EXECUTIVE SUMMARY

*Environmental Health: Bridging the Gaps* is part of an effort by the World Bank’s Environmental Health: Bridging the Gaps program to mainstream environmental health into World Bank operations, particularly into environmental assessments. Part 1 of this volume provides background on environmental health and introduces a new, more effective approach to reducing poverty by addressing environmental health problems. Part 2 provides the basic tools needed to implement this approach. Part 3 presents findings of and background for a workshop in Ghana that puts into practice some of the ideas of parts 1 and 2. A glossary and bibliography of resources available on environmental health and other forms of assessments may be found among other back matter for the volume.

Part 1

Intended for policymakers and practitioners alike, part 1 of this volume explains the foundations of environmental health and proposes a new approach that taps health benefits systematically outside the health sector through multisectoral collaboration. Chapter 1 details the differences and challenges of environmental health in developing countries. The new approach introduced in chapter 2 addresses these challenges by harmonizing sectoral approaches through targeted collaboration to tap health benefits outside the health care system, benefits that tend to be missed. Chapter 3 asserts that environmental health measures can target at least an equal share of the burden of disease than the health sector, that is, roughly 20 percent for a fraction of the cost of health sector interventions. Chapters 4 through 6 compare and contrast six alternatives to making sound decisions, devising entry points, and establishing mutual benefits from targeted collaboration and provide practitioners with checklists related to Bank projects and components, proposing remedial measures.

*Chapter 1: Challenges of Environmental Health in Developing Countries*

- A great deal of the underlying causes of disease, injury, and death in developing countries lie outside the purview of the health care system and cover physical (inadequate sanitation, water, drainage, waste removal, housing, and household energy) and behavioral factors (personal hygiene, sexual behavior, driving habits, alcoholism, and tobacco smoking). Many of these turn into public health problems when they become widespread, a factor aggravated by inadequate public health infrastructure.
- Yet, policies in the sectors responsible for negative health impacts are often not based on health criteria. The health sector itself tends to focus on interventions within the health care delivery system, not necessarily sectors that are the sources of the problem. The enormity of health benefits possible through interventions outside the health sector are only partially tapped.
- Many analyses of environmental health issues in developing countries reflect an inadvertent bias. Much information on environmental health is based on conditions in developed countries, particularly ambient air pollution from vehicular and industrial sources. Poorly addressed is indoor air pollution from cooking, heating, and lighting, the more serious threat to human health in developing countries. Mosquitoes and snails, at best, considered nuisances in industrialized countries, remain major health problems in developing countries.
• Dispersal of responsibilities for environmental health among non-collaborating agencies has made environmental health an institutional “orphan,” adopted by few multidisciplinary agencies as a priority or focal point.
• Multisectoral problems clearly require multisectoral solutions. Yet, how can agencies be motivated to take on increased costs if they benefit society at large without furthering the sector’s own priorities? Streamlining projects for administrative feasibility may also neglect many health risks or promote the wrong mix of investments.
• Finding the right mixture of broad objectives tempered with administrative feasibility faces interrelated obstacles: (a) lack of attention to the whole picture, (b) absence of or insufficient procedures to cope with multisectoral issues and environmental health, (c) inadequate budget, (d) poor availability and reliability of data, especially for monitoring and evaluation, (e) technologies not adapted to developing countries, (f) inadvertent professional bias (described above), and (g) inadequate input of health personnel in decisionmaking outside the health sector.

Chapter 2: Developing Solutions Through Targeted Collaboration

• *Environmental Health: Bridging the Gaps* helps identify opportunities for productive interventions outside the health sector. It should encourage a multidisciplinary approach to analyzing projects, one that ensures that investments in single sectors, especially for pollution management, also produce long-term health benefits. The intention is to alert staff to low-cost, often neglected measures that could anchor and enhance the health benefits of such investments.
• The main objectives of this new approach are, first, to enhance the Bank’s chief goal of poverty reduction by mainstreaming environmental health into World Bank operations and, second, to achieve multisectoral collaboration by harmonizing health and other sectoral priorities.
• Instead of focusing analysis on the statistical levels of death, disease, and disability, this volume shifts the focus to remedial measures outside the health care system to solve health problems. Harmonizing sectoral priorities depends on a process that targets collaboration among those sectors and on those measures that, tempered by administrative considerations, have the best chance of generating health and other benefits, generally at a lower cost for all. The process involves identifying and prioritizing measures, devising entry points, and enhancing mutual benefits for the sectors involved.
• The new approach has two prongs that develop (a) methodologies to target and facilitate multisectoral collaboration among a critical mass of players and stakeholders needed to solve the problems and (b) instruments to mainstream multisectoral collaboration in decisionmaking and integrate it into operations.
• Harmonizing sectoral priorities depends on a process that targets collaboration among those sectors and on those measures that, tempered by administrative considerations, have the best chance of generating health and other benefits, generally at a lower cost for all. The process involves (a) identifying and prioritizing measures outside the health care system that will enhance efforts of the health care system, (b) quantifying missed or untapped health benefits, (c) devising entry points based on institutional capability to collaborate, and (d) enhancing the mutual benefits for the sectors that agree to collaborate.
Chapter 3: Socioeconomic Justification and Challenges

Relative to the other chapters, Chapter 3 is written with a greater emphasis on technical issues. Many ideas being presented are new, particularly those of health benefit valuations that have often been missed. These new ideas have not been subjected to analyses from several sectors. As a result, greater attention has been placed on explaining methodology than on its application.

- Over the 1990-99 period, the burden of disease growth outpaced the population growth in SSA (26 against 21 percent respectively over the period). This increase is a stern reminder that communicable diseases (+41 percent), mainly HIV/AIDS, malaria, respiratory diseases and water-related diseases, which have different growth rates over the period, represent a growing portion of SSA’s burden of disease in relative terms (73 percent in 1999 against 66 percent in 1990).
- More than 20 percent of SSA’s burden of disease is attributable to environmental health problems (mainly attributable to communicable diseases), and 10 percent affect the poorest of the poor. The environmental health problems, whose underlying causes lie outside the purview of the health care delivery system, impinge on SSA’s population wellness, especially the poor; overall economic performance; and health care delivery systems. The latter inherit by default any disregarded environmental health problems. An environmental health approach is multisectoral and preventive in nature. It is intended to complement health care delivery system interventions by promoting a systematic approach to determining the environmental health attributes—that is, ecological, man-made, and behavior-prone health risks—and to mainstream environmental health concerns in development work in a cost-effective manner.
- Identifying environmental health attributes, including environmental health externalities, helps determine policy, institutional, and market failures. Harmonizing a cross-sectoral enabling environment subsequently helps formulate environmental health policies in line with cross-sectoral policies (e.g., regulations, financial mechanisms, and budget allocation), designate a lead agency (health and/or environment and determine institutional responsibility and accountability), and forge partnerships and devise cross-sectoral monitoring systems to achieve outcome-based results. To this end, macro and sectoral Bank instruments, institutional and market concerns, as well as monitoring indicators are reviewed to identify options for integrating environmental health concerns.
- To help formulate an “environmental health–friendly” policy response, the SSA environmental health burden of disease is quantified, apportioned in terms of environmental burden of disease borne by the poorest of the poor, and valued in terms of lower-bound social cost. More specifically, the burden of disease is dis-aggregated and re-aggregated.

*See table 6-7 on “Sample Environmental Health Linkages of Bank Lending by Sector” for more detail.*
in terms of targetable environmental health (20 percent) and health care system (18 percent) interventions. Back-of-the-envelope calculations are performed to determine possible infrastructure-based intervention efficiency ratios.

- Prioritizing a cluster of infrastructure interventions to relieve the burden on the population in general and the poor in particular should be associated with a critical need to bring awareness and educate the people to understand the full significance, impacts, and linkages of environmental, environmental health, and health issues on their well-being, livelihoods, and development options. Despite the intractable multisectoral issues that need to be carefully assessed at the Bank and in member countries, linking infrastructure with environmental health remains promising, yet fundamental: environmental health interventions could have long-lasting positive results, only if a cross-sectoral and public-private-community mechanism is devised to internalize necessary behavioral change and insure a steady flow of resources for adequate and continuous asset management, upkeep, and monitoring to improve service delivery to the population.

Chapter 4: Gathering and Analyzing Information for Environmental Health

- Six different options exist for identifying entry points or prioritizing environmental health collaboration, all based on or relating to an environmental health assessment (EHA), a planning tool that helps prevent, mitigate, or manage health risks by gauging environment-based risks and proposing remedial measures.
- An EHA is not merely a health assessment within an EA, nor is it limited to pollution. It blends techniques from separate, but related fields, such as EAs, social assessments (SAs), health assessments (HAs), national or local environmental action plans (NEAPS/LEAPS), and comparative risk assessments of pollutants. Neither EHAs nor HAs have gained as much acceptance as the EA process.
- No standardized reference texts, outlines, formats, or procedures have been accepted as international norms for EHAs, which have no set definition or criteria. Techniques used in EHAs are still evolving. They may, nonetheless, be confused with other types of assessments and action plans.
- Because many EHA users will probably not have background in health or environment and possibly neither, an EHA, environmental health profile, or equivalent analysis should include background material that is easily skimmed and absorbed (i.e., avoiding technical jargon and complicated tables and calculations).
- The six options to identifying entry points or prioritizing environmental health collaboration are (a) preparing an environmental health profile (EHP), (b–d) adapting an existing EA, HA, SA, or poverty assessment (PA) to serve as an EHA, and (e) conducting a complete EHA. Of these options, this volume recommends the first, preparing an EHP, a technique specifically developed for this volume.

Chapter 5: Preparing an “Environmental Health Profile”

- An EHP may be prepared by sectoral specialists not used to working with information outside their own sector, or, especially in the Bank, by economists who work on poverty reduction without focusing on any one sector.
- A multidisciplinary team drafts an EHP by first compiling sectoral profiles as background information and then analyzing the data for sectoral linkages. Sectoral profiles facilitate the EHP process by noting key players and stakeholders, facilitating intersectoral collaboration within agencies, fostering public-private stakeholder partnerships and helping to make decisions using incomplete data.
- The team may confront two complementary problems in preparing these profiles: a paucity of reliable data on environmental health and staff without background in environment and/or health. This chapter and chapter 6 address these difficulties by identifying
existing sources of data in World Bank documents from several sectors or similar sources in bilateral or government agencies. This reduces the need for basic research or data gathering.

- The team then “cuts and pastes” from these different reports, helping to compensate for the team’s lack of specialization in health and environment. Analysis of the information requires such background, which may be overcome through joint discussion and analysis.
- Analysis of the data is then reviewed from the team’s multiple perspectives, which should ideally include public health or epidemiology, sociology or anthropology, economics, environment, and infrastructure.

Chapter 6: Adapting Environmental Assessments and Preparing EHAs

- Multisectoral teams may decide to prepare a complete environmental health assessment, whether as a first step or following preparation of environmental health profiles. The four other options to environmental health profiles differ from EHPs in that they result in a complete environmental health assessment. They are adapting an existing EA, HA, SA, or PA to serve as an environmental health assessment and conducting a complete EHA. The advantages and disadvantages of each are described at the end of chapter 4. This chapter describes the steps involved for each.
- *Adapting an existing assessment*. Existing EAs or even NEAPs can be tapped for information that may not be readily available in health agencies, especially because HAs are scarce, compared with EAs. Tables 6-2 through 6-5 in chapter 6 outline the contents of key Bank documents concerning EAs that illustrate how existing assessments can be adapted to serve as an EHA.
- Adaptation is likely to remain the case in the Bank, because environmental health considerations are cross-sectoral and already partially addressed in various Bank policies. It could be considered administratively cumbersome to add another tier of analyses for developing country borrowers, when it may be possible to integrate environmental health analyses into projects by adapting EA procedures that are already in place.
- *Conducting a complete EHA*. The process of preparing an environmental health assessment is new and rapidly changing, with no established procedures to follow. The process should, above all, identify the broad picture, on which to base priorities among practicable remedial measures for a given project. This section describes the kinds of information that are useful in an environmental health impact assessment and necessary to identifying remedial measures based on intersectoral linkages. Given the practical realities of acquiring accurate data, adapting information from alternative sources can be a useful option.

