • A global commitment that by 2008, 80 percent of at-risk population will be protected by treated bed nets, indoor spraying, and other key measures
Environmental sustainability	Water pollution kills 2.2 million annually; more than 75 percent of the world's fish stocks are overfished; rising sea levels could displace tens of millions • Address health problems caused by air and water pollution through initiatives to reduce exposure to risks • Combat climate change by adopting the target of stabilizing greenhouse gas concentrations in the atmosphere • Structural changes: strengthen institutions and governance; correct market failures and distortions; improve access and use of scientific and technical knowledge
Lack of access to water and sanitation	4 in 10 people lack access to a simple pit latrine; nearly 2 in 10 (more than 1 billion people) have no source of safe drinking water—3,900 children die daily as a result • Move sanitation crisis to the top of national agendas • Increase investment for sanitation • Investments in water and sanitation must focus on sustainable service delivery • Empower local authorities and communities with authority, resources and capacity to manage water supply and sanitation service delivery • Build system for collecting revenues to users who can afford to pay for services • Establish coordination mechanisms among agencies

Source: Task Force Reports 2005 (http://www.unmillenniumproject.org/reports/reports2.htm).

Box 2. Environmental Health in PRSPs: Some Good-Practice Examples

The **Djibouti PRSP** finds that water quality is a recognized determinant of public health. Diarrheal diseases are associated with the fecal contamination of drinking water (particularly in respect of problems associated with sanitary storage and transport and polluted rural wells), cholera, and malaria.

The **Cameroon PRSP** articulates environmental priorities that fall within the Millennium Development Goal 7 (MDG-7) context. It presents targets and indicators related to water supply. It presents baseline information on protected areas and sanitation and emphasizes improvements in housing (Bojö et al. 2004.).

Source: Djibouti PRSP, Bojo et al. 2004.

Photo: Curt Carnemark

"Poor men and women were unanimous in saying that the most important effects of poverty included illness and the inability to meet the cost of treatment. Hunger and malnutrition were in second place"

– Yemen's PRSP

resulting in lower attention within PRSPs. Another issue raised in the findings is that sanitation remains secondary to water supply. Although PRSPs recognize sanitation as critical to the incidence of diseases such as diarrhea, sanitation is addressed as an adjunct to water supply. The importance of sanitation in tackling health problems needs to be stressed more strongly.

OPPORTUNITIES FOR COLLABORATION

The WHO review highlights one of the potential benefits of the PRSP process or any multisectoral planning process; that is, it provides an opportunity for different agencies to come together and undertake joint planning. PRSPs often provide information to suggest that cross-sectoral action for health is important. Examples of such multisectoral collaboration in countries are beginning to emerge. In Zambia, the energy sector proposes to fit rural health centers with solar panels; in Burkina Faso, sanitation facilities will be built in schools; and in Ethiopia, rural electrification and telecommunication schemes will be developed to meet the needs of health services (WHO 2004).

NEED FOR BETTER DATA AND MONITORING

Another finding of the WHO review was that PRSPs fairly consistently reflect the goals of MDGs, but they do not necessarily develop quantifiable targets. For example, 20 out

of 21 PRSPs link their strategy for safe water to the respective MDG, but very few refer to the target of halving the number of people without sustainable access to an improved water source. One exception is the Malawi PRSP (Box 3). The review also recommends that the irregularity in data and unreliability of information on environmental health issues often found in developing countries needs to be addressed through a stronger public health surveillance system.

CLARIFICATION OF OWNERSHIP

PRSPs are often unclear on which agency within the public sector is responsible for environmental health outcomes. This is an indication that environmental health programs are difficult to implement because of their cross-cutting, multisectoral nature.

Box 3. Malawi: Good Practice in Environmental Indicators

The **Malawi PRSP** has set quantifiable environmental indicators to set targets and against which progress can be gauged. Environmental health targets relating to malaria include (a) increasing the percentage of households with mosquito nets in priority areas from 70 percent in 2000 to 80 percent in 2005; and (b) reducing malaria-related mortality in children under the age of five (among children in rural hospitals) from 34 percent in 2000 to less than 18 percent in 2005.

Source: Malawi PRSP.

Photo: Scott Wallace

Progress reports on both MDGs and PRSPs recognize that the multisectoral nature of environmental health issues and poor institutional coordination within developing countries have resulted in weaknesses in addressing, targeting, and monitoring environmental health. Critical issues in environmental health—such as water, sanitation, and indoor air pollution—tend to fall through the cracks in development strategies and between the different mandates of development agencies, yet they are critical for poverty reduction (Lvovsky 2001, Kishore 2006, WHO 2006).

CHALLENGES ASSOCIATED WITH PLACING ENVIRONMENTAL HEALTH ISSUES ON THE DEVELOPMENT AGENDA

Why do environmental health issues tend to fall through the bureaucratic cracks? There are a multitude of reasons. First, environment is typically perceived as a global public good, rather than one that is also closely linked with the well-being of the poor. Recent efforts by multiple agencies are trying to change this perception, but it is still widely held. As a result, issues that matter to the more well-off (and politically powerful groups) dominate. If there is an overlap between the environmental health issues that matter to both vulnerable and more powerful groups, action may often be visible, as is the case with urban air pollution in many large cities. In other instances—for example, indoor air pollution, which is related to the poor's access to cleaner fuels and therefore only impacts the poor—there has been less progress in placing the issue high on the development agenda despite it being responsible for over 1.5 million deaths per year, which is significantly greater than in the case of urban air pollution (WHO 2007b).

Second, at a sectoral level, institutional incentive structures are often not set up to place environmental health issues that matter to the poor high on the agenda. There are different reasons for this. First, environmental health is rarely placed on the agenda of many conventional health sector programs. This may be because, in order to address environmental health, both a preventive and a rapid treatment approach are important. This means that solutions arise from multiple sectors—such as water, sanitation and hygiene, energy, education, and health—rather than action primarily by one sector. Often, however, the roles and responsibilities of different agencies related to addressing public environmental health services are not well-defined, including who takes the lead in coordinating such efforts. Hence encouraging coordination and creating a sense of ownership and accountability are often big challenges. Second, actions to tackle environmental health issues often do not require large budgets at least initially. But they do require continuous effort, and capacity is weak in developing countries. Third, the indicators available for measuring environmental health impacts are notoriously difficult to collect. Data collection may be very comprehensive, but may not include all the necessary information for decisionmaking. For example, in the case of energy the survey may include questions on energy source, but not on pricing, connection fees, seasonal variation, quantities of fuel and electricity consumed, among others (Sullivan and Barnes 2007). Hence results can be difficult to measure and disseminate, thus again leading to accountability issues.

Given these challenges, the next chapter describes what role officials in a planning or finance ministry can play to better integrate environmental health issues into national development plans and/or poverty reduction strategies. The roles described are also equally applicable at a subnational level; for example, within a planning department in a state or province or within a mayor's office in the context of city development planning. The subsequent chapter then goes on to describe how government officials can work closely with other stakeholders, such as civil society organizations and the private sector, to build longer-term constituencies to place environmental health issues on the development and poverty reduction agenda.

Further reading:

MDGRs and Environmental sustainability:
http://www.undp.org/fssd/docs/mdg7english.pdf

Poverty Reduction Sourcebook:
http://go.worldbank.org/3I8LYLXO80

Poverty Reduction Strategy Papers:
http://www.imf.org/external/np/prsp/prsp.asp

PRSP Fact Sheet:
http://www.imf.org/external/np/exr/facts/prsp.html

Poverty Reduction Strategy Papers: Their Significance for Health: second synthesis report:
http://www.who.int/hdp/prsps/en/

WHO database on health and the PRSPs:
http://who.int/hdp/database

Millennium Project Task Force Reports:
http://www.unmillenniumproject.org/reports/reports2.htm

13. See WHO 2004. This study builds on previous studies by WHO on tracking the health components of PRSPs. WHO has systematically reviewed PRSPs since 2001, increasingly improving the analytical framework used for assessment. For the WHO (2004) study, 11 full PRSPs were examined and the original 10 PRSPs were revisited.

14. This assessment builds on previously published reviews of PRSPs (Böjo and Reddy 2002, 2003; Böjo et al. 2004). In those reviews, 53 PRSPs were assessed according to 17 variables for environmental mainstreaming. Sixteen PRSPs that had received a score of 2.0 or higher were selected for the present review.

15. This may be the result of specific guidelines for incorporating water and sanitation specifically that does not occur with environmental health more generally.

Photo: Shehzad Noorani

3. OPPORTUNITIES FOR INCORPORATING ENVIRONMENTAL HEALTH INTO DEVELOPMENT PLANNING AND POVERTY REDUCTION STRATEGIES

While the MDGs have articulated what needs to be done to address poverty reduction, countries are still learning how to implement these goals. One way to do this is for countries to incorporate MDG targets into their national development plans and PRSPs or at a subnational level into state and provincial development plans and city plans. The previous chapter discussed the extent to which environmental health issues appear in poverty reduction plans and related reports. This chapter will discuss briefly the process of strategy formulation and implementation to better understand key entry points for incorporating environmental health into development and poverty reduction-related strategies and plans and their implementation processes. It also presents tools that public officials can use to better inform these plans as they are developed.

Strategy formulation and implementation processes are complex at best. A study to improve our understanding of how environmental issues can be integrated into the formulation and implementation of development policies found that viewing the decision-making process as a rational, linear process, and applying technically oriented rational analysis to influence it was an ineffective way of influencing policy formulation (World Bank 2005). Rather, recognition is needed that policy formulation and implementation is, in reality, a continuous and complex process. Strengthening institutional and governance processes is essential so that (a) the voice of weak and vulnerable stakeholders is also heard (in addition to the more politically powerful groups); (b) there is social accountability of public officials to all stakeholders; and (c) there is an opportunity for learning to occur so that continuous improvement takes place in the design and implementation of public policies (Ahmed and Sánchez-Triana 2008). The subsequent chapter discusses in more detail how to build long-term constituencies to continually place environmental health issues on the development and poverty reduction agenda.

Environmental health can be incorporated into development plans or strategies more targeted at poverty reduction at the country or subnational level at different stages. The institutional process of preparing and implementing such plans varies greatly among developing countries, with differing types of governments, enabling environments, and circumstances. Therefore, rather than give specific recommendations, this report gives process guidelines on the tools that can be used to incorporate environmental health issues at the different stages of the institutional process of preparing and implementing such development plans or poverty reduction strategies (Figure 6).

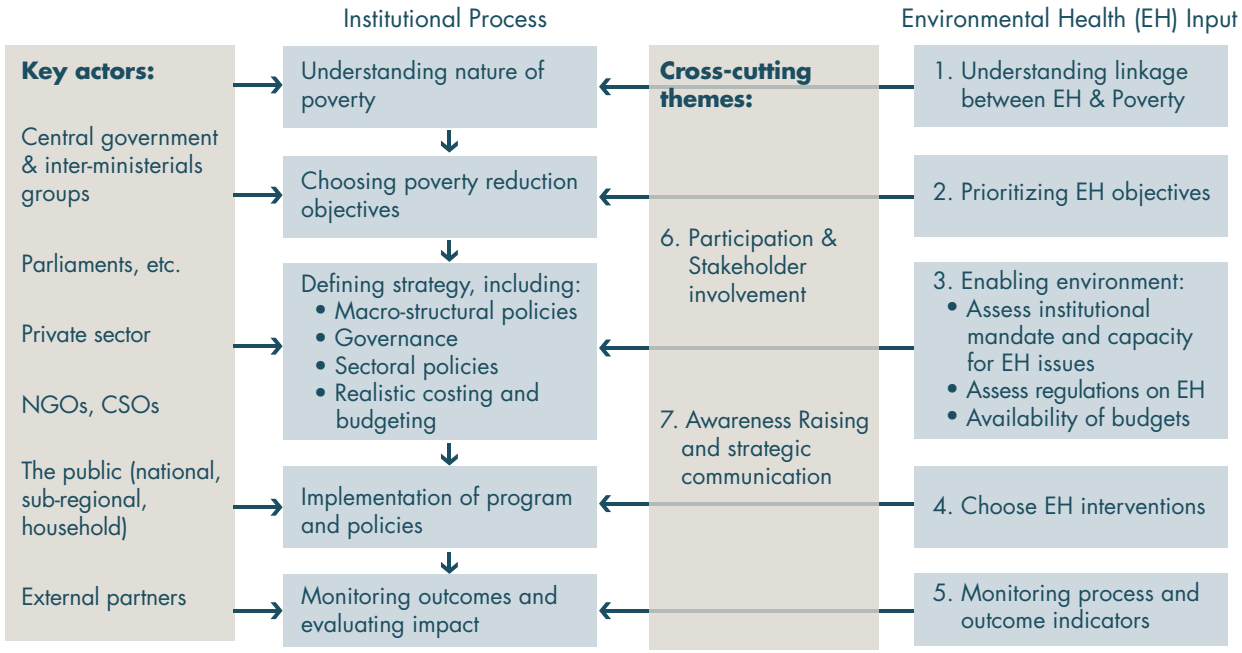
Figure 6 schematically shows the various stages at which environmental health inputs can be brought into the institutional process to prepare and implement strategies and plans aimed at development and poverty reduction. These steps include:

1. Analyzing the linkages between environmental health and poverty
2. Prioritizing environmental health issues within the larger poverty reduction objectives
3. Assessing the country's enabling environment specifically in terms of institutional mandates and related capacity, regulations, and budgets relating to environmental health
4. Selecting and ensuring adequate financing of environmental health interventions based on the above assessments

"25 percent of extremely poor households obtain their water from uncovered sources. Lack of knowledge of water and disease relationships is a major factor in water-point contamination"

– Gambia's PRSP

Figure 6. Incorporating Environmental Health into Institutional Processes Aimed at Enhancing Development and Poverty Reduction



Source: Adapted from Klugman 2002 PRSP Sourcebook, World Bank 2005, Ahmed and Sánchez-Triana 2008.

