Bridging Environmental Health Gaps

Recommendations for Sub-Saharan Africa and the Rest of the Bank

Volume III

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Health cannot be attained by the health sector, either alone, or even primarily.

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This work was generated as part of the "Regional Study on Urban Waste Management: Examples and Best Practices in Africa." In considering past and on-going projects, it became clear that, despite its importance to sustainable development, very little information existed on the environmental health linkages beyond the very strong associations with diarrheal diseases, still one of the most important causes of death and disability in developing countries. It was decided to conduct a study on Sub-Saharan Africa (SSA) infrastructure operations to assess their environmental health dimensions and extract lessons that could be transferred to projects without necessarily complicating project management. Although multisectoral, this work concentrates on infrastructure, and within that presents a more detailed analysis of the water supply and sanitation subsector, particularly factors related to waste management, the overall context of the exercise. "Bridging Environmental Health Gaps" addresses four questions:

- Why is environmental health important?
- What are the main cross sectoral environmental health issues that need to be addressed?
- What can Infrastructure Task Managers (TM) and Country Officers (CO) do about them?
- If interventions would not conform easily to a Bank project, or if the Bank does not have a comparative advantage in executing them, what other measures are practicable?

"Bridging Environmental Health Gaps" consists of three volumes, each aimed at integrating environmental health into operations, but with a different emphasis:

- The Main Report (Volume One) is intended primarily for technical staff responsible for infrastructure sector programs in Sub-Saharan African countries. In addition, the Main Report should be of use to staff engaged in Environmental Assessments (EAs) of sector policies and programs. It would also be of interest to staff dealing with public health policies as well as water resource management. The main conclusion is that the contributions of infrastructure projects toward poverty alleviation and improvement in living conditions could be significantly enhanced by systematic consideration of opportunities for health improvement.

- Volume Two consists of a cross sectoral literature review used as background, and contains an annotated bibliography.

- Volume Three raises questions about the compatibility between environmental health and sustainable development and makes recommendations about how treatment of environmental health issues can be improved within the Bank.

The latter two volumes are expected to be of use to a wide audience not specialized in environmental health, since the two volumes approach environmental health as lying at the core of poverty alleviation and sustainable development, whether in policy or operations.

The Main Report is published as an AFTES Divisional Paper and may eventually be issued for broader circulation as an AFT Technical Paper. The two companion volumes are issued as Working Papers. The preparation of the three volumes was largely funded by the umbrella Trust Fund for Environmental Studies established by the government of Norway.

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BRIDGING ENVIRONMENTAL HEALTH GAPS:
VOLUME THREE: RECOMMENDATIONS FOR SUB-SAHARAN AFRICA AND THE REST OF THE BANK

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I. IN A NUTSHELL

1. **Justification.** It has become a global cliché that bureaucracies do not communicate well and that the environmental dimensions of their work need to be better integrated. "Bridging Environmental Health Gaps" makes a modest attempt at responding to the cliché. Many important environmental health Issues fall through the cracks of development agencies because environment and health are both cross-sectoral, but institutions commonly lack clear directives for the multisectoral dimensions of their work.

2. **Summary of Lessons.** Because Bank experience with environmental health has been limited, so have the lessons; but there is an impressive array of lessons from the water/sanitation subsector. The lessons point to the value of integrating water supply with sanitation, drainage, community education and hygiene practices. In a phrase: *handwashing became as important as engineering.* No other sector has benefitted from nearly a quarter century of research devoted to low-cost appropriate technology and an international decade dedicated to making drinking water and sanitation universally available.

3. **Summary of Observations.** A stunning observation comes from a thumbnail calculation: that the infrastructure sector can exert an effect on 44 percent of the burden of disease in Sub-Saharan Africa (SSA). This figure was derived merely by looking at health improvement from the vantage of potential solutions. The actual potential to improve human health outside the health sector, however, is still poorly explored. For example, techniques to estimate the costs of health damages still accentuate death, but environment-related diseases affect long-term debility.

4. A similar approach which can elicit lessons like handwashing is still wanting in the 1990s, in spite of the "greening" of development. Perhaps the two decades it took to integrate handwashing with engineering into Bank operations could be substantially reduced given the existence of a broader range of environmental specialists and the availability of that research. There is a risk, however, that greening will merely cause a shift in emphasis to ecology and not address the potential for projects to miss health issues or, worse, do harm by neglecting such factors as the contribution of roads to spread malaria.

5. **Main messages.** The overall message is simple: most causes of disease, injury and death in developing countries — inadequate sanitation, poor personal hygiene, road accidents, tobacco smoke, pollution — lie outside the control of the health sector. Yet, the policies of sectors that exert these direct health impacts are not set by health criteria. "Bridging Environmental Health Gaps" helps identify opportunities to improve Bank operations through the possibilities for interventions outside the health care system. Each Volume has a separate message based on its emphasis.