Part 2

Intended for Bank Task Managers and practitioners in the field, part 2 of this volume provides basic tools to identify, prioritize, and propose remedial measures for many multisectoral health problems, many of which could and do otherwise fall between the cracks in single sector projects. Chapter 7 provides basic environmental health background pertinent to all sectors covered in part 2. Chapters 8–14 provide guidance on environmental health linkages within and among sectors, which are summarized in a checklist at the end of each chapter. This edition of *Environmental Health: Bridging the Gaps* focuses particular attention on cross-sectoral linkages with infrastructure interventions between the agriculture and rural development sector (chapter 8) and the infrastructure sector (chapter 13). The other chapters briefly review linkages in the environment (chapter 10), health (chapter 11), and industry (chapter 12) sectors and with global issues, that is, those that affect the planet as a whole (chapter 14), because many of the issues have already been addressed in chapters 7, 8, and 13.

Chapter 7: Environmental Health Background Analyses
Chapter 7 provides basic environmental health background pertinent to all sectors covered in part 1, divided into sections on:

**Leading health problems:**
- Malnutrition
- Malaria and vector related diseases
- Diarrheas and gastroenteric diseases
- Respiratory diseases and diseases related to air pollution
- Injuries and accidents
- Mental health and stress

**Diseases for special consideration:**
- AIDS
- Epidemic cholera
- Guinea worm infection

**Key cross-cutting issues:**
- Pesticide use
- Biodiversity and traditional medicines

Each chapter contains definitions of key, confusing, and misused terms to help clarify their different meanings to different professions as well as to those without health or environmental training.

**Chapter 8: Cross-Sectoral Linkages: Agriculture and Rural Development Sector**

The first five sections of the chapter weave together many seemingly unrelated topics, emphasizing rural infrastructure in food production, for which linkages are strong with health. They are:

- *Human settlements.* What are the risks, especially in farming, of living conditions in villages and small towns?
- *Land use and natural resource management.* What human health risks are associated with farming, forestry, and other activities?
- *Water and waste management.* How is health linked with irrigation and drinking water? What risks link wastes to food and farmers?
- *Rural transportation.* What type of health risks are associated with transporting products from the fields to markets?

The sixth section, an environmental checklist, looks at these same issues in terms of Bank lending.

The most common environmental health linkages in the agriculture and rural development sector involve food production and other aspects of low-density rural life, such as poor access to water, sanitation, transportation, and electricity. These linkages can set in motion sometimes inter-linked health consequences, including malnutrition, spread of infectious diseases, deaths and injuries related to flooding, and so on. (See chapter 14 on how some of these effects are linked to climate change.) The most common linkages include:

- Pollution from excessive use of agrochemicals (especially pesticides and nitrates from fertilizers)
- Creation of nearly permanent vector breeding areas and other changes through, for example, year-round cultivation of food staples and impact of forestry projects
- Malnutrition from inadequate food supply or contamination of the food chain
- Water and soil contamination from inadequate processing of agricultural and animal wastes
- Respiratory diseases from use of biomass fuels for cooking, heating, and lighting, as well as injuries from gathering fuels.
Chapters 9 Energy, 10 Environment, 11 Health, 12 Industry, and 14 Global Issues

Chapters 9 through 12 provide less detailed guidance on environmental health linkages within and among the energy, environment, health, and industry sectors, because many of the same issues have been covered in chapters 7, 8, 13, and 14. Each chapter contains a literature review that concentrates on the policy determinants as they impinge on health for each sector. Policy is stressed more than technical aspects, because the latter are changing daily and it is hoped that future versions of this work on environmental health will be able to address technical issues more appropriately. Nonetheless, each chapter contains three tables: (a) the main environmental health linkages, (b) occupational and high risk groups, and (c) a checklist showing the typical projects and components, their major health-related issues, and suggestions for remedial measures. Chapter 14 focuses on those environmental issues that affect the planet as a whole, that is, with the potential of affecting everyone.

Chapter 13: Cross-Sectoral Linkages: Infrastructure Sector

This chapter covers environmental health linkages with the infrastructure sector, weaving together many seemingly unrelated topics with a common thread—urban and periurban human settlements—for which linkages are strong with health. Sections on cross-cutting issues and each of the four infrastructure subsectors present a broader range of environmental health issues than those traditionally associated with physical infrastructure:

- **Cross-cutting issues.** What are the key broad and cross-cutting environmental health issues, and what is special about their urban settings?
- **Housing and urban development.** What risks are presented by living conditions in big cities and surrounding areas? How, if at all, do secondary cities differ?
- **Telecommunications.** How are rapid changes in modern telecommunications technologies affecting health?
- **Transportation.** What type of health risks are associated with transporting products from rural fields to urban markets?
- **Water supply and sanitation.** How are health risks linked with drinking water, drainage, waste disposal, and sanitation services?

Discussion of each subsector concludes with an environmental health checklist. The chapter also discusses four environmental health issues—“brown” issues, vector-related diseases, food chain contamination, and AIDS—that impinge on all four subsectors.

Part 3

Chapters 15, 16, and 17 summarize the findings and present background material from a workshop in Ghana, “Targeted Collaboration among Line Agencies, Local Communities and the Ministry of Health,” putting into practice the ideas of parts 1 and 2. Innovations included a multisectoral environmental health needs assessment, as well as suggestions for remedial measures. The summaries can be useful for policymakers and the details, process, and recommendations can be useful for practitioners in the field.

Chapter 15: Ghana Sample Sectoral Profiles

This chapter presents several individual sector “profiles,” using data on Ghana that illustrates information readily available in Bank files, according to Bank sector designations. Such profiles contain considerable extra information to ensure that individual sectors are not summarized out of context. The material supported preparation of an environmental health needs assessment for Ghana and development of a workshop to determine priorities for targeted collaboration in Se-
kondi-Takoradi, one of Ghana’s five most populous cities. This chapter presents sectoral profiles on environment, health, infrastructure, energy, and industry, and multisectoral profiles on demographic, development assistance, institutional, and poverty reduction aspects.

Chapter 16: Sample Needs Assessment from Ghana

This chapter is based on a pilot study in Ghana, “Targeted Collaboration Among Line Agencies, Local Communities, and the Ministry of Health.” The work took place in Sekondi-Takoradi, one of the five largest cities in Ghana and also referred to as the Shama Ahanta East Metropolitan Assembly (SAEMA). The chapter presents a needs assessment for a city, beginning with its terms of reference.

Chapter 17: Sample Workshop on Targeted Collaboration in Ghana

The objective of the sample workshop on targeted collaboration in Ghana was to enhance health improvement outside the health care system by fostering multisectoral collaboration among line agencies and civil society to improve service delivery to the people. The workshop was based on three “entry points,” where the likelihood for interagency and stakeholder collaboration was expected to be high due to common interests in solving these common problems:

- Management of health facility waste
- Urban malaria and other vector-related diseases
- Water, sanitation, and drainage.

The workshop participants, drawn from SAEMA departments, the Ministry of Health, MLGRD, UESP, civil society, and the World Bank, were asked to:

- Identify risks and stakeholders, especially vulnerable groups, at risk.
- Determine institutional and financial strengths and weaknesses, relying on the information provided in the institutional needs assessment prepared for the workshop.*
- Suggest areas of mutual collaboration and partnership among infrastructure, environment, and health agencies and civil society at large.
- Propose recommendations that could constitute the elements of an action plan for improving service delivery.

* See chapter 16.
Part 1: Harmonizing Sectoral Priorities: A New Approach to Environmental Health
A great deal of the underlying causes of disease, injury, and death in developing countries lie beyond the purview of the health care system. They cover a range of physical factors (inadequate sanitation, water, drainage, waste removal, housing, and household energy) and behavioral factors (personal hygiene, sexual behavior, driving habits, alcoholism, and tobacco smoking). Many of these environment- and occupation-related health problems turn into public health problems when they become widespread, a factor aggravated by inadequate public health infrastructure.

Yet, policies in the sectors responsible for these negative health impacts are often not based on health criteria. The health sector itself tends to focus its interventions within the health care delivery system, not necessarily in other sectors that are the source of the problem. Similarly naturally occurring ecological factors that can exert negative impacts on all sectors (mosquito-borne diseases, arsenic in the water, floods, droughts, and so on) are seldom addressed systematically by any of the sectors at risk, even though some sectors may be exacerbating their effects (spreading mosquito habitats, consuming great quantities of water, or producing greenhouse gases that may worsen climate change). As a result, the enormity of health benefits possible through interventions outside the health sector are not being tapped.

The enormity of health benefits possible through interventions outside the health sector are not being tapped.

Part I of this discussion paper addresses these concerns by presenting a new multisectoral approach to reducing poverty, one that employs preventive environmental health measures to improve the efficiency of development projects and investments in several sectors. This chapter begins by explaining the rationale for a multisectoral approach and its challenges, laying the basis for understanding the proposed approach, introduced in chapter 2.

Inadvertent Bias in Neglecting Environmental Health

Much general information about environmental health is based on conditions in developed countries. This is not surprising, as the driving forces in research, development, and technology largely emanate from the industrialized world. About 90 percent of the $US56 billion currently invested in health research and development by the public and private health sectors goes to research concerning only 10 percent of the world’s population.²

This situation has introduced an inadvertent bias into many analyses of environmental health issues in developing countries. Literature on air pollution in industrialized countries generally emphasizes ambient air pollution from vehicular and industrial sources, while poorly addressing indoor air pollution from cooking, heating, and lighting, the more serious threat to human health in developing countries. Similarly, mosquitoes and snails are considered, at best, nuisances in industrialized countries, whereas they remain major health problems in developing countries.

The underlying reasons for this bias are clear. Public health or environment students in training in industrialized countries hear only passing reference to vector-related diseases. Physicians receive little basic training in environmental health, except for a few diseases, such as asthma, which are extremely sensitive to pollution.
Little time is spent in medical school and residency training on environmental hazards and their relationship to illness. General medical and pediatric textbooks devote scant attention to illness as a result of environmental factors. Information pertinent to pediatric environmental health is widely scattered in scientific, epidemiological, and specialty journals not regularly read by clinicians. 

Nutritionists learn much about micronutrients, but little about malnutrition from diarrheal diseases caused by inadequate sanitation. Ecologists learn about reducing pollution to meet water quality standards, but water meeting those standards may still be pathogenic and unsuitable for drinking! (It does not generally harm, because it is diluted when released into receiving waters.)

Policies also unintentionally embed these biases, because many scientific journals tend to specialize and limit themselves to statistically significant results. They, therefore, underemphasize environmental health factors, which already tend to be underreported due to inadequate data. In addition, environmental health factors result in more disease and disability than death, and disability that does not require hospitalization or a medical consultation is difficult to capture in health statistics.

Inadvertent professional bias can also influence the effectiveness of remedies, for example, diverting attention from other important sources of lead in children’s blood (see box 1-1), and omitting possibly promising avenues of addressing critical health problems comprehensively with time.

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**Box 1-1: The Case of Lead**

The case of lead is excellent for showing the power of interventions outside the health sector and the difficulty of coordinating multisectoral interventions. Only in the past few decades have measures been taken to reduce human exposure to lead. These have only been partial, typically reflecting the approaches of a single profession, such as engineering or medicine, and not coordinated explicitly among professions to improve health. Because lead risks are derived from many sources simultaneously (eaten, breathed, drunk, or absorbed by the skin, as shown in table 7-4) it may be more effective to coordinate sectoral approaches into preventive measures. Unfortunately, this seldom happens.

In Mexico City, for example, the phase-out of leaded gasoline has been quite effective in reducing general human exposure to lead. Nevertheless, many people may be exposed to higher levels of lead from traditional blue-glazed pottery than from automobile emissions; yet, the thrust of remedial measures has been toward transportation. One study of school children with high blood levels of lead attributed 40 percent of individual levels to walking to school near heavy traffic, but another 40 percent came from chewing the lead paint on their pencils. The perceived direct cause, vehicle emissions, should indeed be reduced, but authorities should not neglect other equally or more important, but less obvious indirect sources (see table 7-4). Finding cost-effective measures to address the various sources collectively underlies a multisectoral approach. Unfortunately, this, too, seldom happens, because benefit-cost analyses tend to focus only on one sector.

The case of lead also illustrates the positive effects that other sectors can have on human health, where some of the most important reductions in lead have come from the environment sector. In the Bank, for example, response by the environmental community to problems such as lead has evolved. Efforts to meet the needs of Bank borrowers initially focused on pollution abatement and control. Efforts now emphasize pollution management, which strives to address economic incentives and policies to reduce and avoid pollution in the first place. In public health terms, this would be equivalent to a temporary transformation emphasizing curative measures (abatement and control) until long-term preventive measures (management) could be developed and implemented.