Photo: Dominic Sansoni

5. Monitoring process and outcome indicators to track progress and to continuously improve policy design and implementation.

In addition to these direct inputs, environmental health interventions also benefit from cross-cutting issues that come into play through the entire process of preparing and implementing these plans:

6. Participation and involvement of stakeholders that give voice and influence to the weak and vulnerable stakeholders

7. Awareness-raising and communication to help civil society hold government accountable for continuous progress on this agenda.

The latter two points are discussed further in chapter 4.

Despite the schematic illustration, the policy cycle is not rational and linear, but a continuous process. It is also important to note that these different steps could be carried out at different levels of government. The communication channels between local and national levels of government are crucial to ensure that local information is translated into policy action, and equally

that national policy can be implemented at the local level. In the case of environmental health, this is further complicated by the necessity for cross-sectoral coordination horizontally at the national and local levels of government.

The rest of this chapter discusses tools that can be used by public officials during stages 1 to 5 above to facilitate integration of environmental health issues into national and local development agendas and the related monitoring system to evaluate progress. Good practice examples are also described. The application of these tools could be carried out directly by the government officials or could be facilitated and/ or financed by development partners.

ANALYZING THE LINKAGES BETWEEN ENVIRONMENTAL HEALTH AND POVERTY

The first step in incorporating environmental health into national or local development plans is through an assessment of poverty-environment-health linkages. There is already much information in the public domain regarding public health impacts linked to major environment risks, both at a global level and a regional level (WHO 2002, Cairncross et al. 2003, World Bank 2007). Indeed, the very idea that poor environmental health conditions were the root cause of poverty was behind the great environmental health reforms that started in the 19th century in the United Kingdom (Rosen 1958) and produced significant reductions in the burden of disease. For example, the links between water, sanitation and hygiene, and infectious diseases such as diarrhea are now well-established. Research shows that public investment in environmental infrastructure should target poor communities rather than poor households, because investment in clean water and sanitation creates positive externalities for household health (World Bank 2007). Table 3 provides some examples of environmental health and poverty linkages.

Understanding these linkages is an important first step. However, equally important is using local information to assess these linkages within the country at a national or subnational level. In this context, data can be drawn from several different tools, including national census data, Demographic and Health Surveys (DHS), Living Standard Measurement Surveys (LSMS), national health surveillance systems, national environmental monitoring systems, and exposure/ epidemiological studies. In most cases, however, information may be scarce. It is important to develop a local evidence base through additional questions in existing survey instruments or through strengthening existing environmental monitoring and health surveillance systems. A recent study analyzes some

Table 3. Examples of Environmental Health and Poverty Linkages

EH THEME	EXAMPLE OF EH–POVERTY LINKAGES
Water supply and sanitation	• Lack of water supply and sewage treatment infrastructure in rural areas leads to increased risk of water-related disease; early childhood diarrhea leads to lower education and cumulative earnings
	• Poor people pay a high percentage of their income for water, which cuts the household food budget
Indoor air pollution	• Burning biomass in poor households for cooking and heating leads to increased risk of acute respiratory infections
Industrial & municipal waste	• Uncollected household waste increases rodent infestation and provides a breeding ground for flies, which leads to environmental health problems
	• Contamination of surface water, groundwater, and soil by industrial toxic wastes results in health risks, especially in marginal areas
	• Leaching from unsanitary landfill sites located in poor areas contaminates water resources and causes health risks
Malaria	• Vector-borne diseases such as malaria are linked to a wide range of environmental conditions related to mosquito breeding, including irrigation, poor drainage, and stagnant water
Urban air pollution	• Emissions from energy and transport sources are contributors to respiratory disease burden and premature deaths
Institutional development	• Inadequate institutional capacity and legal frameworks underlie the specific environmental health and poverty issues described above

Source: Dale 2005.

of the questions that could be included in existing surveys linked to energy-environment topics. The study found that LSMS surveys typical lacked sufficiently detailed questions on (a) the prices households pay for fuels and electricity, (b) connection fees, (c) service quality and supply reliability from service providers, (d) seasonal variation as it related to pricing and service reliability, (e) household coping costs (e.g. what do households do when there is a power outage?), and (f) quantities of fuels and electricity consumed and attitudes toward various energy sources (for example, are some types of energy perceived to be cleaner, more convenient, reliable or expensive in comparison to others?) (Sullivan and Barnes 2007). In the case of water and sanitation, efforts have been made to harmonize the water- and sanitation-related questions included in national surveys in order to help countries identify the needs of the population while seeking to make data across countries more comparable (WHO, UNICEF et al. 2004).

While it is clear based on hard evidence that the poor are disproportionately affected by many environmental risks, such as indoor air pollution, it is also important to overlay the environment-health data with poverty data to gain a better understanding of the risks faced by the poor in a particular area. Distributional analysis—for example, overlying health impact data with income data graphically using GIS information, or including income questions in existing health surveys such as DHS, as well as including health questions in traditional living standard surveys to enable econometric analysis—is one important way to gather specific data to better assess these linkages.

In the absence of quantitative data or to complement existing data, qualitative means to collect information on environmental health aspects that are perceived to be important by the poor themselves for their well-being are also crucial. Focus groups and opinion polls are two instruments to gather information. This is especially important for understanding and changing behavior, such as that relating to hygiene practices. As noted in chapter 1, a recent opinion poll conducted in Colombia found that the poor had very different environmental health priorities compared with people in higher-income brackets.

Once officials have a broad understanding of the most important environmental health factors relating to poverty, the next stage is for governments to prioritize the public actions that will be most effective and cost-efficient in changing these environmental conditions.

PRIORITIZING ENVIRONMENTAL HEALTH ISSUES

Environmental health issues can be prioritized in terms of their effect on both economic development and poverty reduction. Both quantitative and participatory techniques are needed to select themes or sectors for which there is a definite recognition of the severity of environmental health issues. The prioritization of environmental health issues can be done in terms of health impacts, economic costs, or welfare benefits to vulnerable populations such as the poor. Some of the tools with which to carry out these prioritization exercises are discussed below.

Box 4. HELI: Health, Environment, and Economic Benefits of Water Efficiency in Jordan

In Jordan, Uganda, and Thailand, the joint WHO/UNEP Health and Environment Linkages Initiative (HELI) conducted pilot projects that used qualitative and quantitative analysis to compare the benefits of different policy choices.

The Jordan pilot project considered the health and environment benefits of improved water efficiencies. The assessment included a cost-benefit analysis of three scenarios for government investments in water efficiency improvements over a time span of 10 to 25 years. The assessment involved all major government agencies—health, environment, agriculture, and finance—along with key civil society actors. It optimized the scope and quality of the assessment and allowed clear, wide-ranging consensus recommendations. This analysis identified a wide range of benefits, and assigned a money value to selected benefits for which quantitative analysis could reasonably be conducted. One of these involved an estimate of economic gains that could result from investments in domestic water infrastructure, yielding improvements in consumer water supplies and consequently reduced incidence of water-related diarrheal diseases.

The assessment concluded that the "maximum investment" scenario extending between 2005 and 2015 could potentially yield a 2.4:1 benefit-over-cost ratio in terms of both illness averted as well as environmental savings from energy and agricultural efficiencies (for example, increased use of drip irrigation).

Source: WHO 2007c.

Burden of disease analysis

Two questions—How much disease is currently caused by environmental risks? How much of the disease burden could be averted by environmental improvements?—are important when it comes to decision making in disease prevention and reduction. Environmental burden of disease analyses are methods to quantify health impacts caused by various environmental risks (WHO 2007d). Such quantitative information is essential, both as a basis for further calculating the economic value of this health burden (such as in cost of degradation studies), as well as alongside information on effectiveness and costs of intervention strategies. A recent example includes the 192 country profiles of environmental burden of disease, which mapped major environmental risks by country .

Costs of degradation studies

These studies place an economic value on health impacts and on loss of productivity associated with environmental degradation, and offer policy makers instruments for integrating environment into economic development decisions. Additionally, by expressing damage costs as a percentage of GDP, it allows for comparison with other economic indicators (Sarraf 2004).

Recent studies have demonstrated that direct health impacts associated with environmental risk factors cost countries between 2 to 4 percent of their GDP (Figure 4). Newer analysis, which includes indirect effects through malnutrition, put the figure closer to 9 percent of a country's GDP in some regions (World Bank 2008). Such studies help establish environmental priorities that directly affect sustainable growth.

Cost-benefit analyses

In Jordan a cost-benefit analysis was undertaken to demonstrate that a "complete cost, incomplete benefit" analysis would show that water efficiency measures were a "good deal" (Box 4). In Box 5, another cost-benefit analysis was carried out showing that the costs from a cholera epidemic were higher than improving safe drinking water.

Cost-effectiveness studies

These studies get away from the difficulties of assessing health benefits in economic terms and help to compare interventions. As the Zimbabwe example shows, it can be cost-effective to invest in changing behavior (Box 6).

In addition to quantitative studies, bottom-up participatory approaches, where the poor can voice their concerns and needs, can help establish the community's environmental health priorities and provide low-cost solutions.

Participatory Poverty Assessments (PPAs)

This tool allows policymakers to consult the poor directly and transmit findings (World Bank 2005). PPAs are flexible methods that combine mapping, matrices, diagrams, open-ended interviews, and discussion groups, all of which emphasize exercises that facilitate information sharing, analysis, and action (Chambers 1997). PPAs need to be linked with policy making and not be used as a tool to extract information—although some issues highlighted by PPAs

Box 5. Even as a Health Measure, Infrastructure can be Cost-effective

The net cost of the 1991 cholera epidemic to Peru's economy has been estimated at $1 billion (Epstein 2001). By comparison, the total cost of providing safe drinking water at public standposts for Peru's 5.9 million people who are still unserved, at an average of $41 per head, would be only $242 million. As well as controlling the cholera epidemic, this would have saved millions of women from hours of drudgery collecting water, enabled the poor to avoid the exorbitant charges for water made by vendors, and improved people's quality of life.

Source: Cairncross et al. 2003.

Box 6. Behavior Change can be Cost-effective

DFID funded the Community Health Clubs in rural Tsholotsho District, Zimbabwe. The project increased the proportion of households using a ladle to draw water from 3 percent to 93 percent and the proportion with an improved pit latrine from 40 percent to 80 percent, as well as improving other aspects of hygiene behavior, at a cost of $3.33 per household.

A recent hygiene promotion project in the town of Bobo Dioulasso (population 341,000) in Burkina Faso was found to have changed the hygiene practices of only 18.5 percent of the mothers of young children, and to have cost $292,000 to implement. Nevertheless, it has been calculated that the project could generate $394,000 in savings to the health system and in terms of lost productivity associated with child death (Borghi et al. 2002)

Source: Cairncross et al. 2003.

Box 7. Seasonality is Important in Tanzania: Findings from the PPA

In many PPAs, seasonality analysis highlighted great differences in poverty, vulnerability, and coping strategies throughout the year. A household survey in Tanzania concluded that 22 percent of the poor had access to safe water from protected sources, indoor plumbing, standpipes, and covered wells with hand pumps. But the survey overlooked the seasonal dimension of access to safe water and therefore overestimated the access. The PPA, which collected information from the same villages, revealed that in two-thirds of the villages thought to have access to safe water, water was actually a major problem. In the dry season, as water tables fell, people were forced to walk further for water or switch to unsafe alternatives such as uncovered dug wells, ponds, streams, and rivers.

Source: Robb 1998.