- The Main Report (Volume I) is operational, based on 203 SSA infrastructure projects (1984-94) and 300 Bank documents. It contains background on environmental health and a checklist for Task Managers, and details how projects can help relieve the burden of disease. Volume I reveals that consideration of environmental health in Bank projects has been minimal to date.
- Volume II is a cross-sectoral literature review of about 2,000 works. Whereas Volume I summarizes infrastructure lessons, Volume II discusses each sector. The literature indicates the limited role health has actually played in determining policies outside of the health sector.
- Volume III looks at the role of environmental health in sustainable development and contains recommendations. It identifies significant issues that have not yet been resolved within the

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*Environmental health is "the body of knowledge concerned with the prevention of disease through control of biological, chemical, or physical agents in the air, water, and food, and the control of environmental factors that may have an impact on the well-being of people." (The VNR Dictionary of Environmental Health and Safety; F. S. Lisella; 1994.)*
Bank, and cites the possibility of going against the first dictum of public health — that remedial measures do no harm — even for well intentioned projects:
- cut-and-paste science inevitably leads to cut-and-paste priorities;
- unclear sectoral responsibilities lead to incomplete solutions;
- sustainable development notions are confused with sustainable pollution abatement.

Leaving the door open for potential negative health repercussions is not sustainable development, even though it might be an admirable attempt at sustainable pollution control. In economic terms, to overlook environmental health is equivalent to setting national energy policies based exclusively on capital-city gasoline consumption, without any discussion of secondary cities, rural areas, agricultural/industrial uses, coupled with their elasticities and externalities. (See box, p. 7.)

6. Questions Raised. Volume III asks if Bank policies and priorities are on target in alleviating poverty and makes recommendations accordingly. It is unclear if past project objectives or successes would have changed with advocacy for environmental health issues that appear to fall between the cracks.

- Do sectoral investments miss opportunities to alleviate poverty as defined by health improvement? For example, respiratory infections, the number-two burden of disease in SSA, are aggravated by indoor air pollution. Yet, 1.3 percent of SSA energy lending from 1984-94 was devoted to efficiency of cooking stoves, for ecological reasons, not health; no housing subsector loans have addressed indoor air pollution per se. Is it fair to say that these factors have been neglected, to say "only" 1.3 percent?
- Does the paucity of staff instructions preclude appropriate consideration of environmental health? Of the 30 staff instructions (OP/BPs) dealing with sectoral issues, one deals with environmental health. Out of nearly 400 publications on sociology/anthropology, two deal with health. Of 124 SSA infrastructure Environmental Assessments (EAs), 31 mentioned health, but none included detailed analysis. Is it fair to say that environmental health "only receives perfunctory attention"?
- How does the Bank's in-house professional competence exert an impact on health improvement? The SSA infrastructure project analysis showed that health has been managed by engineers and economists. A health specialist participated in preparing two out of 203 projects and went on two of about 600 missions by the time 63 of those projects were completed. Is the term "only two" appropriate? Does it undercut the valuable contribution of engineers and economists?

7. Recommendations. Whereas Volumes I and II suggest pollution has been overaccentuated relative to other important factors, work done thus far on pollution provides an excellent foundation from which to redress the imbalance. It also provides a broad research base from which to focus in on key gaps, particularly those estimating health costs of environmental damages. Recommendations are based on the premise that compatibility of institutional objectives is as important to success as are the technical issues themselves. The recommendations center around the notion of "targeted collaboration" (para. 41) which aims to help resolve health problems outside the health sector per se, to stretch budgets and to reverse the imbalance of research/information flows going from industrialized to developing countries. Recommendations include:

- get moving with what is available in the Bank by mainstreaming environmental health into SSA infrastructure operations (para. 45),
- building up a critical mass of environmental health competence within the Bank (para. 46),
- integrating environmental health into other sectors and regions (para. 47), and,
- devising cross-sectoral approaches to cutting-edge issues, inside and outside the Bank (para. 49).
II. DEFINE HALF A PROBLEM — DEVISE HALF A SOLUTION.

8. The Issues. A mistaken notion has developed that what is good for the environment is also good for public health, leading to a chain reaction with potentially negative consequences that run the gamut from national policies to household activities. The chain starts with basic ignorance about the linkages among ecology, health, and human behavior and finishes by sending the wrong messages to set sustainable policies, promote economic incentives and encourage behavioral change. The most notable manifestation of the chain reaction is the overemphasis on pollution control at the cost of an underemphasis of other equally important public health factors. Define half a problem; devise half a solution. Three cases are indicative of work inside and outside the Bank:

9. Cut-and-paste science inevitably leads to cut-and-paste priorities. Incorrect emphasis can be put on data, resulting in incorrect emphases in remedial measures. Air quality indexes, for example, reflect ambient air, but seldom monitor air at nose-level or, more important, indoors, where household smoke can be far more serious than automobile exhausts. (Unventilated cooking fumes can equal 4-5 packs of cigarettes a day!) A risk exists that pollution data without proper interpretation could overemphasize transport, industry and energy while neglecting housing, where people spend most of their time.