Even though lead poisoning would not statistically constitute one of the top ten health problems in developing countries, the collective positive effects of such interventions over time can be significant.

*Source: Authors’ data*
How the Health Picture Differs in Developing Countries

Understanding how the health picture differs in developing countries is the first step in countering this inadvertent professional bias.

Chief among the differences is the nature of disease in developing countries. Infectious and parasitic diseases, such as diarrheas, respiratory infections, and malaria—diseases traditionally associated with poverty—predominate. In contrast, “modern” diseases of affluence, such as cancer and heart disease, are associated more with developed countries.

Box 1-2: Key Confusing and Misused Terms on Diseases and Statistics

Burden of disease (BOD), also, global burden of disease. As used in health analyses, a comprehensive, internally consistent, and comparable set of estimates of current patterns of mortality and disability from disease and injury for all regions of the world.

Biological oxygen demand (BOD): As used in environmental analyses, a measure of the amount of oxygen in water needed to decompose organic matter and the propensity of water to eutrophy, that is, become unable to support aquatic flora and fauna. Can be used as an indicator of fecal contamination (organic).

Disability-adjusted life year (DALY), a recently derived measure of health providing more information than mortality rates by combining premature deaths and years lived with disability.

Vector-borne or vector-related diseases. Refers generally to diseases transmittable by an animal intermediary, such as mosquito, snail, or rodent. Also refers in a narrow, technical sense to diseases in which the disease agent undergoes a transformation in an intermediate animal host that is necessary to develop the pathogen that eventually infects humans.

Source: Authors’ data.

Table 1-1 summarizes this difference between developing and developed countries. Because death rates do not capture the full socioeconomic impact of death, disease, and injury, the table uses “disability-adjusted life years” (DALYs). These combine the effects of premature deaths and years lived with disability, according to a weighted average of the severity of the disease. The table shows that, in 1998, five of the top ten individual diseases, that is, respiratory infections, diarrheal diseases, HIV/AIDS, malaria, and measles, fall into WHO’s broad category of infectious and parasitic diseases. This category ranked as the top source of DALYs in developing countries, compared with the tenth in the developed world, and accounted for 23 percent and 0.2 percent respectively of the global grand DALYs total.

Another major difference between developing and developed countries is the proportion of disability caused by disease. Table 1-1 also shows that developing countries exhibit nearly double the proportion of disability (i.e., included in DALYs) relative to death than developed countries. Significant to this observation, the overall share of DALYs attributable to environmental factors in developing countries is also high (see table 1-2), for example, 60 percent of respiratory and 90 percent of diarrheal diseases, respectively, and tend to affect the poor more than the rich. A large share of these environment-related diseases in developing countries are due to the absence of basic services, such as potable water, decent housing with proper ventilation, nonpolluting household fuels, and proper sanitation and waste disposal—services that, for the most part, are taken for granted in developed countries.

* See box 3-5 for a fuller discussion of this measure.
**Table 1-1: Top Ten Diseases and Conditions (1998) by Indicative DALYs**

<table>
<thead>
<tr>
<th>Cause</th>
<th>DALYs (1,000s)</th>
<th>Deaths (1,000s)</th>
<th>Rank</th>
<th>DALYs (1,000s)</th>
<th>Deaths (1,000s)</th>
<th>Rank</th>
<th>DALYs (1,000s)</th>
<th>Deaths (1,000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acute lower resp. infections</td>
<td>82,344</td>
<td>3,452</td>
<td>8</td>
<td>1,355</td>
<td>306</td>
<td>1</td>
<td>80,990</td>
<td>3,146</td>
</tr>
<tr>
<td>2. Perinatal conditions</td>
<td>80,564</td>
<td>2,155</td>
<td>5</td>
<td>2,020</td>
<td>53</td>
<td>2</td>
<td>78,544</td>
<td>2,102</td>
</tr>
<tr>
<td>3. Diarrheal diseases</td>
<td>73,100</td>
<td>2,219</td>
<td>17</td>
<td>359</td>
<td>7</td>
<td>3</td>
<td>72,742</td>
<td>2,212</td>
</tr>
<tr>
<td>4. HIV/AIDS</td>
<td>70,930</td>
<td>2,285</td>
<td>46</td>
<td>1,022</td>
<td>32</td>
<td>4</td>
<td>69,907</td>
<td>2,253</td>
</tr>
<tr>
<td>5. Unipolar major depression</td>
<td>58,246</td>
<td>0</td>
<td>3</td>
<td>7,029</td>
<td>0</td>
<td>5</td>
<td>51,217</td>
<td>0</td>
</tr>
<tr>
<td>6. Ischemic heart disease</td>
<td>51,948</td>
<td>7,375</td>
<td>1</td>
<td>9,501</td>
<td>1,884</td>
<td>6</td>
<td>42,447</td>
<td>5,492</td>
</tr>
<tr>
<td>7. Cerebrovascular disease</td>
<td>41,626</td>
<td>1,106</td>
<td>2</td>
<td>5,219</td>
<td>893</td>
<td>8</td>
<td>36,407</td>
<td>4,213</td>
</tr>
<tr>
<td>8. Malaria</td>
<td>39,267</td>
<td>1,110</td>
<td>97</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>39,267</td>
<td>1,110</td>
</tr>
<tr>
<td>9. Road traffic accidents</td>
<td>38,849</td>
<td>1,171</td>
<td>4</td>
<td>4,556</td>
<td>142</td>
<td>9</td>
<td>34,293</td>
<td>1,029</td>
</tr>
<tr>
<td>10. Measles</td>
<td>30,255</td>
<td>888</td>
<td>67</td>
<td>188</td>
<td>5</td>
<td>10</td>
<td>30,067</td>
<td>882</td>
</tr>
<tr>
<td><strong>Total of Top Ten</strong></td>
<td>567,129</td>
<td>25,761</td>
<td>31,249</td>
<td>3,322</td>
<td>535,881</td>
<td>22,439</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grand Totals</strong></td>
<td>1,382,564</td>
<td>53,929</td>
<td>108,305</td>
<td>8,033</td>
<td>1,274,259</td>
<td>45,897</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DALYs/deaths: 26% World, 14% Developed, 28% Developing

a. Top ten and remainder. Totals may not add up due to rounding.
b. In this table, refers to premature deaths.


**Table 1-2: Environmental Factors and the Global Burden of Disease: Proportion of Global DALYs Associated with Environmental Exposures (1990)**

<table>
<thead>
<tr>
<th>Environmental Factors</th>
<th>Global DALYs (thousands)</th>
<th>Percent Attributable to Environmental Factors</th>
<th>Environmental DALYs (thousands)</th>
<th>Percent of all DALYs (all age groups)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute respiratory infections</td>
<td>116,696</td>
<td>60</td>
<td>70,017</td>
<td>5.0</td>
</tr>
<tr>
<td>Diarrheal diseases</td>
<td>99,633</td>
<td>90</td>
<td>89,670</td>
<td>6.5</td>
</tr>
<tr>
<td>Vaccine-preventable infections</td>
<td>71,173</td>
<td>10</td>
<td>7,117</td>
<td>0.5</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>38,426</td>
<td>10</td>
<td>3,843</td>
<td>0.3</td>
</tr>
<tr>
<td>Malaria</td>
<td>31,706</td>
<td>90</td>
<td>28,535</td>
<td>2.1</td>
</tr>
<tr>
<td>Injuries</td>
<td>152,188</td>
<td>30</td>
<td>45,656</td>
<td>3.3</td>
</tr>
<tr>
<td>Mental health</td>
<td>144,950</td>
<td>10</td>
<td>14,495</td>
<td>1.1</td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>133,236</td>
<td>10</td>
<td>13,324</td>
<td>1.0</td>
</tr>
<tr>
<td>Cancer</td>
<td>70,513</td>
<td>25</td>
<td>17,628</td>
<td>1.3</td>
</tr>
<tr>
<td>Chronic respiratory disease</td>
<td>60,370</td>
<td>50</td>
<td>30,185</td>
<td>2.2</td>
</tr>
<tr>
<td><strong>Total these diseases</strong></td>
<td>975,350</td>
<td>33</td>
<td>320,470</td>
<td>23.0</td>
</tr>
<tr>
<td>Other diseases</td>
<td>403,888</td>
<td>NEb</td>
<td>NEb</td>
<td>NEb</td>
</tr>
<tr>
<td><strong>Total all diseases</strong></td>
<td>1,379,238</td>
<td>23</td>
<td>320,470</td>
<td></td>
</tr>
</tbody>
</table>

a. Intentional injuries account for homicide, violence, and warfare.
b. Not estimated.

Because environment-related diseases can cause recurrent or long-term disability without killing, they tend to be underreported in health statistics, which are still oriented toward death rates. The burden of disease on the poor is, thus, often understated because of statistical limitations. For the total burden of disease in the world, for example, disability is more than twenty-five times the proportion for premature deaths alone (see DALYs/deaths in table 1-1). But, looking at vector-borne diseases, disability rises to more than 41 times the death rates (see table 1-3). The figures are even more skewed when analyzing data solely for developing countries, especially for diseases that are not tracked because mortality is low (e.g., intestinal worms).

These observations underscore the importance of understanding the indirect impacts of disease, such as disability, in developing countries and the need to look systematically for new solutions inside and outside the health sector. Similar arguments are appropriate for economic evaluation techniques, which need considerable interpretation of their face value.

**It is important to understand the indirect impacts of disease and to look systematically for new solutions inside and outside the health sector.**

### The Changing Face of Disease and the Developing World

Not only is the health picture in developing countries different, it is continually changing. Since 1950 astronauts have gone to the moon and surgeons have replaced human hearts; yet, scourges of the early twentieth century, that is, tuberculosis, cholera, and malaria, are returning and twenty-nine new infectious diseases have been discovered in the past 20 years. This includes acquired immunodeficiency syndrome (AIDS), which accounts for 9 percent of adult deaths from infectious disease in the developing world; by 2020, that share will quadruple to more than 37 percent. Population increase, rapid urbanization, and global-level changes, such as climate change and ozone depletion, are also influencing the health picture around the world, but the developing world is least prepared institutionally to respond to these changes. These new developments in health present challenges that intensify the need for innovative approaches within and outside the health sector.

### Vector-Related Diseases

Nearly one-third to one-half of the world’s population is potentially at risk of exposure to vector-borne diseases. Table 1-3 shows estimates of the health consequences of the top ten of these diseases, which cause more than 1.2 million deaths annually. Malaria represents the lion’s share—more than 1.1 million deaths and 2.4 billion people at risk.

The parasite’s resistance to medications complicates the malaria situation, and no vaccines are likely for widespread use for at least 15 years. In 1976 drug-resistant malaria was confined to Southeast Asia; now it is global. The mosquito’s resistance to DDT, its potential carcinogenicity, and the unavailability of an ecologically suitable yet equally effective substitute further complicate the situation (see also “Vector Control” in chapter 7). Malaria is surging in many countries where it had once been sharply reduced or eradicated. More than a third of the world’s total population now live in malaria-endemic areas.
**Table 1-3: Death and Disability of Top Ten Vector-Borne Diseases (1998)**

<table>
<thead>
<tr>
<th>Disease/Condition</th>
<th>DALYs (thousands)a</th>
<th>Deaths (thousands)b</th>
<th>Population at Risk (millions)c</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Malaria</td>
<td>39,267</td>
<td>1,110</td>
<td>2,400</td>
</tr>
<tr>
<td>2. Schistosomiasis</td>
<td>1,699</td>
<td>7</td>
<td>600</td>
</tr>
<tr>
<td>3. Dengue</td>
<td>558</td>
<td>15</td>
<td>2,500</td>
</tr>
<tr>
<td>4. Filarisis</td>
<td>4,698</td>
<td>0</td>
<td>1,000</td>
</tr>
<tr>
<td>5. Leishmaniasis</td>
<td>1,710</td>
<td>42</td>
<td>350</td>
</tr>
<tr>
<td>6. Trypanosomiasis</td>
<td>1,219</td>
<td>40</td>
<td>50–60</td>
</tr>
<tr>
<td>7. River blindness</td>
<td>1,069</td>
<td>0</td>
<td>123</td>
</tr>
<tr>
<td>8. Chagas’ disease</td>
<td>589</td>
<td>17</td>
<td>100</td>
</tr>
<tr>
<td>9. Guinea worm</td>
<td>NA</td>
<td>NA</td>
<td>100</td>
</tr>
<tr>
<td>10. Yellow fever</td>
<td>NA</td>
<td>NA</td>
<td>450</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>50,809</td>
<td>1,231</td>
<td>NA</td>
</tr>
</tbody>
</table>


Land use changes are influencing the pattern of vector-borne diseases. For example, primarily rural vector-borne diseases are adapting to urban conditions. Periurban agriculture, recreation, and ecotourism also play key roles by changing land use and increasing human exposure (see “Periurban Agriculture and Livestock” in chapter 8).