Photo: Arne Hoel

"Poor people cannot improve their status because they live day by day, and if they get sick then they are in trouble because they have to borrow money and pay interest"

– a woman in Tra Vinh, Vietnam
(*Crying out for change*, World Bank)

can be effectively applied to identify environmental health concerns that communities face, as they have the capacity to analyze the cause of their vulnerability and rank their priorities (Box 7). In PPAs carried out in Ghana, Mali, and Nigeria, for example, the poor said that physical isolation and lack of access to water were their main problems (Robb 1998). PPAs may be used to complement quantitative data and provide a deeper understanding of the complexity of poverty, health, and service provision.

Assessments combining analytical and participatory approaches

Other key tools that combine both analytical and participatory approaches, and often feature in national legislation, include strategic environmental assessments (SEAs) and health impact assessments (HIAs). Good-practice guidance on strategic environmental assessment has recently been published by the OECD Development Assistance Committee (OECD 2006). Another important approach is the joint WHO/UNEP Health and Environment Linkages Initiative (HELI), which has developed a tool kit of health and environment assessment approaches. Both the HELI approach

Box 8. Incorporating Environment and Health into Poverty Reduction Strategies in Tanzania

The "Programme on Integrating Environment into PRSP," which began in 2003 and is now in a second phase called MKUKUTA, is led by the Vice-President's Office/ Department of Environment in partnership with other ministries that include the Ministry of Planning, Economy and Empowerment and the Ministry of Finance, among others.

To mainstream environment into the PRSP, several activities took place. These included:

- Production of guidelines for mainstreaming environment into the PRS process, including budget guidelines and a public expenditure review on environment
- Development of environmental indicators
- Establishment of an Environmental Working Group
- Training of state and non-state agencies.

The following were some of the outcomes of those efforts:

- The environment was expressed as a challenge to livelihoods, health, and economic growth
- Environmental concerns were incorporated into 16 of 96 development targets and integrated into the monitoring process
- Different stakeholders were brought together to lay the foundation for future cooperation
- The budgetary allocation for the environment was increased
- Increased awareness of poverty-environment linkages.

Source: UNDP-UNEP Poverty Environment Initiative (n.d).

and SEA can accommodate both economic assessment as well as qualitative analysis (including institutional analysis), and also emphasize involvement of both expert and broad stakeholder consultations.

Comparative Risk Assessments (CRA)

Another example is CRA, which provides a systematic framework for evaluating different environmental problems that pose different types and degrees of risks to human health and the environment. CRAs also consist of both analytical and participatory components; however, some CRAs have used expert groups rather than more broad-based groups to rank different environmental problems (Morgenstern 2008). The biggest impact of CRAs has been to help broaden thinking in the policy community regarding the need to prioritize efforts on the basis of risk reduction potential. As a result, the Hawaii CRA resulted in the establishment of an indoor air program, a program to test blood levels in children, new legislation to implement the recommendations, and a cabinet-level committee to oversee progress (Ijjasz and Tlaiye 1999).

One of the lessons learned from prioritization exercises is that it is important that countries build their own capacity to conduct such exercises through universities and think tanks. The process of capacity building should be recognized as a slow process. Similarly, prioritization of environmental health issues would benefit from cross-sectoral and multistakeholder dialogue. One result is that benefits that may be hard to value in economic terms but are important

Box 9. Changing the Policy Approach: Lessons from Yunnan Province

Yunnan is a poor and remote province in China dependent on economic activities that include the unsustainable exploitation of mineral or forest resources. Traditionally, government agencies in the province have formulated supply-led, top-down poverty reduction projects, where policies have not adequately reflected the needs and requirements of the poor. A change in national policy, however, has given local governments more flexibility in the preparation of local development programs. As a consequence, the institutional framework has changed to give local government the responsibility for village-level infrastructure and agricultural resources. It has also encouraged the participation of community organizations. Within this institutional change, the Yunnan Environment Development Program (YEDP) began with the support of the UK Department for International Development. YEDP has not only instituted a bottom-up approach to service delivery, but has also attempted to change how its partners—from veterinary workers to water supply engineers—work together. Integrated work is difficult because (a) each agency has its own mandate, (b) agencies compete for financial resources, and (c) the incentive and reward system are associated with the agency rather than with the YEDP. This was solved by having a key actor lead the initiative, which is not tied to a given agency in terms of budgeting and reporting lines. In this case, it was the township vice-mayor who assisted the process.

Source: Spencer et al. 2006.

Photo: Ray Witlin

Box 10. Philippines: A Need to Rediscover the Sanitation Code

Although environmental health practice is well-established in the Philippines and has a long tradition dating back to the colonial era, it had been neglected for a while, and more recently has been rediscovered as an important feature of health protection.

Under-5 mortality has been dropping in the Philippines thanks to current child survival efforts, but it remains high, especially among the poor in both urban and rural settings. Twenty-five million people in the Philippines live in households without sanitary toilets. Diseases typically related to the inadequate provision of water and sanitation, as well as improper hygienic practices, dominate the disease burden. For example, diarrhea is the leading cause of hospitalization, and 40 percent of Filipino children are infected with soil-transmitted helminths that are largely attributable to inadequate sanitation practices.

The Code on Sanitation (1975) is the centerpiece of health protection legislation in the Philippines. As a cross-cutting theme, environmental health is governed by this and several other laws in other sectors that seek to protect citizen's health from environmental hazards. At the national level, environmental health is within the mandate of the Ministry of Health, which coordinates activities and interventions through the Interagency Committee on Environmental Health. The functions of this committee include (a) formulating policies and guidelines and developing programs, (b) coordinating, monitoring, and evaluating environmental health programs and projects, (c) disseminating and coordinating education campaigns, and (d) coordinating research and relevant activities for environmental maintenance and protection. This committee has established similar regional interagency committees for implementation at the regional level.

In 1991 the devolution of many health and environment functions put local governments in control of many environmental-health-related functions, making implementation capacity a key issue at the local level. A sanitary inspector is part of the local health team and is responsible for most environmental health functions, including water supply, foods safety, sewage and excreta collection and refuse disposal, vermin control, and industrial hygiene. During the past decade or so, there have been efforts to improve coordination of multisectoral health activities at the national level, but more is needed to guarantee crucial horizontal coordination at the local level.

Source: World Bank 2007c.

from a cultural perspective are also determined, and broader support amongst different groups is built. Finally, priority setting processes should ideally take place periodically in order to detect environmental health problems at an early stage rather than when they impose a significant cost to society (World Bank 2005).

ASSESSING AND STRENGTHENING INSTITUTIONAL CAPACITY AND GOVERNANCE ON ENVIRONMENTAL HEALTH ISSUES

Research on development has found that the state of institutional development is the single most important variable in explaining a country's overall level of development (World Bank 2002). Poor governance at the national and local level and within other governing bodies is a key cause of poor environmental health. Governance can be undermined by a range of factors, including lack of transparency, weak accountability, poor organization and lack of technical capacity, inefficiency, and poor motivation. Within the institutional assessment, informal institutions such as traditions, customs, and practices also need to be assessed as they can be a constraint or a facilitator for reform. For environmental health, this means examining the institutional and governance underpinnings, identifying strengths and weaknesses, and making recommendations to enhance policies on better environmental health (Lovei and Pillai 2003).

Environmental health by definition is cross-sectoral, and requires the participation of many ministries in the policy process. However, the implementation of specific interventions needs to be carried out by an individual agency with clearly delineated responsibilities (OECD 2006b). Existing coordination of environmental and health policies often takes place in the context of sectoral specialization and distinct responsibilities working in "silos" with little communication between agencies. Supra-national initiatives, such as those implemented by WHO (European Environment and Health Process) or the European Commission (European Environment and Health Action Plan 2004–10) can have a positive impact on policy coordination. For example, in the European context, the WHO-led National Environmental Health Action Plan (NEHAP) has been a powerful tool to increase collaboration and facilitate integration of the policy domains of the environment and health sectors. NEHAP has played an important role in increasing awareness of environmental health and promoting ministerial coordination and decision making (Ivanov et al. 2004, OECD 2006b, Perlstadt 2003). Similarly at a national level, coordination across sectors, appropriate budget allocation, and results monitoring by finance and planning ministry officials can help to marshal individual efforts by different sectoral agencies toward better environmental health. Box 8 demonstrates the power of an approach in Tanzania that takes a multistakeholder perspective. At a city level, the mayor's office often plays such a role.

In addition to better cross-sectoral collaboration, the successful implementation of environmental health interventions often relies on both horizontal and vertical partnerships across and between local and state levels, as well as with NGOs and the private sector. The latter is discussed further in chapter 4. However, within government, it is particularly important that local governments convey the environmental health priorities of their constituents upwards to national-level authorities as they formulate policies and assign budgets, and similarly that national agencies can work with state and local levels to implement these policies. Box 9 provides an example of a shift from a top-down approach to a bottom-up approach to service delivery in China. Box 10 on the Philippines Sanitation Code also illustrates the importance of ensuring that there is capacity at the local level for horizontal coordination.

Many aspects of environmental health depend on improved governance, both in delivery of essential environmental health services and in regulation and legislation. Laws on health and environmental quality, as well as environmental standards for clean air and water, are an important first step in safeguarding the country's public health. A mix of approaches—including economic instruments, inspection and enforcement, and penalties and fines—can be used to ensure compliance with regulations. Regulations linked with disposal of wastes, use of pesticides, housing construction, and food hygiene are also important examples of the regulatory framework for environmental health and further demonstrate the importance of cross-sectoral collaboration as they are often developed and enforced by different agencies.

Regulatory frameworks also need to be revisited every few years to keep up with new studies on the effects of pollutants on people's health. Constant reevaluation of priorities and sharing this information with stakeholders is also important. In the 1970s, for example, the conventional wisdom was that high ambient concentrations of total suspended particles (TSP) represented a serious health problem. More recently, with improvements in measurement technologies and analytical techniques, fine particles with diameters of 2.5 microns or less appear to be the real culprits. This finding has led to significant changes in air pollution control strategies in the U.S. and other countries.

The basis for establishing health-based national or local environmental regulation is provided by WHO guidelines. These are science-based and are available, for example, for drinking water quality, safe use of wastewater in agriculture

and aquaculture, safe use of excreta and greywater, and air quality (valid for indoor and ambient air pollution). These guidelines are regularly updated on the basis of emerging evidence of links to health (WHO 2005c).

Some of these changes in environmental standards can also be a product of globalization or international commitments to international agreements, such as the Stockholm Convention governing the use of persistent organic pollutants. For example, trade regulations in industrialized countries can affect developing countries and smaller-scale producers by

Box 11. 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 export revenue in India at the time.

The export ban prompted a quick regulatory action by the Indian government to prohibit manufacturing of the banned chemicals. The application standardized methods for testing so as to ensure compliance, and provided for 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.

Box 12. How Peru Incorporated Environmental Health into National Plans and Policies

Peru began the process of developing a Country Environmental Analysis (CEA) through a participatory process to build consensus on the identification of environmental priorities for poverty alleviation and on the design and implementation of related environmental policies. Several workshops were held in which various sectors participated, including the ministries of environment, health, finance, agriculture, and energy and mines; regional environmental authorities; the private sector; NGOs; indigenous communities; civil society; and international organizations. Through a media campaign, the CEA also helped generate national consensus, create awareness, and build constituencies. As a result, environmental health issues were incorporated into this analysis as environmental health currently represents Peru's most important environmental problem.

First, the CEA helped identify the linkages between environmental health issues and poverty. The poor in general were exposed to greater environmental risks than higher-income groups and lacked the resources to mitigate those risks. For example, the analysis found that the impact of urban air pollution relative to income is more severe for the poor than for the nonpoor. Health impact relative to income is a useful indicator, because illness and premature mortality result in medical treatment costs and lost income, in addition to pain, suffering, and restriction of activity. Based on this indicator, health impacts are between 75 and 300 percent higher among the poor.

Second, the CEA helped prioritize environmental health issues by identifying which issues had the most significant economic costs. The analysis shows that the most costly problems associated with environmental degradation are, in decreasing order, inadequate water supply, sanitation, and hygiene; urban air pollution; natural disasters; lead pollution; indoor air pollution; and agricultural soil degradation. The study found that these issues cost Peru 3.9 percent of GDP each year.

Third, the CEA helped choose environmental health interventions by conducting an analysis that estimated the costs and benefits of four interventions: (a) handwashing by mothers or caretakers of young children in rural and urban areas, (b) improved water supply in rural areas, (c) safe sanitation facilities in rural areas, and (d) drinking water disinfection at point-of-use in urban and rural areas.

Without an enabling environment, such interventions could not be implemented. Given the severity of environmental health risks, the CEA recommended the establishment of an autonomous Environmental Health Agency responsible for developing and enforcing health-related parameters, such as WHO water-quality parameters that have health implications such as pathogens, volatile organic compounds, and persistent organics. Such parameters contribute to the monitoring process of the chosen interventions, and contribute to reducing health risks associated with poor health.

Source: World Bank 2007b.