10. Unclear sectoral responsibilities lead to incomplete solutions. Responsibilities for environmental health are not clearly defined. In effect, different agencies make a series of perfunctory inputs rather than contributions to an overall guiding principle. In Mexico City reducing air pollution has meant focussing on vehicle emissions, especially lead. However, other equally important sources — notably, traditional pottery (the blue glaze contains lead and leaches out) — have been neglected. They have been addressed in health reports, but not necessarily in environmental assessments. The risk exists that those charged with pollution reduction consider the task accomplished, when it is not. For example, reducing automobile emissions does not address already-settled lead which can recirculate in dust up to 30 years.

11. The notion of sustainable development is confused with sustainable pollution abatement. By focusing on pollution, important diseases like TB, cholera, dengue, and malaria, which are staging comebacks globally, are seldom factored into environmental reports. In the water-scarce Middle East, sustainable development strategies have focused on reducing air/water pollution and improving efficient water use. But they have not addressed the human response to water scarcity: household storage or local impoundment. Both actions can spread habitats of the mosquitoes and other vectors that spread disease. Malaria is still endemic in over 100 countries with a global population-at-risk of over 2 billion, 150 million new cases and 1.5 million deaths annually. In 1976, drug-resistant malaria was confined to southeast Asia; in 1996, it is a global problem. (Many articles speculate that global warming is already contributing to an extension of mosquito habitats.) The risk exists for projects actively to do harm by omitting potentially negative factors involved with pollution abatement programs.

12. The Literature and Bank Documentation. The literature review (Vol. II) and project analysis (Vol. I), clearly indicate that a set of complicated cross-sectoral problems is being addressed by single-sector responses. Most environmental health literature has emphasized pollution, but has also revealed areas which had not been explored a decade ago, such as "urban health", violence, and economic evaluation of environmental degradation. Very little was found in the overall literature combining ecology and public health, such as shared monitoring criteria or contamination of the food chain through agriculture and water pollution. A consistent theme, however, showed the poor being inordinately burdened with the results of environmental degradation in all sectors.
13. Bank documentation shows an uneven treatment of environmental health (see Vol. I, Annex B, paras. 4-5). Several Environment Department publications refer to the pollution-health linkage in annual reports and other evaluations of Bank work. A bibliography on sociology and anthropology covering 18 years includes two entries on health out of 390 citations. Project documents and other publications focus mostly on pollution control. In the Middle East and North Africa, Europe and Central Asia Regions, environmental health was used as an input into developing regional strategies; in the Latin America and the Caribbean (LAC), and East Asia and Pacific Regions attempts were made to estimate the economic costs of human health damages. The health advisory group of LAC have made innovative uses of health data, e.g., by estimating future changes of death, disease and injury, relating them to future investments for the health care system. The latter have application to other sectors and Regions, especially as they pertain to improving health outside the health care system, a factor which has not yet been explored. All these efforts should be encouraged (see Recommendations).

14. Sectoral Lessons. Lessons come from the "Appropriate Technology in Low-Cost Water Supply and Sanitation" of the 1970s, and the promulgation of United Nations "International Drinking Water Supply and Sanitation Decade" (IDWSSD) of the 1980s. The actual effects of infrastructure in improving health, however, have never been systematically evaluated. By putting handwashing on a par with engineering, the Bank gradually changed the way it did business. Flush toilets were no longer viewed as a badge of economic success because they were unaffordable to most of the poor. The technological features that had been adopted from temperate climates were adapted to tropical conditions. Eventually, water quantity became as important as water quality, since it allowed for personal hygiene. And so a range of other options was developed based on cost, service level, consumer preference, technological capability, and client demand.

15. Over the two-plus decades it became clear that provision of physical infrastructure for water supply alone would not solve the world's water supply problems; nor, alone, could improved water supply improve health. At that time, the number-one killer, diarrheal diseases, was attributed to poor quality drinking water. Today, the overriding concern seems to be pollution abatement per se, much like the water quality focus of the 1970s. A lesson in-the-making would focus on how to broaden pollution abatement to be as successful as water/sanitation; some of the factors are described below.

16. Operational Lessons. In the 1970s, the Bank went through a period of integration similar to its 1987 "greening." The focus on "urbanization" was changed to "urban development", and from "agriculture" to "integrated rural development". Many felt that integration combined too many objectives — Christmas tree projects — making management too cumbersome. The breadth of projects was curtailed in favor of management efficiency. Some could argue that this retrenchment stymied the type of innovation inherent to putting handwashing on a par with engineering (para. 18). A risk exists that current emphases on environment, poverty and gender could evoke a similar curtailment unless integration is carefully targeted, and keep environmental health considerations limited to pollution.