**The Double Burden of Disease in Developing Countries**

In the next 25 years, the world’s population will grow from six to eight billion people. Ninety-eight percent of that increase will take place in developing countries and nearly entirely in urban areas. A large increase in urban poverty is expected, particularly in parts of Sub-Saharan Africa (SSA) and East and South Asia.

Population increase and urbanization places a double burden on developing nations in terms of disease and death. In addition to the infectious and parasitic diseases of poverty—diseases that are exacerbated by the absence of basic services such as sanitation, water supply, housing, and health care—developing countries can expect an increase in modern diseases, such as cancer, hypertension, and so on, as more people move to the cities. This will increase pollution and mental stress and place ever greater demands on cities, especially large ones, to provide basic services, initiating a vicious circle.

**Box 1-3: Urbanization in Sub-Saharan Africa**

In 1999, for the first time, more people in the world lived in urban than rural areas. SSA, however, is still predominantly rural, although expected to undergo rapid urbanization. Urban populations are expected to grow by about 6 million people per year and would constitute 50 percent of the total population in about 10 years. In western Africa, the figures are even more daunting—an increase of about 43 million people in the next 10 years.

*Source: Authors’ data.*

**Global Change**

Global change, notably climate change and ozone depletion, will also affect the health picture in the future (see chapter 14). Ecological disturbances may cause or worsen health effects, many indirectly (see table 14-1). Injury and death due to heat waves and flooding from storms are obvi-
ous impacts. Not so obvious are the insidious, slow effects of drought or increases in moisture that influence the breeding patterns of mosquitoes and help spread malaria. Increases in temperature can stimulate algal blooms that spread cholera.

**Multisectoral Approaches and the Challenges they Present**

Environmental health is intended to prevent human illness and injury. Past work on environmental health, however, has typically focused attention on individual diseases; sources of pollution responsible for many health problems, especially in their occupational settings; and positive steps to correct these problems and calculate their economic implications. The broad picture in project planning, however, has often been neglected. This is particularly the case for cross-sectoral linkages, which could considerably enhance the value of single sector projects, if correctly harnessed to avoid doing too much in a given project.

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**Box 1-4: The Health Situation in Sub-Saharan Africa**

The face of disease and death in SSA is also changing, but in a different pattern. Diarrheal and respiratory diseases are no longer considered the single most important causes of disease and death, as they were in the 1970s; they are now competing with AIDS, and malaria. It is not that diarrheal and respiratory diseases have been reduced, but rather that HIV/AIDS (human immunodeficiency virus)/AIDS and malaria have been added to the burden.

The situation in SSA largely reflects the global situation shown above in table 1-1, where respiratory and diarrheal diseases are among the top three. Five of the top ten entries are infectious and respiratory infections, which rank in first and second place respectively. The main difference comes from HIV/AIDS, which is more widespread throughout the Africa Region than other regions, and from “unintentional injuries” for males, reflecting a high level of traffic-related and occupational causes (see table 1-4).

**Table 1-4: Rank and Share of Burden of Disease in SSA (1990)**

<table>
<thead>
<tr>
<th>Female Rank</th>
<th>Percent</th>
<th>Male Rank</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Malaria</td>
<td>11</td>
<td>1. Injuries*</td>
<td>13</td>
</tr>
<tr>
<td>2. Respiratory infections</td>
<td>11</td>
<td>2. Respiratory infections</td>
<td>11</td>
</tr>
<tr>
<td>3. Diarrheal diseases</td>
<td>10</td>
<td>3. Malaria</td>
<td>11</td>
</tr>
<tr>
<td>4. Childhood cluster</td>
<td>9</td>
<td>4. Diarrheal diseases</td>
<td>10</td>
</tr>
<tr>
<td>5. HIV/AIDS and other STDs</td>
<td>9</td>
<td>5. Childhood cluster</td>
<td>10</td>
</tr>
<tr>
<td><strong>Subtotal of top five</strong></td>
<td><strong>50</strong></td>
<td><strong>Subtotal of top five</strong></td>
<td><strong>55</strong></td>
</tr>
</tbody>
</table>

a. Includes intentional injuries, which account for homicides, violence, and warfare
b. Childhood cluster consists of perinatal conditions: whooping cough, poliomyelitis, diphtheria, measles, and tetanus.


---

* Even plague may be re-emerging in about a dozen SSA countries. In the past 15 years, WHO has reported about 18,000 cases in twenty-four countries, more than half of them in Africa (Hawke 1999).
Box 1-4 (continued)

Table 1-5 shows changes in SSA for 1990–98, including about a sixfold increase in AIDS and a continuing increase in malaria.

Table 1-5: Rank and Share of the Burden of Disease in SSA (1990–98)

<table>
<thead>
<tr>
<th>Rank and Share of the Burden of Disease</th>
<th>Percentage 1990a</th>
<th>Percentage 1998b</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. AIDS</td>
<td>2.8</td>
<td>16.6</td>
</tr>
<tr>
<td>2. Malaria</td>
<td>9.2</td>
<td>10.6</td>
</tr>
<tr>
<td>3. Diarrheal diseases</td>
<td>10.9</td>
<td>7.5</td>
</tr>
<tr>
<td>4. Acute lower respiratory infections</td>
<td>10.2</td>
<td>7.0</td>
</tr>
<tr>
<td>5. Perinatal conditions</td>
<td>6.5</td>
<td>6.2</td>
</tr>
<tr>
<td><strong>Subtotal of top five</strong></td>
<td><strong>39.6</strong></td>
<td><strong>47.9</strong></td>
</tr>
</tbody>
</table>


### AIDS

Nowhere is the AIDS epidemic more severe than in SSA, where it has become a health and development emergency. To date, 13.7 million African have died of AIDS. More than 23 million are currently living with HIV/AIDS, of whom 3.8 million were newly infected in 1999. A child born in Zambia or Zimbabwe tonight will, more likely than not, die of AIDS. In many other African countries, the lifetime risk of dying of AIDS is greater than one in three.

In June 1999 the Bank confronted these distressing facts in its strategy, *Intensifying Action Against HIV/AIDS in Africa*. Staff throughout the Region are being asked to incorporate AIDS prevention strategies in projects in all sectors. Accordingly, the checklists on environmental health found in Part II of this volume cite AIDS-preventive measures as appropriate. (see “Diseases for Special Consideration” in chapter 7.)

### Malaria

More than 90 percent of the estimated 300–500 million cases of malaria worldwide occur in SSA. Children and pregnant women are the most vulnerable. Each year, the disease causes between 600,000 and 1 million deaths in children under five in Africa alone. When malaria does not kill, repeated bouts of fever lead to school absenteeism and impair physical and mental development in children.

Rural African communities are affected the worst, due to poverty. Rapid urbanization and government decentralization, however, is exacerbating the situation, partly because periurban settlements often provide similar breeding environments to those in rural areas and partly because expansion of water supply has allowed year-round breeding of mosquitoes. Various levels of governments may not have the institutional capabilities to cope with both urban and rural malaria.

Malaria may annually cost African countries more than 1 percent of their gross domestic product. Initial estimates of direct costs indicate that the disease places a major economic burden on households, which spend significantly on malaria prevention and treatment. Losses to productivity and output are substantial but not yet fully quantified.

*Source:* Authors’ data.

This tendency has been compounded by dispersal of responsibilities for environmental health among several agencies that generally do not collaborate. The result is that environmental health has become an institutional “orphan,” adopted by few multidisciplinary agencies as a priority or focal point.
Environmental health has become an “institutional orphan,” adopted by few multidisciplinary agencies as a priority or focal point.

Economic analyses of environmental health have focused considerable attention on broad issues, under the rubric of “health effects,” although sometimes intensely scrutinizing individual diseases. Such analyses, however, have paid little attention to multiple health effects, even though dis-aggregating them could greatly improve the economic impacts of projects. For example, analysis of the benefits of urban drainage to reduce breeding areas of mosquitoes that spread malaria could miss or neglect other diseases, such as dengue and filariasis, which are spread by mosquitoes with slightly different breeding habits, but also reduced by the same drainage improvements (see chapter 3).

Multisectoral problems clearly require multisectoral solutions. Yet, multisectoral approaches present a number of challenges in and of themselves. Agencies outside the health sector that would incur the costs of these solutions would not necessarily reap the benefits. How can agencies be motivated to take on these increased costs if they benefit society at large without furthering the sector’s own priorities? Why, for example, should transport agencies take on added responsibilities to clean drains to reduce mosquito breeding sites for malaria control? Why should these agencies then spend time coordinating with other agencies on these efforts?

This dilemma has, in part, turned environmental health into an institutional orphan; environmental health efforts are hampered by a lack of incentive or motivation in agencies with other priorities.

Dilemma: How can agencies be motivated to take on these increased costs if they benefit society at large without furthering the sector’s own priorities?

Lessons from the past have repeatedly shown that projects that attempt too much, no matter how well intentioned, may become too cumbersome to achieve their original goals. This raises yet another dilemma: streamlining projects for administrative feasibility may inadvertently neglect many health risks, even in well-intentioned projects, or promote the wrong mix of investments.

Dilemma: Streamlining projects for administrative feasibility can neglect many health risks, even in well-intentioned projects, or promote the wrong mix of investments.

Collaboration with another agency can sometimes compensate for unintentional neglect based on administrative efficiency; yet, such coordination rarely occurs, primarily due to a lack of understanding of environmental health linkages or poor interagency communication.

Finding the right mixture of broad objectives tempered with administrative feasibility, however, faces a number of interrelated obstacles:

- Lack of attention to the whole picture
- Absence of or insufficient procedures to cope with multisectoral issues and environmental health
- Inadequate budget
- Poor availability and reliability of data, especially for monitoring and evaluation
- Technologies not adapted to developing countries
- Inadvertent professional bias (described above)
- Inadequate input of health personnel in decisionmaking outside the health sector
- Poor economic techniques to show value added from environmental health considerations
• Inappropriate technical assistance from industrial countries with very different environmental health methods and solutions.

Box 1-5 presents a case illustrating nearly all these obstacles.*

**Box 1-5: A Near Miss in an Environmental Assessment**

The environmental assessment (EA) for a 15-year sanitary waste disposal site in Asia predictably centered on water pollution in identifying health issues and nearly omitted discussion of two potential epidemics. Preparation of the EA took place while local press carried headlines about rats spreading plague from an unrecognized virus. International newspapers and television news programs discussed global travel restrictions from India, where plague had already broken out in 1995.

The expatriate EA team and local office staff were well respected in their fields—engineering, ecology, environmental assessments, and economics. The team, however, did not contain a public health specialist and the expatriates considered rats and mosquitoes more as nuisances than health risks.

The EA was eventually altered to address vector-related diseases. The case is striking, however, because of the questions apparently not asked. This is not atypical in EAs, because current procedures do not systematically require health analyses, and illustrates the need to look at environmental health problems from a broader perspective.

*Source: Authors' data.

The last obstacle listed, absence of input from health personnel in decisionmaking, is particularly subtle, but crucial to harmonizing sectoral priorities. Many development projects with health repercussions are designed without direct input from health specialists, who, therefore, have little input into important decisions affecting human health (see table 1-6). Environmental health considerations are, at best, policy “afterthoughts” for the business, commerce, industry, and government agencies that create most environmental health problems, possibly inadvertently, and could help solve them. This includes 203 Bank SSA infrastructure projects (1984–94) designed mainly by engineers and economists. Neither these projects nor the events and documents cited in table 1-6 necessarily produce unintended health repercussions, but, it is possible that these projects could have helped alleviate poverty better with the input of health specialists. Lack of formal input from health personnel also stems from the current tendency in society for professionals to specialize, possibly aggravated by budget considerations, for example, precluding participation in conferences by staff of different specialties from the same organization.