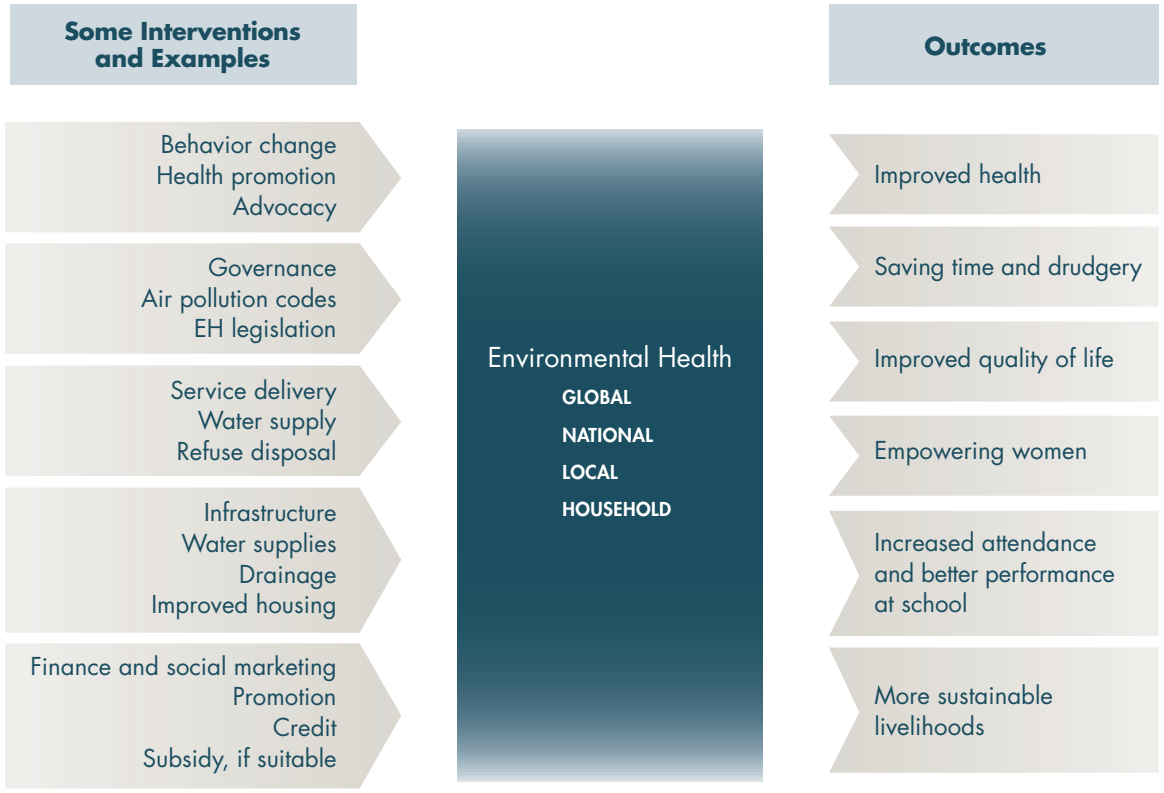
requiring them to adhere to stronger environmental and health standards than prevalent in their own countries. In order to remain competitive, small and medium enterprises will conform to higher environment/health standards to meet international requirements effectively, turning them into a market advantage rather than an obstacle (Box 11).

It is essential that responsibilities for tackling environmental health priorities are clearly defined and budgets are appropriately allocated. Since this role of approving budgets often lies with finance or planning departments at a national or state level, or with a mayor's office, it is essential that these institutions use tools—such as periodic reviews of legislation—to ensure that mandates and responsibilities are clearly defined both horizontally and vertically among government departments, as well as public expenditure reviews to assess whether priority issues are receiving adequate funding within sectoral departments.

Public expenditure reviews

Public expenditure reviews are tools that systematically assess the equity, efficiency, and effectiveness of public spending. By incorporating specific questions on environmental health expenditures (such as spending on water supply, sanitation and hygiene, and improved cookstove programs), these existing tools can also be used to provide additional information on whether priority issues are receiving adequate funding (Hamilton et al. 2006). Sector reviews (based on annual performance), value-for-money, and public expenditure tracking studies (PETS) are also good tools to use.

Figure 7. Multiple Inputs and Outcomes in Environmental Health



Source: Cairncross et al. 2003.

Box 13. The Ecohealth Approach: Combating Malaria through Agricultural Practices in Kenya

In Kenya, a project supported by the International Development Research Centre is examining the linkages between agriculture and malaria through the ecosystem approach. The goal is to reduce the incidence of malaria through agricultural interventions. Through research and capacity-building, communities can adopt numerous agricultural practices to reduce and prevent malaria, improve nutrition, and benefit their economic outlook. These practices include the following:

- Using cattle as "bait" to divert mosquitoes away from humans. Research has shown that certain species of malaria-bearing mosquitoes prefer the blood of cattle to that of humans.
- Reduce mosquito-breeding habitats by limiting the amount of water used for rice cultivation.
- Reduce the amount of time that paddies are wet, either by changing flooding schedules or alternating rice cultivation with dryland crops such as soya. In addition to limiting the mosquitoes' habitat, planting soya could boost income and improve nutrition.
- Introduce naturally occurring bacteria into stagnant water to kill mosquito larvae during the peak breeding season.

The heart of the ecosystem approach is to include active participation of community members in the research process, and therefore help researchers understand people's perceptions of the health and development problems in the area. The ecosystem approach also seeks interventions and solutions that are transdisciplinary.

Source: IDRC 2003.

CHOOSING APPROPRIATE ENVIRONMENTAL HEALTH INTERVENTIONS

Using the information from the previous steps, government departments will be better placed to choose specific environmental health interventions. Box 12 illustrates such an example in the context of Peru, where ranking of the country's priorities, an assessment of costs and benefits linked to individual investments, combined with information about the enabling environment (institutions, laws, budgets) helped to guide the choice of intervention.

In many cases environmental health interventions can complement or supplement the activities of the health sector and do not need to compete for resources. There are several areas where case management through health systems is falling short—for example, childhood illnesses such as diarrhea, ARI, and helminth infections—suggesting the need for better primary prevention of environmental risks. Environmental health interventions, for example, can complement child survival, nutrition, and programs for the integrated management of childhood illness. At first, incorporating environmental health issues within conventional health sector interventions may be a challenge. However, it can also be seen as an opportunity to significantly impact health outcomes by complementing or supplementing health system activities. Mexico, for example, complemented child survival interventions—generally managed using a more "health-systems" perspective, and thus restricted to vaccinations, micronutrient supplementation, and promotion of breastfeeding—with a clean water program. As a result. it is now one of seven countries on track with meeting MDG-4 (reduction of child mortality) by 2015 (World Bank 2008).

Photo: Dominic Sansoni

Additional considerations that need to be taken into account while choosing environmental health interventions include the level of social acceptability, political will, and level of poverty impact. In rolling out programs on improved cookstoves, it is imperative to undertake formative research on whether local communities will adopt and use these stoves appropriately. Involving communities in identifying and choosing interventions is essential to identify locally relevant solutions. In Kenya, Box 13 illustrates an approach that is both multisectoral and informed by community involvement.

Since there are multiple outcomes linked with environmental health issues (Figure 7), bringing different stakeholders together and identifying how some of these outcomes are also synergistic with other priority development goals is important. Furthermore, fostering an environment that encourages the creation, sharing, and effective application of knowledge to improve health outcomes will help to better bridge the knowledge gap of "what needs to be done" and "how to do it," thus helping governments to continuously adapt policies and interventions to changing circumstances in the enabling environment through a dynamic learning process.

Table 4. Key Environmental Health Indicators

ENVIRONMENT-RELATED ILLNESS	INTERMEDIATE INDICATOR	IMPACT OF INDICATOR
Diarrhea	• Access to safe water (private or public) • Access to sanitation (private or public) • Hours/days of available piped water • Quantity of water used per capita per day • Time taken/distance involved in collecting water • Disposal practices of children's feces • Percentage of child caregivers and food preparers with appropriate hand-washing behavior • Coliforms/100 ml of water consumed by residents by both source and tap • Persons per room of housing	• Incidence of diarrhea • Diarrhea mortality • Malnutrition (weight for age, height for age, weight for height)
Respiratory infections*	• Availability of ventilation in home • Children sleeping in cooking area • Percentage of households using cleaner fuel • Persons per room of housing • Percentage of households using improved stoves	• Incidence of ARI/ chronic respiratory diseases • Incidence of bronchitis • ALRI • Death rate of children under five years of age
Malaria	• Proportion of households having at least one treated bednet • Percentage of health facilities reporting no disruption of stock of anti-malarial drugs (as specified by national health policy) for more than one week during the previous three months	• Malaria death rate (probable and confirmed) among target groups (under 5 and other) • Number of malaria cases, severe and uncomplicated (probable and confirmed) among target groups • Percentage of malaria patients getting treatment
Broad Indicators	• Public health expenditures	• Under 5 mortality rate • Lost disability-adjusted life years (DALYs)

**Notes:* The intermediate indicators in this category pertain mainly to indoor air pollution. However, for countries such as China where urban air pollution is likely to grow in magnitude, it would be important to identify intermediate and impact indicators related to outdoor air pollution. Blood-lead levels among children are a good indicator of urban pollution, but bio-monitoring is very expensive.

MONITORING PROCESS AND OUTCOME INDICATORS

In order to measure progress of the impact of environmental health interventions, a system is required to systematically monitor exposure and health improvements. In most developing countries, health surveillance systems need further enhancement and exposure monitoring data is largely unavailable. Furthermore, measurable and appropriate indicators are often not tracked.

Household surveys are often a key source of national data. However, national-level surveys (such as the DHS and LSMS) often ask very few questions on environmental-health-related issues. For example, a study in Guatemala found that DHS lacks information on household income, ARI symptoms, and women's respiratory illness. Meanwhile, the LSMS lacks clarity on ARI symptoms and the relative use of fuels in households that use more than one fuel (Ahmed et al. 2005). New modules on specific environmental health issues such as indoor air pollution should be considered for incorporation into these surveys (see Sullivan and Barnes 2007). In other cases, efforts have been made to encourage the use of harmonized questions in national surveys as a tool to help countries gain more systematic information on the water supply and sanitation needs within their population. Such efforts also seek to make data across international and national survey programs more comparable so that more accurate water supply and sanitation coverage estimates can be made (WHO, UNICEF et al. 2004).

Furthermore, vital registration systems in most developing countries are very poor; less than 50 percent of births are recorded, and less than 30 percent of deaths recorded. Work

needs to be carried out on strengthening data collection systems. An ideal setting would be for data collected to reflect health outcomes rather than inputs or outputs. However, this is a difficult task. Process indicators—for example, the percentage of the rural population with access to a water supply—may be easier and more reliable to measure, and progress is more easily attributable to interventions and has greater diagnostic power. For this, collaboration is needed across sectors. The measurement of these indicators will provide opportunities for multisectoral collaboration.

National, subnational and household-level indicators are important. National-level data may only tell half the story, so setting up surveys and monitoring systems at the local level is vital. Disaggregated data at the subnational level helps to better identify vulnerable groups and geographic priorities, while household-level data will provide the necessary information to facilitate community-level interventions.

Indicators are essential for raising the importance of environmental health issues to high-level decision makers. For example, a recent study of Vietnam, Lao PDR, and Cambodia developed a spatial analysis to determine in which districts the poverty-environment nexus was worst. The variables used included poverty incidence, deforestation rate, steepness of slope as an indicator of soil vulnerability, wood/charcoal use, unsafe water sources, and prevalence of childhood diarrhea. Such an analysis can help target interventions to specific areas. Instead of using a particular indicator for environmental health, a basket of different sector indicators that may already be collected could be useful. These indicators also need to capture issues of access by income or wealth quintile, as well as address the statistical needs of several stakeholders, including donors, NGOs, local governments, national planning commissions, and interested ministries, among others.

In any given country, the measurement system to monitor environmental health outcomes will depend on (a) data, (b) cost and ease of measurement and monitoring, (c) stakeholder perceptions on what is important to monitor and acceptance of indicators, and (d) the final purpose for which the information is used (Shyamsundar 2002). Finally, even though there are challenges associated with measuring and using environmental health indicators, this is clearly an area that can yield massive benefits in reducing poverty compared with the associated costs.[16] Box 14 shows an example of how several international organizations are working together to develop common indicators to monitor children's environmental health.

This chapter has highlighted some of the entry points in development planning and related tools to better integrate environmental health issues into development agendas. It has focused on the role that an umbrella coordinating agency can play, such as a ministry of finance or planning, similar departments at the state or provincial level, or a mayor's office. The next chapter discusses in more detail how governments and other stakeholders, such as NGOs and the private sector, can work together to build long-term constituencies in order to continually place environmental health issues on the development and poverty reduction agenda.