17. Current Bank Procedures. Current sectoral breakdowns do not foster that same type of interaction that would lead to an equivalent handwashing lesson. Cross-fertilization on health issues within and among the three sectoral vice presidencies depends as much on personal contacts as it does on Bank procedures. A typical example from each vice presidency which could benefit from collaboration, is:

- "Human Development" links anemia with deficient nutrition as a health sector issue, but does not link hookworm, a major contributor to anemia, with deficient sanitation (the worms hook on to the intestines, causing blood loss).
"Industry and Energy" examines ambient air pollution, but only accords minimal treatment to indoor pollution and its link to respiratory diseases, now considered one of the most important health problems in the developing countries. Much industry/energy work is done in the context of privatization, not human health.

"Environmentally Sustainable Development" links pesticides with water quality, but not with breast cancer in women farmers, or with general contamination of the food chain, which are not dealt with at all inside the Bank.

In the Bank there is no clear definition of environmental health, which exacerbates the already-difficult process of cross-fertilization. Moreover, instructions to staff are sparse. "Only" one of the 30 Operations Policies and Best Practices (OP/BP) is devoted to environmental health, i.e., the use of pesticides, but is limited to public health uses of mosquito control and does not deal with the widespread use of pesticides in agriculture. Four other OP/BPs contain passing references to environmental health either in a single paragraph or a footnote. (See Vol. I, Annex B, para. 3.)

18. Critique. To a certain degree, Bank documentation and internal procedures reflect the same rough distribution and accuracy as the outside literature, wherein the health sector is inward focused, environmental health accentuates pollution, and cut-and-paste health information is often misapplied. On the positive side, considerable headway has been made in integrating environmental factors into economics, much of it being cutting edge. On the neutral side, it means that many documents do not get a peer review for each of their environmental, health, and economic dimensions. On the negative side, one could conceivably make the same comment that was made about the Bank 10-15 years ago, prior to the 1987 Reorganization that created environmental departments and divisions. That is, a considerable number of worthwhile and cutting-edge activities occur Bankwide, but there is no systematic advocacy or internalization of environmental health concepts throughout the Bank. Environmental health input, when it occurs at all, comes, for example, from cooperation with EPA and WHO in document review, or from the occasional hiring of a consultant. While this process is helpful, it does not always guarantee that the full range of important variables is considered, since the terms of reference or request for review is generally limited to the document itself without necessarily stipulating its broader setting — or they presume that ecology and environmental health are wholly compatible.
III. COMPATIBILITY OF ENVIRONMENTAL HEALTH AND SUSTAINABLE DEVELOPMENT

19. The Link between Environmental Health and Sustainable Development. The environmental movement has changed the way development agencies do business, spawning a change from "economic growth" to "economic development" to the current "sustainable development." The core of the movement is integration of objectives from different disciplines, drawing from experiences which showed that many development projects created problems more by what they forgot than what they did. In the health sector, there have been similar changes, where specialists have replaced the "family doctor," remembered for the lost art of treating the patient, not the disease, the very essence of integration. Indeed, the Pan-American Conference on Health and Environment on Sustainable Development — Americas in Harmony (October 1995) was organized around the need for cooperation. This was the first conference of its kind drawing together ministers of health, environment and economy to discuss the linkages of the three groups; it was also the first time that ministers of health collectively looked at factors outside the health care system. "Health cannot be attained by the health sector, either alone or even primarily." Nonetheless, we continue to designate single sector responses to cross-sectoral problems.

20. The Issue — Right Answer, Wrong Question. In principle, sustainable development criteria are compatible with environmental health, but in practice they are not mutually inclusive, more a question of imbalance than error — the right answers to the wrong questions. Some of the imbalance comes from a human tendency to respond more to audio-visual and olfactory senses than to sound science. This propensity, in turn, hinges on the measurement quandary for which techniques in estimating the potential adverse economic effects are about a decade behind other sectors, largely because of the wide array of variables simultaneously at play.

21. Measurement is typically a technical issue, but with environmental health it lies at the core of defining half a problem. This is especially perplexing in the Bank, since many project decisions need to be made not with the best available information, but the only available information. The importance of measurement is discussed below from three interrelated vantage points, each which can lead to negative consequences even in well-intentioned projects:

- using health information out of context,
- defining externalities from an economic and environmental health perspective, and
- the compatibility between public health and ecological criteria.

22. On a positive note, the measurement issue was confronted in 1975 when the Bank conducted a study to justify investments in water/sanitation projects based on their positive health effects. The study concluded that data were insufficient to justify such projects; it did not suggest that positive effects did not exist, they were just unmeasurable. Now, such benefits are accepted in that sector.

23. The Measurement Quandary — Using Information Out of Context. The literature review (Vol. II) identified only five comprehensive studies on environmental health, four done under USAID. One commendable study, on Cairo\textsuperscript{2}, helps illustrate how a misunderstanding between pollution control and environmental health can lead to a false sense of security that projects adequately address environmental health problems. The study was based on a comparative risk assessment to determine environmental

\textsuperscript{2} "Comparing Environmental Health Risks in Cairo, Egypt": PRIDE for USAID/Egypt; Vol. 1, February 1994 draft; Vol. 2, May 1994 draft.
problems of a given area and help prioritize them. This procedure, available to epidemiologists for about a decade, is not commonly used by ecologists or in EAs. The study is as important for its omissions as for its conclusions, an inevitable occurrence given budget, data and time limitations. It identified, as "higher risk," particulate matter air pollution and lead in all media. The study did not, however, examine to the same degree other factors that could be as potentially important as those identified, viz., climate change, occupational risks, noise, radiation, large-scale industrial accidents, or vector-related disease per se.