Absence of health input can lead to unintended results, often described as “unforeseen consequences.” They are unforeseen, however, often simply because nobody looked. The examples of these omissions presented in table 1-6 are not meant as a criticism, merely an affirmation of the status quo and an indication that otherwise well-intentioned projects are achieving less than their potential. The situation could be turned around, if agency policies or environmental reviews compensated, for example, through environmental assessments that systematically include health.

*Examples of interpreting the same data from several perspectives, uncovering potential cross-sectoral conflicts, and increasing economic benefits are presented in “Analyzing Data” in chapter 4 and in chapters 5 and 6 and annex A.
### Table 1-6: Possible Consequences from the Absence of Health in Decisionmaking

<table>
<thead>
<tr>
<th>Event or Document</th>
<th>Sample Health Issues</th>
<th>Responsible Agencies</th>
<th>Agencies Not Consulted or with Minor Input</th>
<th>Possible Health Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>203 World Bank infrastructure projects</td>
<td>Contaminated water, indoor air pollution, vector-related diseases, and injuries</td>
<td>Infrastructure: water, sanitation, housing, transport, waste management, urban management, and telecommunications</td>
<td>Health</td>
<td>Diarrheal diseases, respiratory diseases, vector-related diseases, injuries, and so on</td>
</tr>
<tr>
<td>World Bank “Green Top Ten,” lead by phase out of lead in gasoline in 5 years</td>
<td>Lead pollution, false sense of security in dealing with part of lead problem, and no health input into funding lead substitutes</td>
<td>Environment, urban development, and transport.</td>
<td>Health</td>
<td>Lead “replacements” can cause equal or worse health damage. Focus on gas can overshadow other more serious lead problems</td>
</tr>
<tr>
<td>Kyoto Climate Change Conference</td>
<td>Several indirect effects, e.g., respiratory and vector-related diseases</td>
<td>National governments, environment, and the private sector</td>
<td>Health was not part of the official agenda</td>
<td>Fuel price changes: (a) use of cheaper fuels could negatively affect respiratory disease and (b) economic analysis of dams could expand dam construction increasing schistosomiasis (and possibly malaria)</td>
</tr>
<tr>
<td>Insurance industry hurricane analyses</td>
<td>Injuries and deaths from storms, physical and mental stress from loss of home or job, and so on</td>
<td>Private sector, national and local government, infrastructure (water, housing, transport, and telecommunications), and emergency services</td>
<td>Health</td>
<td>Insurance industry calculates property damage, but not health factors covering a wide range of conditions, e.g., sickness to suicide</td>
</tr>
<tr>
<td>WHO Malaria Rollback Initiative</td>
<td>Help confront drug resistance, changes in breeding patterns, and spread of habitat</td>
<td>Health</td>
<td>Infrastructure (transport, housing, water, waste management), and agriculture</td>
<td>Missed opportunity to diminish malaria even more</td>
</tr>
<tr>
<td>The Pan-American Health Organization Disaster Preparedness Conference</td>
<td>Health and disaster</td>
<td>Infrastructure (transport, housing, water, and waste management)</td>
<td>Poor maintenance makes public infrastructure more vulnerable to severe weather.</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ data and Listorti (1996).

### The Role of Knowledge Management

Knowledge management could play an important role in reaching out to those sectors that could fruitfully contribute to a multisectoral effort. If knowledge management professionals had acquired a better understanding of environmental health issues, they might have applied better technologies to address the problem. Acquiring such knowledge is certainly important. The task remains, however, to communicate remaining opportunities and risks to other sectors that could also be involved. Table 7-4 indicates the breadth of issues needing coordination concerning lead.
This volume is intended to build bridges to promote multisectoral teams in the Bank and in developing countries to address multisectoral problems. This can also help improve service delivery in general. Box 1-6 summarizes the role of environmental health in meeting this challenge, and chapter 2 introduces methodologies and instruments that multisectoral teams may adopt, covered in more detail in chapters 4–6.

This volume is intended to build bridges to promote multisectoral teams in the Bank and in developing countries to address multisectoral problems, which can also help improve service delivery.

Box 1-6: The Contributions of an Environmental Health Approach

Each sector and professional group needs to define their contribution to overall health outcomes and development objectives, their comparative advantage and areas of convergence, linkages, interactions or interface, and the common goals to which they all can contribute. As we think beyond sectors, what can we do in the interface between health and environment? That is environmental health.

Proponents of environmental health should define its comparative advantage, rather than focus on the limitations of others. What is the value added of an environmental health approach? For example, if the health sector has identified a set of priority health problems, what major risk factors should be addressed through an environmental health approach, for example, through water and sanitation and related behavior change interventions, reduction in indoor air pollution (technologies and behaviors), vector control, improved housing and reduced crowding, behavior change interventions, and health promotion. Environmental health can promote a systematic approach to define the most cost-effective, affordable, sustainable, culturally appropriate, and feasible set of interventions across sectors and achieve synergy through the multiple opportunities that policies and projects in different relevant sectors provide.

CHAPTER 2: DEVELOPING SOLUTIONS THROUGH TARGETED COLLABORATION

*Environmental Health: Bridging the Gaps* helps multisectoral teams identify opportunities for cost-effective interventions outside the health sector, building its approach on three underlying principles:

- **The whole is greater than the sum of its parts.** Coordinating interventions among environment, health, and other sectors will do more to reduce poverty than a series of single sector interventions.
- **Define half a problem, devise half a solution.** Environmental health problems tend to be multisectoral and require multisectoral solutions. Any benefits from a single sector approach come with a missed opportunity: the inability to prioritize the relative importance of various issues and their solutions within a broad context.
- **Do no harm.** Putting health in its broader environmental setting can help fulfill one of the most important rules of public health: to do no harm. Single sector projects may miss opportunities to address equally important health issues or sometimes inadvertently do harm by promulgating policies and promoting a mix of investments that fail to address health risks or give a false sense of security that the whole problem has been addressed.

Adhering to these cautionary principles should encourage a multidisciplinary approach to analyzing projects, one that ensures that investments in single sectors, especially for pollution control, also produce long-term health benefits. The principles should not be misinterpreted, however, as a recommendation to *avoid* investments in pollution management. The intention is simply to alert staff to low-cost, often neglected measures—sometimes only a small component within or parallel to a project—that could anchor and enhance the health benefits of such investments.

*Low-cost, often neglected measures—sometimes only a small component within or parallel to a project—could anchor and enhance the health benefits of investments in other sectors.*

Implementation of multisectoral approaches, however, as explained in chapter 1, is fraught with challenges. This chapter presents a new approach that attempts to address these challenges and bridge gaps in current efforts and among various agencies by harmonizing health with other sector priorities and targeting promising areas of collaboration on cost-effective health interventions. Box 2-1 explains some of the ways this new approach can be mainstreamed into the operations of the World Bank and other development agencies.
Box 2-1: Mainstreaming the New Approach into Bank Development Work

Untapped environmental health benefits in development work need to be better quantified, valued and integrated into Bank strategies, policies, and lending procedures at all levels. Bank staff need to be sensitized to practical ways to tap these potential benefits and convey this message to other development agencies, donors and NGOs. Several areas could be explored to help win promulgating these into lending: (a) options to mainstream environmental health; and (b) methodologies and instruments for Bank staff and borrowing countries among others. Environmental health constitutes one of the building blocks of the forthcoming Bank Environment Strategy, which is a recent positive factor that could catalyze the mainstreaming effort. Environmental health concerns are also being integrated in Poverty Reduction Strategy Papers (e.g., Madagascar), thanks to a mounting interest in improving the wellness of the poor through the poverty reduction.

Several other areas could be explored as non-lending options inside and outside the Bank. For example, the Development Committee of the World Bank and the International Monetary Fund need to be sensitized on environmental health issues during IDA replenishment, mainly through the Bank’s Environmentally and Socially Sustainable Development and Human Development networks. Bank, borrower countries, NGOs and CBOs can be sensitized on environmental health concerns which should also be included in Bank research programs and the World Bank Institute’s curriculum; dissemination through publication, web sites, and distance learning. Several of Environmental Health: Bridging the Gaps chapters deal with developing, enhancing or suggesting a panoply of options and tools to mainstream environmental health concerns at the macro, sector and project levels (as shown below).

### Options to Mainstream Environmental Health

**Country/Macro Strategies and Programmatic Instruments.** Structural adjustment lending, country assistance strategies, comprehensive development frameworks, poverty reduction strategy credits, national environmental action plans (WHO-funded national environmental health action plans), and environmental action plans.

**Economic and sector work (ESW).** Integration into (a) poverty reduction strategy papers, country economic memoranda, public expenditures reviews, sector reviews, sector strategy papers, poverty assessments, and social assessments, and (b) Bank sector strategies, for example, environment, health, social, poverty, energy, and water and sanitation.

**Global/Regional/Local Strategies and Instruments.** Including (a) intermediation mechanisms, e.g., community driven development, community action plan, and social funds and (b) other initiatives, programs, funds, and facilities, e.g., Carbon Fund, Cities without Slums, City Development Strategy, Clean Air Initiative, Disaster Management Facility, Global Environment Facility (GEF), Local Environmental Action Plans (LEAP), Multi-Country HIV/AIDS Program, Post-Conflict Reconstruction Program, and Rollback Malaria Initiative.

**Multisector/Single Sector Project and Monitoring.** Including (a) integration of environmental health into environmental assessment procedures and into project documentation, design summary, management, and monitoring and (b) preparation of environmental health projects (e.g., as the one under preparation in South Asia).

**Operational Procedures, Quality at Entry, and Safeguard Policies.** Need to be adapted accordingly.

**Evaluation.** Informal reviews, as well as those of the Operations Evaluation Department (OED), to take into account missed opportunities and make recommendations to be formulated and fed into new Bank sector strategies.

### Tools to Mainstream Environmental Health

**Analytical Tools** to quantify and value environmental health burden of disease (disability-adjusted life years to measure health outcomes besides mortality, and cost-effectiveness) and help mainstream its concerns at the macro, sector and project levels (chapters 3 and 6). Demographic and Health Surveys (DHS), Living Standards Measurement Study (LSMS) household surveys, World Development Indicators (WDI), and so on need to be adapted to provide data on environmental health.

**Sectoral Tools** to bring about sectoral priorities to help harmonize environmental health with other sectoral priorities, e.g., “shortcut tools,” such as “environmental health profiles,” which provide a short list of issues through a desk review or “entry points,” which focus on issues for which a critical mass of the stakeholders are ready to take action (chapters 3-5 and 15-17).

**Institutional Tools** to help determine institutional compatibility through institutional needs assessments and foster multisectoral collaboration and forge partnerships through entry points, incentives and mutual benefits (chapters 2, 3, and 15-17).

**Monitoring Tools** to develop cross-sectoral outcome-based monitoring systems, e.g., application of quality adjusted life years to measure years life gained from an intervention (chapter 3), early warning monitoring indicators, and multilayered geographic information system, which can combine information ecology, topography, socioeconomic groups, and associated environmental health risks (chapters 2, 5, and 17). DHS, LSMS and WDI need to be adapted.

**Procedural and Operational Mechanisms** to deal systematically with environmental health concerns at all levels and possibly: enhance exiting procedures, e.g., poverty, environmental and social assessments (chapters 4-6); and improve control mechanisms such as quality at entry and safeguard policies (chapters 7-14).

Source: Authors’ data.
The overall framework for implementing methodologies to tap missed health benefits through multisectoral collaboration is described below. Chapter 3 describes economic valuation. Chapters 4, 5, and 6 consider the gathering and analyzing of information to aid inclusion of environmental health in decisionmaking and chapters 8 through 15 present environmental health assessment guidelines.

Objectives of Harmonizing Sectoral Priorities

The main objective of the 1996 volumes of Bridging Environmental Health Gaps was to improve the well-being of the population at large. To this end, the Environmental Health: Bridging the Gaps program has worked to mainstream environmental health into World Bank operations. Current Bank attempts to bridge sectoral gaps through its “networks” help link two sectors, but difficult problems in Bank projects could benefit from solutions in several sectors simultaneously. The approach introduced here facilitates multisectoral efforts to the Bank’s chief goal of poverty reduction and sustainable development and expands health benefits beyond those of single sectors—health care, basic infrastructure services, and pollution management, fulfilling the first of the principles cited above.

Box 2-2: Environmental Health Defined

Environmental health is as much a way of thinking as a set of facts or professional discipline. Preventing disease, death, and disability should ideally form its core and entail looking at a problem in both its broad and narrow contexts. Broadly speaking, environmental health is intended to reduce exposure to adverse environmental conditions as well as promote behavioral change. More narrowly, it addresses the underlying causes of individual groups of diseases and injuries by looking at the direct and indirect causes and effecting relationships in the short and long term. Table 2-1 shows typical examples and their adverse health consequences.