Box 14. Global Initiative on Children's Environment and Health Indicators

A Global Initiative on Children's Environmental Health Indicators was launched at the World Summit on Sustainable Development in September 2002. This represents an independent effort that contributes to achieving the objectives of the Healthy Environments for Children Alliance, in particular to inform and influence policy makers and to judge the effectiveness of programs to improve children's environmental health.

The objectives of the initiative are to:

1. Develop and promote the use of children's environmental health indicators
2. mprove the assessment of children's environmental health and monitor the success or failure of interventions
3. Facilitate the ability of policy makers to improve environmental conditions for children.

The implementation of this initiative is being led by the World Health Organization. It builds on existing international, regional, and national work on child health and environmental indicators by initiating a series of regional pilots to develop, collect, and report children's environmental health indicators. The initiative aims to ensure equal relevance of the indicators for the health and environment sectors so that both can monitor their efforts toward realizing healthy environments for healthy children.

WHO regional and country offices, as well as their UNICEF counterparts, are working with countries and partners actively involved at the regional and country level to design and implement pilot projects in North America, Latin America and the Caribbean, Europe, the Middle East, and Africa.

Source: WHO Program on Children's Environment and Health (www.who.int/ceh/en/).

For additional information on available resources:

Sources for data:

Demographic and Health Surveys (DHS): http://www.measuredhs.com/

Living Standard Measurement Surveys (LSMS): http://www.worldbank.org/LSMS/

Country data sheets on health indicators, determinants and finance: http://go.worldbank.org/N2N84RDV00

Environmental health indicators: www.euro.who.int/EHindicators

Children environment and health indicators: http://www.who.int/ceh/indicators/en/

Economic assessment tools:

Cost-benefit analysis (CBA): Peru CEA that used CBA analysis: http://go.worldbank.org/LDDPJN2TU0, cost benefit analysis of interventions on indoor air pollution: http://who.int/indoorair/interventions/cost_benefit/en/index.html

Environmental valuation including cost-of-degradation: http://go.worldbank.org/XBSSSHXD30

Consideration in evaluating cost-effectiveness of environmental health interventions: http://www.who.int/quantifying_ehimpacts/publications/en/wsh00-10.pdf

Environment and health assessment tools:

Environmental burden of disease (EBD): www.who.int/quantifying_ehimpacts/national/en/index.html

Country profiles on Environmental Burden of Disease: www.who.int/quantifying_ehimpants/countryprofiles

Health Impact Assessment (HIA): www.who.int/hia//en/
Country Environmental Analysis (CEA): http://www.worldbank.org/ceatoolkit

Strategic Environmental Assessment (SEA): http://www.worldbank.org/seatoolkit

Environmental Impact Assessment (EIA): http://ec.europa.eu/environment/eia/

HELI: Health and Environment Assessment: www.who.int/heli

Tools for developing environmental and health norms and standards:

Air quality guidelines: http://www.who.int/phe/health_topics/outdoorair_aqg/en/

Wastewater reuse and excreta in agriculture and aquaculture guidelines: http://www.who.int/water_sanitation_health/wastewater/wasteuse/en/index.html

Drinking water quality guidelines: http://www.who.int/water_sanitation_health/dwq/gdwq3rev/en/index.html

On-site sanitation guidelines: http://www.who.int/water_sanitation_health/hygiene/envsan/onsitesan/en/index.html

Other water and sanitation guidance: http://www.who.int/water_sanitation_health/publications/en/index.html

Decision-making tools:

Comparative Risk Assessment (CRA) publications by WHO: http://who.int/healthinfo/boddocscra/en/index.html

Poverty mapping: http://go.worldbank.org/R00QIVF2A0

Scenario analysis: http://go worldbank.org/GLTQA9DHW0

Other Tools:

Public Expenditure Reviews (PERs) are a key tool for analyzing public-sector issues by systematically assess the equity, efficiency, and effectiveness of public environmental spending. See: http://go.worldbank.org/W98PDJFYC0

Public expenditure tracking survey (PETS) is a technique for tracking the effect of public expenditure on growth and/or social outcomes. For more information: http://go.worldbank.org/KQQS1BDG90

Quantitative service delivery survey (QSDS) evaluates efficiency of public spending and incentives by collecting data on inputs, outputs, quality, pricing, and oversight, etc. For more information see: http://go.worldbank.org/MB54FMT3E0

Knowledge management: http://www.who.int/kms/en/

16. This section highlights some of the conclusions reached by the participants of the Workshop on Environmental Health Indicators: Cure or Placebo? June 2006. World Bank, Washington D.C.

Photo: Francis Dobbs

4. BUILDING LONGER-TERM CONSTITUENCIES TO SUPPORT POVERTY-ENVIRONMENT-HEALTH ISSUES

The previous chapter outlined several stages in the development planning process where environmental health inputs could be incorporated by government officials from finance and planning or by a mayor's office. This chapter discusses a topic that cuts across the entire development planning and implementation cycle, namely the creation of long-term constituencies within a country to help continually focus attention on environment-health-poverty issues and promote social accountability among public officials for effective action on these issues (Ahmed and Sánchez-Triana 2008). Such constituencies are also important for facilitating results on this agenda, as environmental health often requires both technology change as well as behavioral change to achieve improved environmental health outcomes.

In order to build constituencies, the first step is making information on poverty-environment-health issues available in order to raise awareness, both in terms of holding the government accountable but also to promote behavioral change among the population. Effective means of communicating this information and making people aware of how they can access the information is equally important. A second important step is involving the public in decision making. Encouraging the participation of weak and vulnerable stakeholders is particularly important, so that all views are taken into account, rather than the views of the more powerful and vocal stakeholders only. A third stage is providing access to justice for all citizens in order to promote social accountability among public officials. These three aspects, namely public disclosure of information, public participation in decision making, and access to justice on environmental matters are highlighted in Principle 10 of the Rio Declaration on Environment and Development and more recently in the Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (www.unece.org/env/pp/documents/cep43e.pdf).

The remainder of this chapter discusses each of these three themes in more detail and in an environmental health context. It also describes the role of different stakeholders in facilitating the formation of constituencies for supporting environmental health and poverty issues. Clearly the government, at both the national and local levels, has an important role to play here. However, the role of civil society organizations (CSOs) and NGOs, as well as the private sector, is equally important.

AWARENESS-RAISING AND COMMUNICATION STRATEGIES

Within the development planning process, monitoring poverty and environmental health indicators are clearly important from the perspective both of understanding the baseline situation, and of monitoring the future impact of policy changes and additional investment. Equally important is making this information available to the general public so that its implications are understood by them and they can use it as a mechanism to hold public officials accountable in the longer term. Box 15 illustrates such an example from Colombia. There are many other examples of policies or programs that facilitate the dissemination of information to the public, including (a) transparency laws enacted by governments; (b) government reports and websites that share monitored information on poverty-environment-health indicators; and (c) voluntary and mandatory public disclosure schemes supported by the private

Box 15. Building Constituencies in Colombia to Reduce Urban Air Pollution

In 2005, the Colombian government requested the World Bank to carry out a Country Environmental Analysis for Colombia. This included a study focused on calculating the cost of environmental degradation. This study estimated that there were close to 6,000 premature deaths as a result of outdoor air pollution in the country, reflecting the shift from a rural economy to a highly urbanized one in the last four decades. Wide media coverage of these findings resulted in a broad public debate, which was also taken up by politicians during the recent reelection campaign. One candidate placed white blankets in the open air in Bogota and then widely disseminated to his constituency the change in color of these same blankets, comparing it to the effect on their lungs and quality of life. This open public debate has resulted in increasing the number of champions in the authorities to revise air quality standards. In 2007, the first Air Pollution Control bill was discussed in the National Congress.

Source: Ahmed and Sánchez-Triana 2008.

Box 16. Environmental Health in the Media

The media is a powerful tool for spreading messages regarding environmental health. Reports from developing countries show that the very first information many people receive about a health hazard is through their newspaper or radio/TV program, followed by a reaction by the formal establishment, either the government or the private sector. Newspapers in particular help create public awareness. In Zambia, a newspaper reporter, when asked what was newsworthy stated: "It is health-related stories such as pollution in cities and their effect on people's lives."

Some examples of the issues covered in developing countries include:

- In Brazil, the mass media appears to concentrate more attention on oil spills near Rio de Janeiro than epidemics affecting the favelas of the city or the epidemics in Amazonia.
- Issues of the Montreal Protocol gets regular coverage in the southern part of Chile, which is near the Antarctic ozone hole and greatly affected by climate change. In contrast, Chile's national media takes less interest in the issue and coverage is superficial.
- A media taboo is lack of sanitation, which has a direct bearing (with hygiene) on people's health.
- There is an overwhelming need to train environmental health journalists, given the increasing complexity of the issues, whether they are global, national, or local.
- How the environment impacts people's health is of direct relevance to those affected.

Source: D'Monte 2005.

Box 17. The Global Public-Private Partnership for Handwashing with Soap in Ghana

In 2004, the National Handwashing Campaign launched an intensive media campaign through three television networks and 17 radio stations throughout the 10 regions of Ghana. These public service announcements were complemented by a number of radio and television discussion programs, with interviews held throughout the country on national media and district-specific FM radio stations. The communication program was supplemented by district-level handwashing action plans for implementation. After six months, reported rates of handwashing with soap among mothers and schoolchildren showed a marked improvement over baseline rates. Exposure to all campaign materials was also very high, with over 80 percent of children and adults reporting positive behavior change since the campaign launch.

Source: Kristensen 2005.

Box 18. Worm Control: An Opportunity for the School System

Recent studies in a number of African countries have shown that primary school teachers can play a key role in the treatment of children with parasitic worm infections. Teachers can also play a part in mobilizing pupils and their parents to prevent environmental transmission of worms (and not just to treat the infection) by building latrines, and clearing vegetation from bathing places infected with schistosomiasis.

Source: Cairncross and Kolsky 2003.

sector together with governments, such as the Pollution Reduction and Transfer Registry for industry in Mexico, the European Blue Flag Scheme for clean beaches, or the PROPER industry disclosure program in Indonesia.

Communication strategies are crucial in making sure this information is accessed and understood by the public and to help stimulate a two-way flow of information. The media can play an important role and efforts to train journalists to understand and report accurately on environmental issues. Box 16 examines some ways in which the media has covered environmental health, with big one-time stories getting more coverage than the long-term environmental health issues that affect millions of people everyday.

Communication is also crucial from the perspective of raising social awareness and promoting behavioral change to improve environmental-health outcomes. Approaches to marketing the links between environment, health, and behavior include television, radio, and street theater. For example, the Mexican television producer Miguel Sabido deftly weaves health and other socially responsible information into "traditional" soap operas to raise consciousness about issues such as diseases that are preventable or readily treatable. The plots of television shows and theater are innovative ways to incorporate environmental health issues, thus both entertaining and educating the general public. Box 17 illustrates how a media campaign in Ghana helped increase handwashing with soap.

Awareness may also be promoted in collaboration with primary and secondary schools. Linking health program delivery into the education system has also proven to be cost-effective. Collaboration between the health and education ministry, teachers and health workers, schools and community groups can be fostered. Experience has shown that school-age children

can carry messages home to their families, including younger siblings, and connect with the wider community in conveying messages on personal hygiene, handwashing, and promoting improved sanitation. For example, for the overall promotion and control of malaria in the community, schools have been successful partners through helping to promote a community-wide understanding of disease and health issues with particular emphasis on the need for community-based control measures, such as the use of impregnated bednets for malaria. Schools can serve as a focus for synchronized impregnation of bednets and distribution (Hunt and Peralta 2003). Another example is in the treatment of parasitic worm infections (Box 18).

Awareness-raising may also be built into the curriculum for professional qualifications. However, less formal education can also play a key part by showing those working on their own how they can help achieve wider benefits, as the Farmer Fields School work on malaria shows (Box 19).

In some cases, improvements to environmental health require interventions that change behaviors. Social marketing builds on traditional marketing approach of the four Ps: product, price, place, and promotion. It is often applied to service provision and use, the development and acceptance of products, or the adoption of new behavior. Social marketing begins with a systematic use of data collection to find out what consumers know, do and want (LSHTM/EDC 1998). The results are used to develop positive messages that address specific health problems. Often it is behavior-focused through for example, hygiene promotion. Over six months of hygiene promotion with a pilot group in Lucknow, India, the proportion of mothers washing their hands with soap after defecation went from under a quarter to over half (LSHTM/EDC 1998). Large-scale social marketing of treated bed nets in rural Tanzania showed an increase in the number of infants sleeping under bed nets from under 10 percent at baseline to over 50 percent three years later. This was further associated with a 27 percent increase in child survival among children from 1 month to 4 years old (Schellenberg et al. 2001). While in Zambia, the Safe Water Systems social marketing program has shown a similar success, with the use of chlorine for household drinking water treatment rising from 13.5 percent in 2001 to 42 percent in 2004 (Scott 2005).