A LUCKY MISS OF A TRAGEDY IN AN ENVIRONMENTAL ASSESSMENT?

"Define half a problem, propose half a solution" manifests itself in a different way when environmental analyses are not adapted to developing countries, sometimes omitting altogether health problems that still plague the bulk of humanity. Take an Environmental Assessment (EA) that missed discussion of two potential epidemics, noteworthy because it reflects an extreme case. In the EA for a proposed 15-year sanitary waste disposal site in Asia, health factors predictably centered on water pollution. The EA was being prepared while the local press carried headlines about rats spreading plague from an unrecognized virus; international newsprint and TV were discussing global travel restrictions from India, where plague had already broken out (1995). In fact, coming from Calcutta, Mother Theresa was almost denied entry into Italy. In addition, health journals and other periodicals were discussing if increases in dengue fever (spread by mosquitoes and endemic in the country) constituted an epidemic due to global warming (which changed mosquito habitats). The expatriates leading the EA were quite competent, but used to thinking about rats and mosquitoes as nuisances. The case is striking because of questions that were apparently not asked; it is not atypical. The net result can lead to misdirected priorities and investments.

24. These are important omissions in the context of predicted water shortages for the Middle East that would inevitably lead to household and village level water storage, a factor that could extend the habitats of mosquitoes and snails which spread malaria and schistosomiasis respectively. Both diseases in Egypt are declining after decades of work, but could easily return if vigilance is relaxed in keeping the vectors in check. (Indeed, the current Latin American epidemic of dengue fever, spread by mosquitoes, has been partly attributed to relaxation of mosquito control programs; and the cholera epidemic of the 1980s was attributed to neglect of water systems.)

25. The issue is not so much the comprehensiveness of the study itself, rather how its strengths and weaknesses are taken into consideration when the study results are used. As a comparative risk assessment of environmental health problems, the Cairo study is excellent, an indispensable input into an environmental strategy with excellent background for pollution abatement. Its strength lies in broadening the traditional scope of inquiry to look at multiple causes and effects on health, not simply concentrating on one sector as is often the case. However, as an accurate, adequate basis for sustainability, the strategy falls short by not being able to analyze to the same degree other risks of equal importance. Identification of the weaknesses of the Cairo study should not be interpreted as a castigation of the study itself but to underscore the practical difficulties by limitations in measurement techniques and budgets.

26. The Measurement Quandary — Incorporating Externalities. Many decisions linked to environmental health are not calculated or are often dropped altogether from economic analysis because

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2 Comparative risk assessment was recently developed to distinguish actual risk from potential exposure. A strength is being able to compare and evaluate the effects of two or three pollutants or hazards. A limitation is its reliance on animal studies, and focus on limited risks. Because few such epidemiological tools exist, they are often overextended or misapplied.

4 Microbiological diseases, e.g., diarrheas, were identified as "middle/higher" risks; together with a range of "middle, lower, and uncertain" risks.
they are considered externalities. That is, because individuals choose to smoke tobacco or buy a cheaper but more polluting household fuel, they are making decision that affect their own lungs, or perhaps those of their household. By comparison, vehicle exhausts pollute ambient air, adversely affecting the lungs of many who had no direct choice in the decision. Admittedly, many sectors are confronted with inadequate data and inaccurate benefits/costs. What makes environmental health different is that evaluation techniques are probably about a decade behind other sectors. At present, only the tip of the iceberg is visible.

27. For an environmental health specialist, exclusion of unmeasured/unmeasurable data poses a dilemma, no matter how sound economic theory may be on the matter. Even if economic theories treat behavior like tobacco smoking as an externality, the lungs make no such distinction. Indeed, if they had voice, the lungs of the poor could also argue that they have no choice; cheaper but more polluting household fuels are the only option and are every bit as disagreeable as are industrial and vehicular emissions. The dilemma comes from having to make a choice for investment calculations with only partial information.

28. A similar problem emerges from using incomplete data without qualification, which an epidemiologist would need to account for, but not necessarily an economist, if the incomplete information was perceived as an externality. Cost estimates of health damages due to lead from the Cairo study, for example, are based on measured pollution, largely from automobile emissions. The remaining factors, i.e., food and water, were not calculated because they were not measured, but were "guesstimated" in other studies to be greater than automobile exhausts.\(^2\) In this case, the process of not accounting for incomplete data leaves a considerable margin of error with a range of 70 percent in the three potential sources of blood lead.