Table 2-1: Sample Environmental Health Determinants and Consequences

<table>
<thead>
<tr>
<th>Underlying Determinants</th>
<th>Possible Adverse Health and Safety Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate water (quantity and quality), sanitation,* and solid waste disposal</td>
<td>Diarrheas and vector-related diseases, e.g., malaria, schistosomiasis, and dengue fever</td>
</tr>
<tr>
<td>Improper water resource management (urban and rural), including poor drainage</td>
<td>Vector-related diseases, e.g., malaria and schistosomiasis</td>
</tr>
<tr>
<td>Crowded housing and poor ventilation of smoke</td>
<td>Acute and chronic respiratory diseases, including lung cancer</td>
</tr>
<tr>
<td>Exposures to vehicular and industrial air pollution</td>
<td>Respiratory diseases, some cancers, and loss of IQ in children</td>
</tr>
<tr>
<td>Changes in feeding and breeding grounds of vectors, such as mosquitoes, from construction and population movement</td>
<td>Vector-related diseases, e.g., malaria, schistosomiasis, and dengue fever</td>
</tr>
<tr>
<td>Exposures to naturally occurring toxic substances</td>
<td>Poisonings from, e.g., arsenic, manganese, and fluorides</td>
</tr>
</tbody>
</table>

* “Sanitation” in this document refers to the various forms of excreta and wastewater removal.
Underlying Determinants | Possible Adverse Health and Safety Consequences
--- | ---
Natural resource degradation, e.g., mudslides, poor drainage, and erosion, which create health and safety problems | Injury and death from mudslides and flooding
Climate change, partly from combustion of greenhouse gases in transportation and industry and poor energy conservation in housing, fuel, commerce, and industry | Injury and death related to extreme heat and cold, storms, floods, and fires. Also indirect effects, e.g., spread of vector-borne diseases, aggravation of respiratory diseases, population dislocations, water pollution from sea level rise, and so on.
Ozone depletion from industrial and commercial activity | Skin cancer, cataracts, and indirect effects, e.g., compromised food production, and so on

Environmental health is intended to prevent human illness and injury by systematically tapping resources outside the health care system to enhance those of the health sector. In this sense, “environmental health” differs from “medicine,” “public health,” and “occupational health” in emphasis and points of intervention (see box 2-3). The World Bank has no specific definition for environmental health. In practice, however, the use of the term is most frequently used in the context of pollution management projects.

*Source: Authors’ data.*

The three underlying principles, stated above, however, call for multisectoral work among government agencies and community groups from health, environment, and other sectors that are not used to working together. A secondary objective, implemented through this discussion paper, has, thus, been to achieve multisectoral collaboration by harmonizing health and other sectoral priorities, that is, identifying and prioritizing remedial measures that are practicable, as defined by national and local institutional capabilities. To this end, health-related measures that may otherwise seem too far removed from or too expensive given overall project objectives are undertaken for their residual health benefits.

**Box 2-3: Key, Confusing, and Misused Terms on “Medicine” and “Health”**

*Medicine.* Emphasizes curative and preventive services oriented to individual diseases and injuries and operates mainly through the public and private health care system.

*Public health.* Emphasizes preventive and curative services oriented to promoting health and safety in society and operates through the public and private health care system as well as other institutions in society at large.

*Environmental health.* Emphasizes preventive services oriented to reducing exposures in society (current tendency toward pollution control) and operates through various public and private sector institutions.

*Occupational health.* Emphasizes curative and preventive health and safety oriented mainly to the workplace. Sometimes referred to as “occupational health and safety” or “occupational and environmental health.”

*Source: Authors’ data.*

The main objectives of the program are to enhance the Bank’s chief goal of poverty reduction by mainstreaming environmental health into World Bank operations and achieve multisec-

* Chapter 4 and the glossary define terms for environmental health assessments.
toral collaboration by harmonizing health and other sectoral priorities. This discussion paper is a means to achieve these objectives.

Methodologies of Targeted Multisectoral Collaboration

Harmonizing sectoral priorities depends on a process that targets collaboration among those sectors and on those measures that, tempered by administrative considerations, have the best chance of generating health and other benefits, generally at a lower cost for all. The process involves four new tactics:

- Identifying and prioritizing measures outside the health care system that will enhance efforts of the health care system
- Quantifying missed or untapped health benefits
- Devising entry points based on institutional capability to collaborate
- Enhancing mutual benefits for the sectors that agree to collaborate.

Identifying and Prioritizing Measures Outside the Health Care System

Instead of focusing analysis on the statistical levels of death, disease, and disability, this volume shifts the focus to remedial measures outside the health care system to solve health problems that are based on the types of interventions used to help solve problems: leading health problems, diseases for special consideration, and key cross-cutting issues that are pertinent to all sectors. This innovative system of classification, new in this discussion paper, maintains the focus on tapping health benefits outside the health care system, complementing and not replacing traditional health data.

Table 2-2 shows the range of possible remedial measures for the infrastructure sector, based on the top five burdens of disease in SSA (see also table 1-5.) This list would lengthen if other sectors were reviewed as part of a coordinated effort to deal with health systematically outside the health care system.

Table 2-2: Infrastructure Measures for Top Five Burdens of Disease in SSA

<table>
<thead>
<tr>
<th>Disease/Condition</th>
<th>Type of Infrastructure Remedial Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. AIDS</td>
<td>Outreach to high-risk groups, such as truckers, work crews, and market-related groups</td>
</tr>
<tr>
<td>2. Malaria</td>
<td>Vector control, and sanitation and drainage</td>
</tr>
<tr>
<td>3. Diarrheal diseases</td>
<td>Improved drinking water supply and waste management</td>
</tr>
<tr>
<td>4. Respiratory disease</td>
<td>Improved housing and air pollution abatement</td>
</tr>
<tr>
<td>5. Perinatal conditions</td>
<td>(Remedial measures handled primarily through the health ministry. Some hygiene education possible through out reach to infrastructure groups.)</td>
</tr>
</tbody>
</table>

Source: Authors’ data.

As one example, table 2-3 shows that seven of the top ten health problems in Ghana are amenable to infrastructure improvements (see also table 17-2). Chapter 3, which discusses socioeconomic aspects of health interventions outside the health sector, estimates that infrastructure projects could conceivably relieve a greater level of the burden of disease than health investments, about 20 percent, for a fraction of the cost. This is because infrastructure projects have already been justified on other grounds. These links to other sectors also open the door to identifying untapped and missed benefits.
Table 2-3: Top Ten Diseases in Ghana by Infrastructure Intervention (1994)

<table>
<thead>
<tr>
<th>Disease</th>
<th>1994</th>
<th>Major Infrastructure Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria</td>
<td>1</td>
<td>✓</td>
</tr>
<tr>
<td>Upper respiratory infection</td>
<td>2</td>
<td>✓</td>
</tr>
<tr>
<td>Skin diseases</td>
<td>3</td>
<td>✓</td>
</tr>
<tr>
<td>Diarrheal diseases</td>
<td>4</td>
<td>✓</td>
</tr>
<tr>
<td>Accidents</td>
<td>5</td>
<td>✓</td>
</tr>
<tr>
<td>Intestinal worms</td>
<td>6</td>
<td>✓</td>
</tr>
<tr>
<td>Pregnancy related complications</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Acute eye infection</td>
<td>8</td>
<td>✓</td>
</tr>
<tr>
<td>Gynecological disorders</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

*Source: Country assistance strategy for Ghana.*

Devising “Entry Points”

Entry points are determined by institutional capability and complementarity, that is, the likelihood of successful interagency and stakeholder collaboration due to their common interest in solving common problems. Promising entry points demonstrate the following characteristics:

- Widespread knowledge of the problem
- Clearly identifiable stakeholders and players
- Ability by the majority of actors in the situation to get to work.

These factors could create a framework for working on a range of environmental health problems, as the individuals and groups involved build up experience and practice working together. A trial case in Ghana Sekondi-Takoradi, one of Ghana’s five largest cities, for example, focused on the following entry points:

- Management of health facility waste
- Urban malaria and other vector-related diseases
- Diseases related to water, sanitation, and drainage.

Even though respiratory disease in Ghana ranks second out of the top ten diseases (see table 2-3), it was not selected for the case study, because the range of relevant players and stakeholders was so diverse. This increased the difficulty of those involved starting immediately to work toward a common goal without a delay involved in creating awareness among stakeholders from several sectors—health, energy, housing, transport, industry, environment—that they had a constructive role to play. With time, building on experiences with various successful entry points, other diseases and areas for collaboration may be identified in Ghana. Table 2-4 presents possibilities any country might consider.
Table 2-4: Sample Linkages and Synergies to Harmonize Sectoral Priorities

<table>
<thead>
<tr>
<th>Sector</th>
<th>Environmental Priority</th>
<th>Health Priority</th>
<th>Health Linkages</th>
<th>Possible Entry Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>Land degradation, pesticide use, and stagnant water (rural and periurban agriculture)</td>
<td>Food security, nutrition, and malaria</td>
<td>Contamination of the food chain, pesticide use, exposure to grain dust, vector-related diseases</td>
<td>Malaria and pesticide management</td>
</tr>
<tr>
<td>Energy</td>
<td>Air pollution and greenhouse gases</td>
<td>Acute respiratory diseases and indoor air pollution</td>
<td>Indoor and outdoor air pollution, and cooking fuels</td>
<td>Household ventilation and improved cookstoves</td>
</tr>
<tr>
<td>Environment</td>
<td>Natural resource management, climate change, global warming, and pollution control</td>
<td>Pollution control</td>
<td>Reduction of lead from multiple sources</td>
<td>Lead reduction for nontransport sources</td>
</tr>
<tr>
<td>Health</td>
<td>Medical waste disposal and greenhouse gas generation</td>
<td>Infant and child health, AIDS, malaria, tobacco smoking, and TB</td>
<td></td>
<td>Medical waste disposal</td>
</tr>
<tr>
<td>Industry and mining</td>
<td>Air, water, and coastal zone pollution</td>
<td>Occupational health and exposure to heavy metals and malaria</td>
<td>Mosquito breeding, respiratory diseases, and contamination of food chain</td>
<td>Malaria reduction and AIDS education</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Providing access to water, sanitation, and waste management facilities; pollution control; and drainage</td>
<td>Diarrheal diseases, traffic injuries, and malaria</td>
<td>Water, air, and land pollution; traffic safety; and mosquito breeding</td>
<td>Diarrheal diseases, traffic injuries, medical waste disposal, urban malaria, traffic-related air pollution, and AIDS in transport, construction work crews, and markets</td>
</tr>
</tbody>
</table>

Source: Authors’ data.

Health agencies may have a number of potential partners at any one entry point. For example, they might join with transport, water and waste management, and community groups, and schools to reduce urban malaria from mosquito breeding sites.

**Establishing Mutual Benefits for Sustainability**

Collaboration is more likely to be sustainable if it is based on sharing benefits, rather than merely increasing the budget for activities added. Establishing the mutual benefits that involved sectors may gain is, therefore, important to the process of harmonizing sectoral priorities. Methodologies for targeted collaboration try to reduce reliance on additional budget by identifying areas of mutual compatibility.

Table 2-5 below shows the stakeholders at risk for each of two entry points in the Ghana trial and possible partnerships. Table 2-6 lists recommendations for the potential partnerships associated with the stakeholders at risk identified in table 2-5 (see chapters 16 and 17 for more details).