PARTICIPATION AND STAKEHOLDER INVOLVEMENT

Participation of stakeholders can facilitate prioritization, help set the agenda, collaborate with implementation, and contribute to monitoring. Often both the poor and local governments are left out of participating in development planning. For this reason, both legal and informal mechanisms that bring together different viewpoints during the policy formulation and implementation process (particularly of those that are most vulnerable) are important (Feldman and Khademian 2008). For example, focus groups with women in Guatemala showed a lack of awareness of the link between indoor air pollution (environmental health issue) and acute respiratory infections (health outcome), which was the single most important cause of morbidity and mortality in the country (Ahmed et al. 2005). Indoor air pollution, however, was a lower priority for Guatemala than urban air pollution. Important environmental health issues for the poor may not make it to the policy agenda without an active effort by public officials to involve and hear the voices of these groups. Sometimes NGOs step in to amplify the voices of these vulnerable groups, as was the case in Ukraine (Box 20).

Involving local constituents and civil society organizations (CSOs) can also help in the implementation of environmen-

Photo: Curt Carnemark

"We have nobody to talk to when we face problems. We become reluctant to talk because village leaders ignore our complaints especially if they touch [governance] issues"

– Women's Dignity Project 2003

Box 19. Tackling Malaria through Work with Farmers — the Farmer Field School Approach

The Farmer Field School uses experiential learning methods to build farmers' expertise. It has an impressive track record in participatory community approaches to agricultural issues. Over 2 million farmers have studied integrated pest management (IPM) during the past 15 years, mainly in Asia, but more recently also in Africa, the Middle East, and Latin America.

Malaria has strong linkages with agriculture, and farmers in regions with malaria have a central position in creating or controlling the conditions that favor disease transmission. An interdisciplinary approach is needed to involve farmers with other sectors in control efforts. Malaria control can benefit from a complementary intervention in rural development, such as in the combined health-agriculture curriculum known as integrated pest and vector management (IPVM) developed in Sri Lanka. Agricultural practice will influence malaria epidemiology if income and living standards are raised (by improving people's access to health care) and if agro-pesticide use is reduced (by lowering the risk of insecticide resistance in malaria vectors). Institutional ownership and support for IPVM could potentially be spread over several public sectors, requiring a process for institutional learning and reform.

Source: van den Berg and Knols 2006.

Photo: Eric Miller

Box 20. Women take a Lead in Tackling Environmental Health Problems

Luzanivka—a district of Odessa in the Ukraine—suffered for many years from two major environmental problems that had direct and serious health impacts. Due to inadequate sewage-pumping capacity in the district, residential houses were often affected by sewage spills. IN addition, a nearby chemical plant had a facility for cleaning railway oil tanks in the open air. This problem led to a severe environmental disaster in 1996, when six people died.

This resulted in a rapid increase in community activity led by a group of low-income women. They initially focused their activities at the grass-roots level, working with people who were most severely affected. They approached the local authorities several times, but were told that there were no funds to address the sewage and air pollution problems.

They responded by working harder and built up their own expertise. They worked with other residents to document the full extent and impact of the environmental problems. Then, with the help of a lawyer, they got 80 residents to sue the local authority for failure to act on air and sewerage problems. This was backed up by protests and media work and was supported by the NGO Mama 86. After some discussion, the national government finally agreed to fund construction of a new sewage facility. The local authority also allocated funds for environmental works in the district.

This participatory action was a new experience for many people in Ukraine. The women led the way in demanding improvements to environmental health systems. While they started with protests, they are now working in cooperation with the state government and local authorities. Luzanivka is still a poor community, but the sewage facility has been built, the hazardous waste facility has been closed, and the wetlands polluted by the oil have been cleaned up.

Source: ANPED 2005.

Box 21. A Hood Solution for a Maasai Community in Rural Kenya

In Kenya, 96 percent of the population lacks access to grid electricity and more than 80 percent of the population relies on solid fuels. Masai women in the Kajiado region cook and heat with wood, cattle dung, and crop residues. Fires are often kept smoldering throughout the day and night, leading to very high levels of indoor smoke. The Intermediate Technology Group/Practical Action (ITDG/Practical Action) worked with local women to solve this problem.

Participatory approaches accompanied the solution from beginning to end. Repeated talks with the Masai community revealed the many health and social problems associated with indoor smoke. From a range of options, the women cooks decided on a simple and affordable smoke hood as the solution that best suited their needs. Together with local artisans, ITDG/Practical Action developed and tested a hood that draws smoke straight from the fire and out through the roof. Once installed, this smoke hood cut down concentrations of respirable particles by up to 80 percent, from more than 4300 mg/m3 to about 1000 mg/m3.

Source: WHO 2006c.

tal health interventions. In rural Kenya, for example, women collaborated with an international NGO to design a low-cost solution—a smoke hood—that not only reduced their exposure to indoor air pollution but also helped the local economy by having local artisans build them (Box 21).

Local governments are in a particularly strong position to facilitate stakeholder involvement and participation at the grass-roots level. Box 22 illustrates how local governments—working directly with affected communities in partnership with NGOs—have successfully improved slum sanitation in India.

Involving stakeholders early in the process of decision making may also help implement politically difficult policies with minimal social unrest (Box 23). If the general public is given information about how a particular practice or environmental risk is affecting their health and they are brought into the consultation process, they will not only support the intervention, but will most likely demand it.

Involvement of research institutes and local universities is important as they can support research on linkages between environmental health and poverty, help analyze data to make decisions, design new innovative projects, and help in monitoring the results. This may require building some research capacity in developing countries. For example, Danida has successfully provided budget support for a program of comprehensive capacity building on intersectoral and intercountry Health Impact Assessments (HIA) in the Mekong Basin.

International as well as national partnerships can help mobilize concern and commitment for environmental health actions to achieve the MDGs. Such partnerships include, for example, the Water, Sanitation and Hygiene (WASH) initiative, led by the Water Supply and Sanitation Collaborative Council; the Global Handwashing Initiative, and the Water and Sanitation

Box 22. Slum Sanitation in Mumbai, India: Building Sustainable Partnerships

Approximately 55 percent of the population of Mumbai lives in slums. Surveys show that 80 percent of the 9,700 public toilet blocks were not functioning and hardly meet 50 percent of the total demand.

The Slum Sanitation Program (SSP) decided to tackle the issue by implementing a framework based on a demand-driven and participatory approach. It adopted a learning-by-doing capacity-building strategy. At the end of the pilot phase, the program moved toward an innovative partnership between the municipality and communities. The municipality provided initial capital to build community toilet blocks, while the community would take full charge of operation and management. The municipality also provided slum dwellers with information packages on hygiene, program implementation and management, the construction of the community toilet block, and the provision of complementary utilities such as water and electricity. NGOs also participated by building the toilet blocks with community inputs.

The first lesson learned from this case study is that stakeholder partnerships are the key to success. Second, ensuring that local communities take charge of management is key to the sustainability of the program. Third, to facilitate and speed up implementation, it is important to work across complementary government institutions/departments to guarantee the mainstreaming of all the necessary bureaucratic procedures. Fourth, an integrated approach to the provision of a wider set of environmental services (including water and electricity) is needed. Last, a solid mechanism for initial assessment and ongoing monitoring and evaluation is important to support the implementation process, evaluate the impact on the ground, and provide lessons for scaling up.

Source: Nitti and Sarkar 2003.

"We don't have influence over the hospital because they don't take our advice"

– Poor people in Mtamba, Malawi

Box 23. Dhaka Two-Stroke Three-Wheelers Phaseout

Three-wheelers with gas-fueled two-stroke engines, nicknamed "baby taxis," provided useful point-to-point transportation for passengers but were a major source of particulate and hydrocarbon air pollution in Dhaka, Bangladesh. Numbering around 50,000, their emissions were exacerbated by the excessive use of inferior-quality lubricant (called straight mineral oil). While technical solutions to reduce and even eliminate this pollution could be designed, implementing such a solution was considered nearly impossible, as made clear at an initial stakeholder's consultation meeting. A five-year multipronged approach was launched to better understand the issues and agree on possible solutions. The plan was to learn and share all information with stakeholders in a transparent manner. Media coverage of activities assisted in raising awareness of Citizens of Dhaka; without this NGO's support, an eventual phaseout would not have occurred.

As a result of the actions mentioned above, a complete ban on all two-stroke baby taxis began in Dhaka on January 1, 2003. Because of prior consultation in preparation for the ban, there was minimal social unrest, even though some of the drivers were displaced. The public response as reported in the media and polls has been overwhelmingly positive, citing much cleaner air along traffic corridors in Dhaka. The weekly average before and after removal of baby taxis shows a 40 percent drop in the average PM2.5 level. This reduced the health impact for the public, in particular the baby-taxi drivers, who were breathing the pollution over 16 hours a day.

Source: World Bank.

Photo: Curt Carnemark

Box 24. Sri Lanka: Collaboration for Urban Air Quality Management

In response to deteriorating air quality in Colombo, the World Bank supported the government of Sri Lanka through a grant for institutional development that helped to build cross-sectoral capabilities not only in government agencies, but also in the private sector and civil society. A key achievement was to facilitate national consensus to move the target date for eliminating leaded gasoline from 2010 to mid-2002. The grant also supported the establishment of the Air Resource Management Center, which has had considerable success in achieving cross-sectoral coordination, leading to development of a program of measures to improve urban air quality, including the Clean Air 2005 Plan, and the introduction of initiatives to control vehicular pollution through emissions standards, regulation, fuel pricing, import policies, and public awareness.

Source: Martin 2004.

Box 25. Reinforcing Social Accountability for Improved Environmental Governance in India

In recent years, India has made progress in accessing the judiciary to address environmental pollution issues. A landmark case on air quality in Delhi firmly brought this issue to the attention of government policymakers and emphasized their accountability to the general public. In the early 1990s, an Indian NGO asked the Supreme Court to compel the Delhi government to enforce the clean air laws that had been passed some 15 years earlier. After a long and sustained campaign—which used quantitative information on health damage effects, including estimated mortality rates, as well as an effective public awareness campaign through the press—the Supreme Court in 1998 issued its first comprehensive mandate for tackling air pollution.

Source: World Bank 2005b, Blair 2008.

Program. The new Global Water Challenge, supported by the United Nations Foundation, is a network of local and international nongovernmental organizations, private sector companies, government officials, and community representatives that support national programs and has already begun to reap the fruits of effective collaboration.

The impetus for improved collaboration and strengthened partnerships can come from within country governments, but may also come from other voices in society as well as external actors. Multilateral and bilateral donors can provide incentives for intersectoral collaboration through their projects and programs. Pressure to improve environmental health issues may also come from NGOs and civil society, as in the case of Mumbai (Box 22) or from the international community, as in the Sri Lanka example (Box 24).

ACCESS TO JUSTICE

Social accountability refers to the broad range of actions (beyond voting) that citizens themselves can use to hold the state accountable; examples include citizen monitoring of public services, participatory expenditure tracking, social auditing, independent budget analysis, civil society monitoring of the impact of policies, and so on (Malena et al. 2005). The social accountability initiatives regularly rely on actions on the part of government, the media, and other societal actors that increase transparency, improve access to public information, or enhance the enabling environment for civil engagement (Malena et al. 2005). Through allowing legal recourse to justice, governments can lay the ultimate foundation for social accountability. Box 25 illustrates an example from India of how civil society organizations (CSO) can put pressure on local governments to enforce its regulations by appealing to the judicial system and sustaining a media campaign on the effects of air pollution, thereby increasing people's awareness.

In Europe, civil society organizations fought to get laws changed so that they could have information and legal rights when their environment and health was damaged (Stephens and Bullock 2000). The Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters is the first international agreement that takes forward both participation in decision making and social accountability (Stephens 2007). The United Nations Economic Commission for Europe (UNECE) describes the convention in the following terms: "The Convention adopts a rights-based approach. Article 1, setting out the objective of the Convention, requires Parties to guarantee rights of access to information, public participation in decision making, and access to justice in environmental matters. It also refers to the goal of protecting the right of every person of present and future generations to live in an environment adequate to health and well-being, which represents a significant step forward in international law. These rights underlie the various procedural requirements in the Convention." (United Nations Economic

Commission for Europe 1999). The convention entered into force on October 30, 2001 and was hailed as a milestone of environmental democracy.

This chapter has outlined the importance of how to build stronger constituencies for environmental health issues through provision of information, public participation in decision making, and access to justice on environmental matters. In the longer term, these constituencies are crucial to more effectively raise the profile of environmental health issues and ensure their integration into national development plans and poverty reduction strategies.