29. There is no ready answer (yet) to accommodate rates of returns and human physiology at the same time. For example, equally persuasive cases can be made that health damages from pollution have been overstated or understated. They are overstated when calculating air pollution effects because available epidemiological data tend to be biased toward deaths, when most health damages come from disability.\(^5\) Damages can be understated, since many health effects cannot yet be proven because of time-lag and interaction among multiple variables, e.g. it can take 30 years for cancer symptoms to emerge.

30. By themselves, externalities are a fascinating issue, but they also lie at the core of the Bank’s policy instruments. Thus, "Bridging Environmental Health Gaps" can only alert economists to proceed with caution, mindful of the potential consequences of their work, which can be negative. The human body’s perspective need not be a hurdle, and could conceivably make the economist’s job easier, simplifying rates of returns by expanding the range of negative consequences (see paras. 37-38).

31. The Measurement Quandary — Public Health vs. Ecology? Measurement reemerges as central issue in how devising only half a solution may lead to misdirected priorities and even do harm over the long term. In principle, measurement criteria are compatible — but in practice, ecological, engineering, and public health criteria are not necessarily mutually inclusive. Because public health and ecology both

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\(^2\) The study concluded that vehicular emissions, systematically measured, constitute the major source of air-borne lead, but that water and food actually constituted the major source of blood lead for unsure reasons because they were not measured. The study’s annexes, however, point out that different studies cite other sources: up to 87 percent of blood lead could come from food, 50 percent from water, and 17 percent by inhalation.

\(^5\) In addition, cost estimates are often based on DALYs (disability adjusted life years), an international standard based on an 82 year average life span that are not always adjusted downward for local conditions.
are multidimensional, their respective criteria/standards are often used inaccurately by diverse professions who emphasize pollutants or populations at risk, but not necessarily together. Many engineering criteria were designed with health in mind, but not as the overriding principle. BOD, for example, is a common ecological indicator of water quality. But water meeting BOD standards can still be pathogenic and unsuitable for drinking! Engineers would not mix water quality and pathogenicity, but others involved with water management do. Similarly, even with public health as an objective of sewage treatment, toxic chemicals are most important to the engineer running the plant because they can disrupt biochemical processes, corrode machinery, or even force a shut down of the plant.

32. The situation is similar for carbon monoxide (CO), one of six "criteria pollutants" used to set air quality standards. CO, mainly from vehicle emissions, is more an irritant than a public health threat (except for people regularly stuck in traffic or exposed occupationally). But indoors CO becomes a major component of household air pollution, exacerbated by tobacco smoke. Indoor CO, however, is generally not used in setting criteria. In addition, general environmental criteria can also conflict with public health at the policy level. For example, energy efficiency in tobacco production, an important source of revenue in SSA, can be in direct conflict with public health agendas aimed at reducing smoking. These observations underscore the need for teamwork from the outset, and also zero in on measurement inadequacies.

33. Questions Raised. Numerical observations, whether expressed as meeting emission standards or the number of health specialists on Bank missions, can be misleading by inferring that the absence of health input is critical, when, in fact, the actual results are not known. Nonetheless, it is appropriate to question how the Bank deals with environmental health as a cross-sectoral issue. How does one judge? For example, given the role of respiratory infections throughout SSA, has the contribution of infrastructure projects been overlooked? As the second burden of disease in SSA, respiratory disease follows malaria for females and injuries for males, but is so important because of the high toll it takes on children under five years old. Have policies led to misdirected investments, as measured by health improvement? Three observations from the project analysis might help put the issue in perspective.

- **Investment patterns do not necessarily reflect environmental health goals.** Nigeria, which contains 13 percent of SSA vehicles, has not included pollution reduction in projects or its National Environmental Action Plan (NEAP), although it is discussing the use of unleaded fuel over the medium term. (Information was unavailable for South Africa, which contains 34 percent of the total vehicle fleet that still uses leaded fuel.)
- **Thumbnail calculations showed that, conceivably, improved stoves could have four times the impact at half the cost in reducing the burden of disease than investment in transportation.** Values were derived by comparing measures aimed at reducing traffic fatalities with those aimed at reducing household pollution, e.g., through better stove designs, overall ventilation, and pollution abatement (Vol. I, Annex A para. 9).
- **Household energy improvements have been based on ecological not health grounds.** Could the 1.3% spent on energy (about $30 million) from 1984-1994 have had a greater impact if reduction in exposure to fumes had been a goal equal to energy conservation?

These observations do not suggest a shift in investments from transport to improved stoves, nor that the energy sector has been remiss; they merely illustrate different conclusions drawn from different perspectives.

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7 BOD, biochemical oxygen demand, is the amount of oxygen in water needed to decompose organic matter; it measures the water's ability to support a wide range of aquatic flora and fauna.
34. Addressing respiratory illness also raises the question of how better investments can alleviate poverty at the household level since so many of the determinants of respiratory infections occur at that level. Thus, for SSA, policies that address deforestation could link ecology with health: by examining the effects of costs on the consumption of more polluting fuels; by establishing indoor air pollution ratings for household fuels; by educating mothers about household smoke, etc. Some data already exist on these topics, but not on their health repercussions. These are examples of areas where behavioral change has been poorly explored and needs to be addressed in Bank projects.