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* Details of the pilot study appear in chapters 15 to 17 in this volume.
### Table 2-5: Stakeholders at Risk and Potential Partnerships for Entry Points in Ghana

<table>
<thead>
<tr>
<th>Entry Point</th>
<th>Populations at Risk</th>
<th>Potential Partnerships for Solutions</th>
</tr>
</thead>
</table>
| Urban malaria and other vector-related diseases | - Children under 5 years and other vulnerable groups (women, elderly, sick, and so on)  
- Communities around bushy and marshy areas  
- Densely populated areas  
- Low income groups that cannot afford any preventive or curative treatments (bed nets or drugs). | - Hydro Division, Ministry of Works and Housing  
- Ministry of Roads and Transport  
- Ministry of Environment  
- Environmental Protection Agency  
- Ministry of Health  
- Ministry of Industry  
- Media (press and radio)  
- Ministry of Planning (Census Statistics), Education, Town, and Country Planning  
- Assemblymen, unit committees  
- Community, religious groups  
- Fishing industry  
- NGOs, community-based organizations, and private sector  
- Shama Ahanta East Municipal Area’s (SAEMA’s) Assembly, Environmental Health Unit, Public Relations Unit, Urban Roads Department, and Waste Management Department |
| Management of health facility waste | - Children  
- Community  
- Health workers  
- Patients  
- Scavengers  
- Waste management operators | - Environmental Protection Agency  
- Environmental Health Department  
- Ghana Medical Association  
- Medical drug vendors and pharmaceutical manufacturers  
- Pharmacy board  
- Waste management department |

*Source: Authors’ data.*

#### Identifying the Stakeholders

Transport agencies, for example, are typically responsible for monitoring and cleaning storm drains to prevent highways and other roads from flooding. Clogged drains provide breeding grounds for malaria. Health agencies could collaborate with transport agencies by monitoring and reporting clogged drains at the neighborhood level. Transport agencies, saving monitoring time and money, could then devote more resources to cleaning. Health agencies could help reduce the spread of urban malaria and could use the monitoring for community outreach on urban malaria. As mentioned before, this collaboration could also address other mosquito-borne diseases, such as dengue (clean water) and filariasis (polluted water), often overlooked in malaria programs and economic analyses. Collaboration must also allow for changes in programs based on technical, social, or economic objectives of nonparticipants. The land reclamation recommended by the community stakeholders, for example, may not be ecologically sound and alternate means would need to be developed.
Table 2-6: Ghanaian Recommendations for Entry Points Based on Multisectoral Collaboration

<table>
<thead>
<tr>
<th>Entry Point</th>
<th>Recommendation</th>
</tr>
</thead>
</table>
| Urban malaria and other vector-related diseases | - Land use management:  
  (a) Land reclamation. Reconsider reclamation of marshy areas to destroy major mosquito-breeding grounds. Reclaimed lands could be used for agriculture, resettlement, or compatible uses.  
  (b) Burrow pits in construction and mining sites. Involve construction, mining, and industry in malaria prevention efforts. For example, work out the social, economic, and technical details of introducing tilapia and/or other appropriate fish species into unfilled areas and determine fishing rights.  
- Proper drainage. Clarify roles and responsibilities for drain management and monitoring:  
  (a) Develop clear maps of primary, secondary, and tertiary drains  
  (b) Link maps (geographic information system) to existing roles and responsibilities  
  (c) Assure an earmarked, nonfungible budget for desilting  
  (d) Involve communities in drain clearing, drawing lessons from the Bank’s Urban Environmental Sanitation Project (UESP).  
- Awareness creation. Build awareness on many alternatives to spraying to prevent mosquito breeding in households—for example, use of tilapia and sealed water tanks, storage, and containers—at all levels of government and society. |
| Management of health facility waste | - Develop medical waste management bylaws. Medical waste management was recently delegated to the local assemblies, which have no bylaws to implement this policy. Such bylaws would need to be based on a multisectoral approach.  
- Build capacity to monitor. Improve the capacity of assemblies to monitor proper disposal of medical waste.  
- Add value to waste. Examine the medical waste stream to determine those items with any economic value, removing hazardous materials from inexperienced waste pickers and disposing of them safely. Help scavengers to improve waste recycling in the medical waste. Items that are now being reused or sold with risk should be removed from the “informal market.”  
- Increase awareness of proper disposal of medical waste at all levels of government and society, especially target communities and medical staff. |

Source: Authors’ data.

Establishing Mutual Benefits through Mapping

The aim of the environmental health map is to devise a model that will help identify the geographic incidence of environmental health effects at the national, regional, and communal levels. The map, which could evolve to become a decision support system to prevent environmental health risks and formulate policy response, should combine environmental health risk factors and national, regional, or urban social maps (to derive vulnerable groups incurring an environmental risk) with a GIS technology to perform an environmental health survey of patterns that could be integrated in an environmental or environmental health assessment:

- Environmental health risk factors can include comparative risk assessment, risk communication, and risk management (see glossary).
- Data from social maps offer a means of exploring national or intra-urban environmental health differentials. Social maps can help identify data sources and contacts, relevant “hotspots,” both topically and geographically, and the perceived social causes that underlie and perpetuate observed patterns. They are an excellent way to begin any data search and, perhaps, frame the policy implications of later findings.
- Geographic information systems (GISs) mapping can help establish benefits by adapting existing GIS maps for environmental health purposes. GISs permit a view of a true spatial relationship of geology, hydrology, and ecology, in conjunction with land use (urban and rural settlements, industry and mining, agricultural land, and so on), social factors (income group concentration, among others), and environmental health patterns.

An environmental health map can effectively be done on a paper map, and a simple discussion note can describe how issues relate to geographic boundaries, as was demonstrated during the
Ghana pilot (see map 5-1 and chapter 17). A multidisciplinary group representing the public sector and stakeholders drew this “low-tech” map to depict the incidence of vector-related diseases in Sekondi-Takoradi.

A more advanced environmental health map could, however, be done by using a GIS or digitizing an approved map that could be used by all the sectors and tiers of the government. After producing the map, participatory discussions involving a multidisciplinary group will help (a) identify the patterns, (b) question the patterns evidenced by the data, (c) recommend further types of prioritized data and queries, believed to be necessary to ascertain the environmental health concerns, (d) formulate a plan of action in conjunction with other sectors’ goals and strategies, and (e) monitor the outcomes on a regular basis, allowing re-evaluation of policy response implementation.

Environmental health applications targeting specific health risks have been performed in several countries, but no comprehensive environmental health map has, as yet, been developed. The degree of sophistication of this decision support system will depend on time and resource constraints, availability, reliability of collected data, and sustainability of the process (designation of a lead agency, update, maintenance, and information sharing), which will help formulate environmental health policy responses at the national, regional, and communal levels.

Quantifying Untapped or Missed Health Benefits

Potential health benefits outside the health care system remain untapped or underestimated and, therefore, unrecognized. Four crucial reasons for this, compounded by problems in data availability and reliability, concern economic and health valuation techniques.

- First, health benefits, especially when calculated within the health sector, tend to focus on measures implemented through the health care system, on a single disease or condition or on a single causal factor. Only occasionally are measures multisectoral. Such analyses of malaria control, for example, tend not to look at other mosquito-borne diseases and concentrate on measures promoted by the health care system, such as bed nets, medications, and other medical treatment. In comparison, positive infrastructure interventions such as proper drainage tend to be excluded. Because drainage networks can support a variety of mosquitoes, drain cleaning and maintenance that reduces breeding sites for mosquitoes that spread malaria can also reduce breeding sites for mosquitoes spreading dengue and filariasis.

- Second, health benefits, especially when calculated outside the health sector, tend to be aggregated under “health,” without recognizing individual contributions of multisectoral causes or remedial actions. Reducing air pollution, for example, has impacts beyond respiratory diseases, addressing impacts on the circulatory system, skin, and eyes.

- Third, the tendency to focus on single diseases may also miss diseases that may be medically different, but would respond to the same type of remedial measures. Under the broad category of respiratory diseases, for example, focusing on acute respiratory infections—the number one cause of DALYs in developing countries (see table 1-1)—would miss diseases such as tuberculosis, asthma, and lung cancer.

- Fourth, it is also possible to miss diseases and conditions that are indirectly related to the single disease being evaluated. For example, in an energy project evaluating the benefits of improved household fuel. Concentrating on indoor air pollution and respiratory disease could miss a range of factors that may be equally important. The consequences of fetching firewood entail injuries (head, neck, and back) to women from carrying heavy loads, and perinatal problems if they are pregnant (low birth weight and miscarriages). Other
missed benefits could include better child nutrition, if mothers are able to improve cooking (boiling water to prevent diarrheas and more hot meals).

These four factors will depend on local conditions, but, collectively, their effects can be considerable.

Analysis of the possible impacts of multisectoral approaches to environmental health, however, can be revealing. The *World Development Report: Investing in Health 1993* estimated that the public sector health care system could relieve about 33 percent of the burden of disease. In comparison, the 1996 *Bridging Environmental Health Gaps* volumes estimated that the infrastructure sector could target up to 44 percent of the burden of disease in SSA (see table 2-7). This points to the great potential of interventions outside the health care system.

The infrastructure sector could target up to 44 percent of the burden of disease in SSA, indicating the great potential of interventions outside the health care system.

**Table 2-7: Burden of Disease in SSA by Main Remedial Measures (1990)**

<table>
<thead>
<tr>
<th>Remedial Measures</th>
<th>Disease or Condition</th>
<th>Years with Disability</th>
<th>Annual Deaths</th>
<th>DALY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved housing and air pollution abatement</td>
<td>Respiratory disease</td>
<td>3,017,000</td>
<td>1,565,000</td>
<td>45,312,000</td>
</tr>
<tr>
<td>Vector control, sanitation, and drainage</td>
<td>Tropical cluster or vector related</td>
<td>8,064,104</td>
<td>1,123,300</td>
<td>35,922,104</td>
</tr>
<tr>
<td>Improved water and waste management</td>
<td>Water and sanitation related</td>
<td>1,468,000</td>
<td>888,539</td>
<td>31,208,000</td>
</tr>
<tr>
<td>Household and traffic injury reduction</td>
<td>Unintentional injuries</td>
<td>5,322,009</td>
<td>335,300</td>
<td>15,067,000</td>
</tr>
<tr>
<td>Subtotal infrastructure related</td>
<td></td>
<td>17,871,113</td>
<td>3,912,139</td>
<td>127,509,104</td>
</tr>
<tr>
<td>Subtotal childhood cluster*</td>
<td></td>
<td>1,501,000</td>
<td>788,000</td>
<td>28,093,000</td>
</tr>
<tr>
<td>Subtotal remaining burden of disease</td>
<td></td>
<td>48,158,000</td>
<td>3,326,861</td>
<td>137,236,104</td>
</tr>
<tr>
<td>Grand total burden of disease</td>
<td></td>
<td>67,530,113</td>
<td>8,027,999</td>
<td>292,838,208</td>
</tr>
</tbody>
</table>

Percent potential for infrastructure interventions: 26.5, 48.7, 43.5

*a. Childhood cluster includes pertussis (whooping cough), poliomyelitis, diphtheria, measles, and tetanus.

Source: Adapted from World Bank (1994) and WHO (<http://www.who.int/peh-super/lectures5.12/15.htm>).

Table 2-8 takes the potential target of 44 percent a step further by estimating the possible range of health benefits available outside the health sector in SSA. Measures inside and outside the health care system could achieve the same order of magnitude, each averaging about 20 percent. In theory, therefore, it is possible to produce the same order of magnitude of health benefits at only a fraction of the cost, because investments have already been justified for reasons other than health (see chapter 3). Although the figures are still estimates and require rigorous statistical analyses, in the absence of statistically significant data, common sense and professional judgment argue for systematic examination of these possibilities.
Table 2-8: Burden of Disease Relieved by Remedial Measures (1998)

<table>
<thead>
<tr>
<th>Remedial Measures</th>
<th>Percent of the Range of DALYs Potentially Reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Environmental health remedial measures for infrastructure and other sectors:</td>
<td></td>
</tr>
<tr>
<td>Improved housing and air pollution abatement</td>
<td>6</td>
</tr>
<tr>
<td>Improved water and waste management</td>
<td>8</td>
</tr>
<tr>
<td>Vector control, sanitation, and drainage</td>
<td>3</td>
</tr>
<tr>
<td>Road, workplace, and housing design</td>
<td>1</td>
</tr>
<tr>
<td>Subtotal of environmental health types</td>
<td>17</td>
</tr>
<tr>
<td>Health care/education remedial measures:</td>
<td></td>
</tr>
<tr>
<td>Subtotal of health care types</td>
<td>15</td>
</tr>
<tr>
<td>Other remedial measures:</td>
<td></td>
</tr>
<tr>
<td>Subtotal other</td>
<td>68</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations.

Table 2-9 estimates that, for respiratory disease alone, 47 percent of the DALYs are often not analyzed for potential benefits available outside the health sector. For instance, the same factors responsible for acute respiratory infections, such as indoor air pollution from poor quality cooking, lighting, and heating fuels, can also cause or aggravate the remainder of respiratory diseases, which are analyzed separately in statistics.