Other resources:

Participatory poverty assessment (PPA) collects poor people's views regarding their own analysis of poverty and the survival strategies that they use. See: http://go.worldbank.org/QAASG4TK80

The Access Initiative: http://www.accessinitiative.org

Partnership for Principle 10: http://www.pp10.org/

Aarhus Convention: http://www.unece.org/env/pp/contentofaarhus.htm

Water Supply and Sanitation Collaborative Council: http://www.wsscc.org/

Global Water Challenge: http://www.globalwaterchallenge.org/

Global Handwashing Initiative: http://www.globalhandwashing.org/

Water and Sanitation Program: http://www.wsp.org

Photo: Ray Witlin

5. MOVING TOWARD ACTION

The previous two chapters have discussed how national and local government actions can facilitate the integration of environmental health issues in development planning and poverty reduction strategies processes as well as to help build long-term constituencies for environmental health issues faced by the poor. Given the nature of the interventions and their impact on improving the well-being of the poor, this chapter briefly discusses how government officials can also draw upon the support of other actors, namely NGOs and CSOs and multilateral and bilateral institutions, to support their efforts.

"When food was in abundance, relatives used to share it. In these days of hunger not even relatives would help you by giving you some food."

– A young man, Nchimishi, Zambia (Dying for Change 2002)

HOW DONORS AND NGOS CAN SUPPORT GOVERNMENT EFFORTS

Many of the tools described in Chapter 3—such as cost-benefit analysis, cost-effectiveness analysis, cost of degradation, and public expenditure reviews—are tools whose use in developing countries is frequently financed by multilateral and bilateral agencies. Officials may wish to draw upon this support as they prepare their development agendas. More broadly, resources applied to programmatic budget support and technical assistance for institutional capacity building can also be utilized by countries to strengthen institutions and governance mechanisms linked with poverty-environment-health issues. The Paris Declaration on Aid Effectiveness establishes global commitments for donor and partner countries to support reforms intended to "increase the impact of aid in reducing poverty and inequality, increasing growth, building capacity and accelerating achievement of the MDGs" (Paris Declaration 2005). In particular, the Paris Declaration recognized the importance of strengthening institutions for development.

The Paris Declaration's main principles are (a) ownership, so that partner countries exercise effective leadership over their development policies and strategies and coordinate development actions; (b) alignment, so that donors base their overall support on countries' national development strategies and procedures; (c) harmonization, so that donor's actions are more harmonized, transparent, and collectively effective; (d) managing development results, which emphasizes the need for results-oriented policies and programs and the need to regularly monitor actual outcomes to identify corrective measures as needed; and (e) mutual accountability, so that both donors and partners are accountable for developments (Shine and Paris 2007).

There are several key future directions highlighted by the Paris Declaration to support action on cross-cutting issues such as environmental health. The shift toward program-based approaches offers potential when accompanied by other development cooperation instruments that build institutional capacity. Development agencies can help by strengthening institutional capacity relating to environmental health for cross-sectoral policy integration. This means supporting the development of a country's national policy formulation, resource allocation mechanisms, and systems and procedures to set targets, and then monitoring the results (Shine and Paris 2007).

Specific reference is also made in the Paris Declaration to the need for specific capacity in areas such as environmental economic analysis to (a) better quantify the economic and financial value of improved environmental health issues, and (b) make a stronger case for environmental health management in negotiations with economic, finance, and planning ministries. Another challenge is to support CSOs and multistakeholder forums involved in informing and influencing policy debates that bring environmental health to the forefront (Shine and Paris 2007).

Photo: Tran Thi Hoa

The involvement of NGOs and CSOs to support the building of longer-term constituencies is also crucial. This suggests that activities (often by other NGOs)—such as through The Access Initiative—that aim to strengthen NGO capacity within a developing country to be better advocates for these issues is also important.

The Poverty Environment Partnership (PEP), as a network of multilateral and bilateral development partners as well as major NGOs, is well-positioned to help support governments in such efforts. At a broad level, PEP can (a) make the case for linking environmental health to poverty reduction by highlighting its economic importance; and (b) incorporate environmental health into existing tools, programs, and investments by PEP members to enhance the quality of life of the poor.

CONCLUSION

There is an immediate need to tackle environmental health issues as part of any strategy to reduce poverty. Problems such as unsafe water, sanitation and hygiene, and air pollution are major contributors to the worldwide disease burden. Poorer communities are disproportionately affected by these issues, which seem likely to worsen with climate variability and change. Ill-health resulting from these problems affects individual's ability to earn a living or go to school, and also affect communities' efforts to improve their longer-term quality of life. At the same time, there may be significant opportunities to affect change rapidly, particularly in areas of population concentration—where poverty, environment, and health issues all overlap—such as in urban slums.

Despite this, the institutional problems associated with working across disciplines—including environment, health, education, energy, water, sanitation, and hygiene—mean that a holistic approach to poverty and environmental health remains a challenge. Making progress in reducing environmental health risks that work toward poverty reduction and sustainable development requires changes in the array of policies, tools, and institutional priorities. Government departments—such as finance or planning or a mayor's office—are particularly well-suited to playing a coordination role to address the environmental health agenda.

This report has outlined two strategies for tackling this enormous and important agenda for the world's poor. This two-pronged approach focuses on (a) identifying the entry points and tools that public officials can use to integrate environmental health issues important for the poor into development plans and poverty reduction strategies, and (b) discussing the elements that are important to help build longer-term constituencies to continually raise the importance of these issues on the development agenda. Governments, NGOs, and the private sector can play a role in facilitating these processes.

National action by governments supported by other partners—including NGOs, the private sector, and multilateral and bilateral institutions—is important to achieve outcomes that can directly contribute to the MDGs. After all, a move toward results on this important agenda—and consequently a continuous improvement in the quality of life of the poor—is essential for sustainable development.

"At least my daughter's education will ensure that she will get a groom who comes from a home with a toilet."

– Manjulaben, age 38, a daily wage laborer from Nagalpur village, Gujarat state, India (Dying for Change 2002)

REFERENCES

Ahmed, K., Y. Awe, D. Barnes, M.Cropper, and M. Kojima. 2005. *Environmental Health and Traditional Fuel use in Guatemala*. Directions in Development. Washington, DC: World Bank.

Ahmed, Kulsum and Ernesto Sánchez-Triana, eds. 2008. *Strategic Environmental Assessment for Policies: An Instrument for Good Governance*. Environment and Development Series. Washington, DC: World Bank.

Alderman, H., J. Konde-Lule, I. Sebuliba, D. Bundy and A. Hall. 2006. "Effect on weight gain of routinely giving albendazole to preschool children during child health days in Uganda: cluster randomised controlled trial." *BMJ* 333(122).

ANPED (The Northern Alliance for Sustainability). 2005. *Building our Common Future*. London: ANPED.

ADB, CIDA, DANIDA, EC, GTZ, Irish Aid, IUCN, SEI, Sida, SIWI, SDC, UNDP, UNEP, and WHO. 2006. *Linking Poverty Reduction and Water Management.* Prepared on behalf of the Poverty-Environment Partnership. Available at: http://www.povertyenvironment.net/pep/?q=node/288

Blair, H. 2008. "Building and Reinforcing Social Accountability for Improved Environmental Governance." In K. Ahmed and E. Sánchez-Triana, eds. *Strategic Environmental Assessment for Policies: An Instrument for Good Governance*. Environment and Development Series. Washington, DC: World Bank.

Bojö, J., K. Green, S. Kishore, S. Pilapitiva, and R. C. Reddy. 2004. "Environment in Poverty Reduction Strategies and Poverty Reduction Support Credits." Environment Department Paper 93. Washington, DC: World Bank

Bojö, J., and R.C. Reddy. 2002. *Mainstreaming environment in poverty reduction strategies.* Environment Strategy Notes. Washington, DC: World Bank.

Bojö, J., and R.C. Reddy. 2003. "Poverty Reduction Strategies and the Millennium Development Goal on Environmental Sustainability Opportunities for Alignment." *Environmental Economic Series*: 92. Washington, DC: World Bank.

Borghi, J., V. Curtis, L. Guinness, and J. Ouedraogo. 2003. "Is hygiene promotion cost-effective? A case study of Burkina Faso." *Trop Med Int Health* 7(11):960-9

Breman, J., M. Alilio, and A Mills. 2004. "Conquering the Intolerable Burden of Malaria: What's New, What's Needed: A Summary." *American Journal of Tropical Medicine and Hygiene* 71 (2 suppl.): 1–15.

Cairncross, S., and P. Kolsky. 2003. "Environmental health and the poor: our shared responsibility." Available at: http://www.lboro.ac.uk/well/resources/Publications/Advocacy%20document%20-%20Front%20cover%20+%20insides.pdf

Cairncross, S., D. O'Neill, A. McCoy, and D. Sethi. 2003. "Health, Environment and the Burden of Disease: A Guidance Note." Prepared for the UK Department for International Development (DFID). London: UK Department for International Development.

Campbell-Lendrum, D., C. Corvalán, and M. Neira. 2007. "Global climate change: implications for international public health policy." *Bulletin of the World Health Organization* 85(3): 235–237.

Chambers, R. 1997. *Whose Reality Counts? Putting the First Last*. London: Intermediate Technology Publications.

D'Monte, J. 2005. "Reporting on environmental health: what works in media." Background paper commissioned by the Environment Department. Washington, DC: World Bank.

Dale, N.J. 2005. "Integrating environmental issues into PRSPs in ECA countries." Environment Strategy Note 12. Washington, DC: World Bank.

DFID, EC, UNDP, and World Bank 2002. *Linking Poverty Reduction and Environmental Management*. Washington, DC: World Bank. Available at: http://www.sarpn.org.za/wssd/protagonists/pr_em/WSSD_Paper_Final_Version.pdf

Epstein, P. 2001. "Emerging diseases in a warmer world." Available at: http://www.peopleandplanet.net/doc.php?id=774 (Accessed October 26, 2007.)

Ezzati, M., A. Rodgers, A. D. Lopez, S.V. Hoorn, and C. Murray. 2004. "Mortality and Burden of Disease Attributable to Individual Risk Factors." In eds. *Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors*. Geneva: World Health Organization.

Feldman, M., and A. Khademian. 2008. "The Continuous Process of Policy Formation." In K. Ahmed and E. Sánchez-Triana, eds. *Strategic Environmental Assessment for Policies: An Instrument for Good Governance*. Environment and Development Series. Washington, DC: The World Bank.

Fewtrell, L., A. Pruss-Ustun, R. Bos, F. Gore and J. Bartram. (2007). *Water, Sanitation and Hygiene- Quantifying the health impact at national and local levels in countries with incomplete water supply and sanitation coverage. Environmental Burden of Disease series No 15*. Geneva: World Health Organization.

Grantham-McGregor, S., Y. B. Cheung, S. Cueto, P. Glewwe, L. Richter and B. Strupp. 2007. "Child development in developing countries: developmental potential in the first 5 years for children in developing countries." *Lancet* 369(9555): 60–70

Guyatt, H., J. Kinnear, M. Burini and R. Snow. 2002. "A comparative cost analysis of insecticide-treated nets and indoor residual spraying in highland Kenya" *Health Policy Plan.* 17(2): 144–153

Hamilton, K., A. Markandya, and E. Sánchez-Triana. 2006. "Getting the most for the money- How public environmental expenditure reviews can help." Environment Strategy Notes. Washington, DC: World Bank.

Hunt, J.M., and G. Peralta. 2003. *A Primer on Health Impacts of Development Programs*. Manila: Asian Development Bank

Hutton, G. and L. Haller. 2004. *Evaluation of the Costs and benefits of Water and Sanitation Improvements at the Global Level.* Geneva: World Health Organization. Available at: http://www.who.int/water_sanitation_health/wsh0404/en/index.html

IDRC n.d. Ecosystem Approaches to Human Health Program Initiative. Available at: *www.idrc.ca/ecohealth*

IDRC. 2003. "Malaria and Agriculture in Kenya: a new perspective on the links between health and ecosystems". *Health: an Ecosystem Approach*. Ottawa, Canada: IDRC. Available at: http://www.idrc.ca/uploads/user-S/10588085651Ecohealth_Casestudy_02_e.pdf

Ijjasz, E., and L. Tlaiye. 1999. "Comparative risk assessment." Pollution Management Discussion Note No. 2.Washington, DC: World Bank.

IPCC. 2007. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK: Cambridge University Press.

Ivanov, I.D., L. Licari, and R. Bertollini, eds. 2004. "Health and the environment in the WHO European Region: Situation and policy at the beginning of the 21st century." Fourth Ministerial Conference on Environment and Health, Budapest, June 23–25, 2004. WHO Regional Office for Europe. Available at http://www.euro.who.int/document/eehc/ebakdoc05.pdf

Kishore, S. 2006. "Environmental Health Issues in Poverty Reduction Strategies: A Review." Environment Strategy Papers (12). Washington, DC: World Bank.