35. Cutting-Edges and Opening Doors. Environmental health affords the Bank a special opportunity to make a major contribution to alleviate global poverty. The Bank could be instrumental in opening doors to reverse the information flow and, for once, have the industrialized countries learn from the developing countries. For example, the bulk of research on consequences of global warming and climate change on health, e.g., alterations in vector habitats, exists in the developing countries.

36. Since many environmental health concerns lie on the cutting-edge of science and technology, the Bank must rely on the outside for guidance. However, the need for best available information to factor into projects — whether costing health damages from air pollution or using bacteria that "eat" water pollution — severely constrains the process of proper scientific review as considered in academia. In the Bank, "outside" or "broad" review is often confused with "peer" review even though outside research is governed by a different set of criteria, without the constraints of calculating rates of return in time for project appraisal. (In fact, the review of Bank documentation encountered only one "proper" peer review where scientists looked at the entire process of estimating health damages from air pollution, going back as far as the initial assumptions and raw data.) Again, "define half a problem, propose half a solution" becomes an issue when documents are circulated internally for clearance. If the departments have no in-house competence to judge health factors, the document often gets a "no-objection" that inadvertently passes for technical review when the document is not reviewed for health content at all. This is not a criticism of any sector, only a statement of fact to underscore the need to develop an in-house competence in environmental health and to be more systematic in seeking outside collaboration for cutting-edge issues.

37. The Bank has an enormous benefit to offer outsiders to help them justify in-kind cooperation for peer review and other factors: projects suitable for study and access to a wide range of government agencies, a factor which could enable some of the above organizations cited above to pay their own way. Three cases help give the issue perspective and illustrate the need for a better capability to integrate environmental health into operations, and where the Bank might "do harm" by lack of technical review.

- Traditionally, air pollution has been linked to respiratory disease, covering a wide range from colds to cancer. New evidence points to the role of air pollution in heart disease. Similarly, new evidence also points to pollution as compromising the body's immune responses, a role that has typically been assigned to infectious diseases and radiation. The research opens the gates for consideration of infectious diseases as contributing to the costs of health damages.
- One study links childhood asthma with the age of the mother at birth, opening the door for the "package deal of poverty" to exert an influence as great as air pollution. In the scientific community, this study (as yet) carries little weight because it contains so many unknowns, and there is not yet a preponderance of evidence to help overcome the individual unknowns.
- Increasing evidence points to the human carcinogenicity of DDT, long suspected but not conclusively proven. New evidence points to its involvement with birth effects (teratogenicity) as well. DDT, is banned in some countries for pest control based on ecological reasons; it is not banned for public health uses, e.g., malaria control (mosquito spraying) in/around houses.
38. Other similar factors could be cutting-edge merely by reusing information in a new way, e.g., the effects of lead. Once considered mainly as an air pollutant from industry and transport, it is now clear that ingestion often is the major route. However, studies from professional journals are now appearing in the popular press citing the link with lead to aggressive social behavior, particularly of adolescents. In addition, some research points to the positive effect of diet, i.e., iron and calcium retard its absorption into the blood, whereas foods with high fat content increase it. These latter factors, particularly the role of diet in combatting lead poisoning in poor center-cities, is virtually unexplored in Bank projects. Other topics would benefit from better cross-sectoral analysis. The phenomenon of global warming has become less controversial recently, allowing more attention to be focused on finding solutions than redefining the problem. Nonetheless, most literature on health implications focuses on the ecological dimensions rather than the potentially equal influence of infrastructure contributions and pollution migrations. Bridging gaps and opening doors are the focus of the recommendations. All of the above could have major consequences to policy and lending, but are not systematically being explored in the Bank.

39. Finally, one of the most important but unresolved issues returns to the measurement quandary. How does one include factors for which there are no statistically significant data proving linkages, but specialists know in their bones there is a causality? A practical step would make sure interdisciplinary teams, involving outsiders, are involved in decision-making.
IV. RECOMMENDATIONS

40. **Targeted Collaboration.** The notion of "targeted collaboration" aims at solving health problems outside the health sector by fostering very selective collaboration among Ministries of Health (MOH) and other agencies involved with creating or resolving the problems. Targeted collaboration helps do more with less by basing remedial measures on capabilities to implement them rather than on the problems themselves. The notion also addresses a management quandary because cross-sectoral solutions are not always attached to cross-sectoral budgets. Even in SSA, the task manager of an irrigation project might be hard pressed to justify a component on vector-borne diseases like malaria because some would see it as a health issue and, thus, a matter for a health project. In addition, looking for solutions to health problems outside the health sector can help stretch budgets. For example, in a Latin American country, nine agencies were monitoring pollution, seven of which were duplicating efforts. Thus, targeted collaboration revolves around institutional capability and compatibility, and around mutual strengths and interests. In a phrase, targeted collaboration helps make the best of a bad situation over the short term, while waiting for long term solutions of the agencies involved.