Table 2-9: Possible Health Benefits Missed by Focusing on a Single Disease

<table>
<thead>
<tr>
<th>Respiratory Disease/Condition</th>
<th>World DALYs (1,000s)</th>
<th>Developed DALYs (1,000s)</th>
<th>Developing DALYs (1,000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counted in top ten or alone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute respiratory infections (lower)</td>
<td>82,344</td>
<td>1,355</td>
<td>80,990</td>
</tr>
<tr>
<td>Subtotal “counted in top ten”</td>
<td>82,344</td>
<td>1,355</td>
<td>80,990</td>
</tr>
<tr>
<td>Diseases counted separately</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute respiratory infections (upper)</td>
<td>975</td>
<td>50</td>
<td>924</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>28,189</td>
<td>142</td>
<td>28,047</td>
</tr>
<tr>
<td>Chronic obstructive</td>
<td>28,654</td>
<td>2,449</td>
<td>26,205</td>
</tr>
<tr>
<td>Asthma</td>
<td>10,986</td>
<td>1,208</td>
<td>9,706</td>
</tr>
<tr>
<td>Other</td>
<td>18,932</td>
<td>1,303</td>
<td>17,089</td>
</tr>
<tr>
<td>Cancer (lung, trachea, bronchus)</td>
<td>11,176</td>
<td>3,122</td>
<td>8,054</td>
</tr>
<tr>
<td>Subtotal “counted separately”</td>
<td>87,736</td>
<td>5,152</td>
<td>81,971</td>
</tr>
<tr>
<td>Combined total</td>
<td>181,256</td>
<td>9,629</td>
<td>171,015</td>
</tr>
</tbody>
</table>

Possibly omitted in calculation of benefits | 45% | 14% | 47%


Improved Service Delivery

The single sector approach may underestimate the environmental health benefits possible through a broader approach to improving overall service delivery. In the case of transport and health agency collaboration on reducing mosquito-borne diseases, transport agencies could improve drainage and, to a lesser extent, traffic flow in the rainy season by transferring some of the drain monitoring to health or neighborhood groups. This concept is further explored in chapter 3’s section on environmental health attributes, which dis-aggregates benefits that are typically listed under the “health” rubric. Table 2-6 above listed expanded health benefits that imply better service delivery, because they add to the types of beneficiaries otherwise excluded from a project.
Estimating Beneficiaries

Single sector approaches traditionally calculate economic rates of returns on a development project by closely examining those directly affected by a project. An environmental health approach needs to examine if benefits can be appropriately applied to a wider audience. Better estimates of beneficiaries can help justify projects or components that are considered too costly.

In the Long-Term Water Sector Project in Senegal, for example, initial economic calculations focused on water as the way to reduce diarrheal disease and on those who would benefit economically by having water conveniently and consistently accessible. An environmental health analysis, however, increased the number of beneficiaries by including (a) 70,000 people who live near a dam in the project zone that are exposed to schistosomiasis and (b) Dakar residents who might benefit from better management of market gardening to help curtail the current spread of urban malaria (see table 2-10).

Table 2-10: Sample of Increased Health Benefits in Long-Term Water Sector Project in Senegal

<table>
<thead>
<tr>
<th>HEALTH BENEFIT</th>
<th>STAGE OF DELIVERY</th>
<th>HEALTH COST/RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Production of Water at Ultimate Source: Senegal River</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Added income to promote better nutrition, especially protein.</td>
<td>• Local populations are moving around the Lac de Guiers because of economic activity spurred by a link to the Senegal River.</td>
<td>• Spread of malaria and bilharzia. • Pesticide and fertilizer contamination.</td>
</tr>
<tr>
<td>2. Production at the Immediate Source</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Lac de Guiers (population estimate, 70,000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Fishing and livestock: added income to promote better nutrition, especially protein. • Agriculture: nutritional benefit from added crops (flood recession cropping). • Reduction of aquatic weeds by shores will help break the cycle of malaria and bilharzia.</td>
<td>• Traditional agricultural activity will expand on the lake’s western shore and part of the eastern shore. Proposed management plan will vary the water level in the lake so that shores dry up annually for 2–3 months (to be determined).</td>
<td>• Fishing: creation of temporary fishing villages with low levels of hygiene and sanitation; sexually transmitted diseases, especially AIDS, from transient population. • Livestock: animal-borne diseases (and, for animals, Rift Valley Fever). • Agriculture: pesticide and fertilizer contamination of the lake, and spread of malaria and bilharzia from improper agricultural practices.</td>
</tr>
<tr>
<td>B. Water Production Plant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Added income to promote better nutrition, especially protein.</td>
<td>• Construction of plant will require sand, soil, and vehicles.</td>
<td>• Areas used for sand and soil can become vector breeding grounds, if not filled in. • Construction vehicles can cause noise; dust, increasing the risk of respiratory disease in local populations; and traffic-related injuries. • Poor sanitation and drainage during construction by workers can spread diarrheal vector-related disease. • Sexually transmitted diseases, especially AIDS, from transient population.</td>
</tr>
<tr>
<td>• Health services available at the water production plant.</td>
<td>• Operation of plant.</td>
<td>• Poor sanitation and drainage by workers can spread diarrheal vector-related disease.</td>
</tr>
<tr>
<td>(None readily apparent)</td>
<td>• Blockage of current watering site for local farmers.</td>
<td>• Increased risk of bilharzia for locals who need to find a new watering site because the area now has no vegetation (breeding sites) at its shore, although other nearby suitable sites do.</td>
</tr>
<tr>
<td>HEALTH BENEFIT</td>
<td>STAGE OF DELIVERY</td>
<td>HEALTH COST/RISK</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>• Improved housing, in addition to water sanitation for about 75 families.</td>
<td>• Vehicle traffic during operations.</td>
<td>• Risk of noise pollution, traffic injuries, and respiratory disease from frequent vehicle traffic passing near homes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Risk of spreading vector-related diseases due to poor sanitation and drainage.</td>
</tr>
<tr>
<td>C. Housing for Water Treatment Workers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Water transportation: Keur Momar Sarr–Thies main

| • Clean water.                                                               | • Villages along water main.                          | • Spread of malaria through improper agricultural practices.                     |
| • Market gardening.                                                          |                                                       | • Small dams can lead to water contamination and breeding sites for disease vectors, if not correctly maintained. |
| • Additional sources of nutrition, especially protein from additional crops possible. |                                                       |                                                                                  |
| • Possible added income from lower water costs.                              | • Legal connections for drinking water.                | • Spread of malaria through improper drainage of water.                           |
| (None readily apparent)                                                      | • Construction work crews and worker camps during pipe laying. |                                                                                  |
| (None readily apparent)                                                      |                                                       | • Spread of AIDS                                                                  |

4. Use: Greater Dakar (Agglomeration de Dakar)

| • Possible reduction in malaria by changing from sprinkle-saturation watering to drip. | • Market gardening in periurban Dakar and five secondary cities. | • Increase in urban malaria from added water without proper drainage. |
| • Reduction in diarrheas and intestinal parasites through improved water, sanitation, and drainage. | • Improved sanitation and drainage.                         | • Spread of urban malaria from improper disposal and drainage. |

5. Use: Dakar City (Ville de Dakar)

| • Reduction in diarrheas and intestinal parasites through improved water, sanitation, and drainage. | • Improved sanitation and drainage.                         | • Spread of urban malaria from improper disposal and drainage. |
| • Reduction in diarrhoeal diseases and intestinal parasites through improved hygiene. | • House connections.                                       | • Spread urban malaria through improper drainage of water. |
| • Reduction in diarrheal diseases and intestinal parasites through improved hygiene. | • Standpipes.                                               | • Spread malaria through improper drainage of water. |
| (None readily apparent)                                                      |                                                       | • Increase diarrhea from improper water management.                  |
| (None readily apparent)                                                      |                                                       | • Spread malaria through improper drainage of water. |
| (None readily apparent)                                                      |                                                       | • Increase diarrhea from improper water management. |

CHAPTER 3: SOCIOECONOMIC JUSTIFICATION AND CHALLENGES

Human beings are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.¹

Relative to the other chapters, Chapter 3 is written with a greater emphasis on technical issues. Many ideas being presented are new, particularly those of health benefit valuations that have often been missed. These new ideas have not been subjected to analyses from several sectors. As a result, greater attention has been placed on explaining methodology than on its application.

This chapter deals with the economic underpinnings of the new ideas being proposed in this discussion paper: that considerable health benefits outside the health care sector remain untapped and require further research and analysis, for example, infrastructure interventions. The chapter builds on the tremendous environmental work that has been done to quantify these health effects and attempts to complement and expand the environmental scope, work, and analysis to look comprehensively and multisectorally at environmental health effects outside the health care system, especially those affecting the poor. More specifically, the chapter covers the following topics:

- First, the chapter introduces the notion of environmental health and attempts to justify the need to mainstream environmental health concerns in development work, while emphasizing that environmental health interventions are not competing with, but complementing health care delivery system interventions in a cost-effective manner.
- Second, the chapter clarifies environmental health attributes, such as ecological factors, man-made factors (or environmental health externalities that tend to be treated under a general rubric of “health”), and human behavior.
- Third, the chapter stresses the need to harmonize the enabling environment to formulate adequate environmental health policy responses (identifying environmental health externalities and associated policy, institutional, and market failures) and devise monitoring systems to achieve outcome-based results. To this end, macro and sectoral World Bank instruments are reviewed to integrate environmental health concerns.
- Fourth, the chapter quantifies and values in terms of social costs the environmental health burden of disease (BOD) in Sub-Saharan Africa and apportion the environmental health BOD borne by the poor. More specifically, the BOD is dis-aggregated and re-aggregated, which allows for “back-of-the-envelope” calculations on the SSA burden of disease that is targetable through environment health and health care interventions. These are quantified in terms of lower-bound social cost to SSA economies.
- Fifth, the chapter prioritizes a cluster of interventions based on environmental health BOD to relieve the burden on the entire population as well as on the poor. A cost-effectiveness analysis is performed and possible intervention efficiency ratios are derived by intervention. Also, policy response and implications are drawn.

Why Do Mainstream Environmental Health in Development Work?

Economic thinking relies on the concept of utilitarianism, by which people strive for well-being and avoid pain. Sustainable development* promotes non-declining well-being for present and future generations through a well-managed physical, natural, human, social, and financial capital. Growing sustainable development challenges in the 1980s and 1990s led to the development of institutional frameworks and application of conventional economic thinking to come up with optimal economic solutions for addressing environmental problems. In contrast, environmental health (see box 3-1 for a working definition) problems (human health problems falling outside the purview of the health care sector, such as health effects resulting from economic activity affecting the environment) are still only partially identified and addressed through a fragmented sectoral approach.

Box 3-1: Working Definition of Environmental Health

Environmental health† relates to ecological factors, human activity (production or consumption), and human behavior that impact socioeconomic conditions and environmental life support systems and potentially affect the well-being of present and future generations by increasing human disease, injury, conditions, and premature death.‡

Source: Authors' data.

At the end of the 1990s, major efforts were made essentially to recognize environment health problems, and numerous surveys and prospective studies were conducted to bring this important issue to the forefront. A worldwide public opinion survey conducted in thirty countries singled out children’s health affected by environmental problems as one of the most important concerns. Over the 1990-99 period, the burden of disease (BOD) growth outpaced the population growth in SSA (26 against 21 percent respectively over the period). This increase is a stern reminder that communicable diseases (+41 percent), mainly HIV/AIDS, malaria, respiratory diseases and water-related diseases, which have different growth rates over the period, represent a growing portion of SSA’s BOD in relative terms (73 percent in 1999 against 66 percent in 1990). A recent World Bank study suggests that the concentration of death and disability-adjusted life years (DALYs) lost to communicable diseases, of which almost a third can be attributed to environment-related problems in SSA, affects the poor—about 60 percent of ill health for the poor compared with 8–10 percent among the richest quintile. In terms of environmental health, communicable diseases (excluding HIV/AIDS) represent the majority of the diseases affecting both, the entire population (86 percent) and the poorest of the poor (87 percent) (see table 3-1).

Environmental health problems are rarely aggregated per se, but, collectively, they amplify the burden of disease, which impinges on Sub-Saharan Africa’s (SSA) in the following ways:

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* Definition: development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland Report: World Commission on Environment and Development, 1987, p. 43).
† See glossary for various definitions on environmental health.
‡ Future generation preferences and possible environment-related human genetic defects cannot be determined or documented ex ante and, therefore, constitute an unresolved issue that will not be addressed in this chapter (See also institutional failures).