Klugman, J.A., ed. 2002. *A Sourcebook for Poverty Reduction Strategies.* Washington, DC: World Bank

Kristensen, P. 2005. "Environment and Health in Africa." In *Environment Matters: Annual Review.* Washington, DC: World Bank

Lee, K. 2007. "An Urbanizing World". In eds. *State of the World 2007: Our Urban Future*. Washington: The Worldwatch Institute.

LSHTM/EDC. 1998. *Guidance manual on water supply and sanitation programmes.* Prepared by Water and Environmental Health at London and Loughborough (WELL). Available at: http://www.lboro.ac.uk/well/resources/Publications/guidance-manual/guidance-manual.htm

Lovei, M., and P. Pillai. 2003. "Assessing environmental policy, regulatory and institutional capacity." Environment Strategy Notes. Washington, DC: World Bank

Lvovsky, K. 2001. "Health and Environment." Environment Strategy Paper 1. Washington, DC: World Bank.

Malena, C., R. Forster, and J. Singh. 2005. "Social Accountability —An Introduction to the Concept and Emerging Practice." Social Development Paper 76. Washington, DC: World Bank.

Martin, P 2004. "South Asia Region." *Environment Matters. Annual Report 2004.* Washington, DC: World Bank.

Miller, D. 2004. "Health-driven environmental issues a top concern in Low-GDP countries." *Environment Matters*. Washington, DC: World Bank.

Morgenstern, R. 2008. "Toward Environmental Priority Setting in Development." In K. Ahmed and E. Sánchez-Triana, eds. *Strategic Environmental Assessment for Policies: An Instrument for Good Governance*. Environment and Development Series. Washington, DC: The World Bank.

Nitti, R and S. Sarkar. 2003. "Reaching the poor through sustainable partnerships: the slum sanitation program in Mumbai, India." Urban Notes: Upgrading experiences (7). Washington, DC: World Bank

OECD. 2006. *Applying strategic environmental assessment: Good practice guidance for development cooperation*. Paris: OECD

OECD. 2006b. *Improving coordination between environmental and health policies: Final report.* Paris: OECD

Paris Declaration (2005). *Paris Declaration on Aid Effectiveness: Ownership, Harmonisation, Alignment, Results and Mutual Accountability*. Available at: http://www.oecd.org/dataoecd/11/41/34428351.pdf

Parkinson, J. 2007. "Improving environmental health outcomes of slum upgrading projects." Report commissioned for the World Bank. Washington, DC: World Bank.

Perlstadt, H. 2003. "International Evaluation of the Environment and Health Process and Action Plans in Europe: Findings and Lessons Learned from the Pilot Phase." Report for WHO/ Europe and the European Commission.

Pillai, P. 2000. *The state and collective action: successful adjustment by the Tamil Nadu Leather Cluster to German Environmental standards*. Unpublished MCP thesis. Cambridge, MA: MIT.

Prüss-Üstün, A., and C. Corvalán. 2006. *Preventing disease through healthy environments: Towards an estimate of the environmental burden of disease*. Geneva: World Health Organization

Rehfuess, E.A., S. Mehta, and A. Prüss-Uestün. 2006. "Assessing household solid fuel use: multiple implications for the Millennium Development Goals." *Environmental Health Perspectives* 114: 373–378.

Robb, C. M. 1998. *Can the poor influence policy? Participatory poverty assessments in the developing world.* Washington, D.C.: World Bank.

Rosen, G. 1958. *A History of Public Healt*h. Baltimore, The John Hopkins University Press.

Sarraf, M. 2004. "Assessing the costs of environmental degradation in the Middle East and North Africa Region." Environment Strategy Note No. 9. Washington, DC: World Bank.

Satterthwaite, D. 2007. "In Pursuit of a Healthy Urban Environment in Low- and Middle-income Nations" In P. J. Marcotullio and G. McGranahan eds. *Scaling Urban Environmental Challenges: From Local to Global and Back*. London: Earthscan

Schellenberg, J., S. Abdulla, R. Nathan, O. Mukasa, T. Marchant, N. Kikumbih, A. Mushi, H. Mponda, H. Minja, and H. Mshinda. 2001. "Effect of a large-scale Social Marketing of Insecticide-treated nets on Child Survival in rural Tanzania." *Lancet* 357 (9264):1241–47

Scott, B. 2005. "Social Marketing: A Consumer-based approach to promoting safe hygiene behaviours". *WELL Factsheet*. Available at: http://www.lboro.ac.uk/well/resources/fact-sheets/fact-sheets-htm/Social%20marketing.htm (Accessed March 3, 2008)

Shine, T., and R. Paris. 2007. "Paris declaration on aid effectiveness and implications on environmental sustainability." Paper prepared for the Workshop on Development Effectiveness in Practice—Applying the Paris Declaration to Advancing Gender Equality, Environmental Sustainability and Human Rights, April 26–27, 2007, Dublin, Ireland. Available at: http://www.oecd.org/dataoecd/39/61/38441220.pdf

Shyamsundar, P. 2002. "Poverty–environment indicators." Environmental Economics Series. Washington, DC: World Bank.

Smith K. R., S. Mehta, and M. Maeusezahl-Feuz. 2004. "Indoor Air Pollution from Household Use of Solid Fuels." In eds. *Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors*. Geneva: World Health Organization .

Spencer, R., M. Watson, and B. Zhou . 2006. "Institutional Reform Linking Poverty and the Environment: Experience from Yunnan Province, People's Republic of China." In Steele, P; G. Oviedo, and D. McCauley eds. *Poverty, Health and Ecosystems: Experience from Asia*. Manila: Asian Development Bank.

Stephens, C., and S. Bullock. 2000. "Environmental Justice: An issue for the health for the children of Europe and the World." In G. Tamburlini, ed. *The Environment and Children's Health in Europe.* Rome: World Health Organization.

Stephens, C. 2007. "Guest Editorial: Environmental Justice in the 21st Century- locally important, internationally critical." *Environmental Research Letters*: 3 (in press).

Stern, N. H. 2007. *The economics of climate change: the Stern review*. New York: Cambridge University Press.

Sullivan, K., and D. Barnes. 2007. *Energy Policies and Multitopic Household Surveys Guidelines for Questionnaire Design in Living Standards Measurement Studies.* Washington, DC: World Bank

Svedberg, P. 2006. "Child Malnutrition in Shining India: A X-state Empirical Analysis." Available at: http://www.bvsde.paho.org/bvsacd/cd56/svedberg-070906.pdf. (Accessed March 3, 2008.)

Teklehaimanot, A., B. Singer, A. Spielman, Y. Tozan, and A. Shapira. 2005. *Coming to grips with malaria in the new millennium.* Millenium Development Project Task Force. London: EarthScan..

U.N. (2005). *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals*. Report of the Millennium Project to the UN Secretary General. New York: United Nations

UNDP. 2006. *Making progress on Environmental Sustainability: Lessons and recommendations from a review of over 150 MDG country experiences*. New York: UNDP

UNDP-UNEP Poverty-Environment Initiative. n.d.. *Country fact sheet on Tanzania*. New York: UNDP-UNEP. Available at: http://www.unpei.org/PDF/Tanzania-country-sheet.pdf

UNICEF. 2006. *UNICEF Statistics: Water.* Available at: http://www.childinfo.org/areas/water/ (Accessed November 2006)

United Nations Centre for Human Settlements Programme. 2006. *The state of the world's cities*. Nairobi, Kenya: UNCHS (Habitat)

United Nations Economic Commission for Europe. 1999. *Convention on Access to information, Public Participation in Decision-Making and Access to Justice in Environmental Matters*. Geneva: UNECE.

United Nations Human Settlements Program. 2003. *The Challenge of Slums: Global Report on Human Settlements*. London: James & James/Earthscan.

van den Berg, H.V., and B.G. Knols. 2006. "The Farmer Field School: a method for enhancing the role of rural communities in malaria control." *Malaria Journal* 5 (3).

WHO. 2000. "Considerations in evaluating the cost-effectiveness of environmental health interventions." Available at: http://www.who.int/quantifying_ehimpacts/publications/en/wsh00-10.pdf

WHO. 2002. *The World Health Report: Reducing Risks, Promoting Healthy Life*. Geneva: WHO.

WHO. 2004. *PRSPs: Their significance for Health: second synthesis report*. Geneva: WHO.

WHO. 2005. *Water, Sanitation and Hygiene Links to Health: Facts and Figures Updated November 2005.* Geneva: WHO. Available at: *www.who.int/water_sanitation_health/publications/facts2004/en/*

WHO. 2005b. *The Millenium Development Goals: the evidence is in: deworming helps meet the Millenium Development Goals*. Geneva: World Health Organization

WHO. 2005c. *WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide, and sulfur dioxide—Global update 2005—Summary of risk assessment.* Available at: http://www.who.int/phe/health_topics/outdoorair_aqg/en/

WHO. 2006. *Fuel for life: household energy and health*. Geneva: WHO.

WHO. 2006b. *ITDG/Practical Action. Reducing indoor air pollution in rural households in Kenya: working with communities to find solutions.* The ITDG Smoke and Health Project, 1998–2001. Available at: http://www.itdg.org/docs/advocacy/smoke-project-report-kenya.pdf

WHO. 2007. "Randomized control trial in Guatemala." Available at: http://www.who.int/indoorair/interventions/guatemala/en/index.html

WHO. 2007b. *Indoor air pollution: National burden of disease estimates*. Geneva: World Health Organization.

WHO. 2007c. *Jordan: Water is life*. Available at: http://www.who.int/heli/pilots/jordan/en/index.html

WHO. 2007d. "Country profiles of environmental burden of disease."Available at: www.who.int/quantifying_ehimpacts/countryprofiles

WHO, UNICEF Joint Monitoring Programme on Water Supply and Sanitation. 2004. *Guide for water supply, sanitation and hygiene related survey questions.* Geneva: WHO/UNICEF

WHO/UNICEF. 2005. *Water for Life: Making it Happen*. Joint Monitoring Programme Report. Available at: http://www.wssinfo.org/en/40_wfl_2005.html

Women's Dignity Project in collaboration with GRAFCA (Grassroots Female Communicators Association). 2003. "Poor women's experiences of health services." Paper presented at NGO Policy Forum, October 31, 2003.

WHO and World Bank. 2002. "Dying for Change: Poor people's experience of health and ill-health." Washington, DC: World Bank

World Bank. 1998. "Comparative Risk Assessment." In *Pollution Prevention and Abatement Handbook*. Washington, DC: World Bank.

World Bank. undated. "Malaria-At-A-Glance."Available at: http://www.rbm.who.int/cmc_upload/0/000/014/813/Malaria_at_a_glance1.htm

World Bank. 2001. *Making Sustainable Commitments: an environment strategy for the World Bank.* Washington, DC: World Bank.

World Bank. 2002. *World Development Report 2002: Building Institutions for Markets*. Washington, DC: World Bank.

World Bank. 2002b. "Comprehensive Development Framework of the Kyrgyz Republic to 2010: Expanding the Country's Capacities." *National Poverty Reduction Strategy 2003–2005*. Washington, DC: World Bank.

World Bank. 2003. *The World Development Report*. Washington, DC: World Bank.

World Bank. 2005. *Integrating environmental considerations in policy formulation: lessons from policy-based SEA experience.* Washington DC: Environment Department, World Bank.

World Bank. 2005b. *For a breath of fresh air: ten years of progress and challenges in urban air quality management in India (1993–2000).* Washington, DC: World Bank

World Bank. 2006. *Poverty Environment Nexus: Sustainable approaches to poverty reduction in Cambodia, Lao PDR and Vietnam.* Washington, DC: World Bank.

World Bank. 2006b. *World Development Report 2006: Equity and Development* 2006. Washington, DC: World Bank.

World Bank. 2006c. *Republic of Colombia: Mitigating Environmental Degradation to Foster Growth and Reduce Inequality*. Washington, DC: World Bank.

World Bank. 2006d. *Repositioning nutrition as central to development: a strategy for large-scale action*. Washington, DC: World Bank.

World Bank. 2007. *Poverty and the Environment: Understanding the Linkages at the Household Level*. Environment and Development Series. Washington, DC: World Bank.

World Bank. 2007b. *Environmental Sustainability: A Key to Poverty Reduction in Peru.* Washington, DC: World Bank.

World Bank. 2007c. *The Philippines Environment Monitor 2006*. Washington, DC: World Bank

World Bank. 2008. *Environmental Health and Child Survival: Epidemiology, Economics, Experiences.* Environment and Development Series. Washington, DC: World Bank.

World Resources Institute. 2005. "Makings the MDGs and PRSPs work for the poor and the environment."In United Nations Development Programme, United Nations Environment Programme, The World Bank, World Resources Institute. Eds. *A guide to World Resources 2005. The Wealth of the Poor: managing ecosystems to fight poverty*. Washington, DC: World Resource Institute.