41. Outside the Bank, informal discussions have resulted in indications of interest in collaborating with the Bank on environmental health; these need to be followed up (notably, WHO, PAHO, Centers for Disease Control in Atlanta, Rockefeller University, London School of Hygiene and Tropical Medicine, Harvard School of Public Health, the International Institute for Environment and Development in London and Buenos Aires, World Resources Institute, USAID, and EPA). The basis for discussions on collaboration thus far have centered on the type of information these agencies would want to feature in their annual reports.

42. **Specific Proposals.** Recommendations (para. 7) revolve around five complementary priority areas:

- promoting a Bank-wide set of cross-sectoral best practices and guidelines;
- preparing draft arrangements to facilitate "targeted collaboration" among MOHs and other ministries/agencies;
- devising better estimates of thumbnail calculations that "44 percent of the burden of disease in SSA is amenable to improvements in infrastructure";
- raising the understanding of the linkages between respiratory disease and infrastructure, especially housing, to be on the same level of as that for water/sanitation-related diseases; and,
- getting a better grasp of the "urbanization" of traditionally rural diseases and their linkages to climate change and remedial measures in infrastructure.

43. A list of short-term (6 mos. to 2 yrs.) and medium-term recommendations has been prepared (paras. 44-48), taking into consideration the interests and relative strengths of operations departments, central departments, the Global Environment Facility (GEF), and the Economic Development Institute (EDI). In addition, a set of fifteen complementary proposals has been drawn from the short-term list, with the different objectives of the Bank and bilaterals in mind, e.g., operations, policy, research, training. The proposals contain Terms of Reference and budgets.

44. **Short-term, Mainstream Environmental Health into SSA Infrastructure Operations.** Recommendations center on helping integrate environmental health into operations and build upon ongoing activities. Even though pollution considerations need to be broadened, they are a good starting
point for collaboration because most governments at least have monitoring programs in place and public awareness is already high. Application of the notion of targeted collaboration to borrowers would require understanding local institutional problems like jurisdiction, budget, and vested interests.

a. **Project management:** i. use the checklist (Vol. I) for projects, and case studies; candidate countries are Senegal, Mauritania, Mali, Togo, Guinea, Lesotho, Mozambique, Tanzania, South Africa, and Ghana; and, ii. prepare checklists for agriculture and energy sectors.

b. **Bank Procedures and Environmental Assessments:** i. design suitable procedures for rapid environmental health assessments for use in EAs (existing guides for rapid assessments by PAHO, WHO, and Bank/UNDP Urban Management Program could be reviewed as an initial step); ii. devise procedures to foster targeted collaboration among sector agencies and MOHs (e.g., sharing data, pollution monitoring criteria, staff compatibility, jurisdictions, capacity building, training, creative financing and budget issues, include the "Panel on Better Health in Africa"\(^2\); iii. examine economic dimensions of targeted collaboration, e.g., savings in pollution monitoring or combining work-program objectives; iv. review upcoming NEAPs for environmental health; and, v. prepare an OP/BP on incorporating environmental health into the EA process.

c. **Training:** i. prepare infrastructure training materials (based on Vol. I); ii. design and conduct seminars for dissemination and training to integrate environmental health cross-sectorally;

d. **Applied Research:** i. continue estimating health damages from air pollution (e.g., Jakarta, Santiago de Chile), but applied to African cities; ii. support EDI's conference "Megacities, Environment and the Coming Plagues", with emphasis on "urbanizing" rural diseases; iii. support the AFTES/EDI Congo basin program, identifying environmental health parameters in rain forests transferrable to other Regions; and, iv. work with health advisory group of the Latin America and then Caribbean Region Technical Department (LATAD) to develop a "disease projection model" for SSA, but emphasizing potential infrastructure interventions.

45. **Short-term, Build up a Critical Mass of Environmental Health Competence within the Bank.** Other specialized aid agencies and bilaterals have created units to deal with the rapidly changing dimensions of environmental health. In 1994, USAID inaugurated the Environmental Health Project to help deal with problems related to pre- and post-industrial economic development. In 1995, WHO created a special office of "Emerging and other Communicable Diseases" that answers to the Director General. The office will deal with "new" diseases like AIDS, as well as the resurgence of long-established diseases like TB and mosquito-borne illnesses. Other agencies have responded similarly. If the Bank's health sector is to remain focused on health care systems (allowing flexibility for responses to AIDS), then the potential gaps identified earlier in this report will have to be addressed outside the health sector, but through targeted collaboration with it.

46. **Bridging cross-sectoral gaps within the Bank to bring it up to speed with other agencies could take several paths.** One of the most essential is to incorporate environmental health into the EA process. There is no count of staff who have academic credentials and work experience in environmental health; some staff working on pollution or engineering are listed as environmental health specialists. It may also be appropriate to consider establishing an environmental health unit to give the review process institutional standing. Initial functions would be to review projects and EAs and alert appropriate staff of salient issues. Staff training is the most salient recommendation to build up a critical mass.

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\(^2\) The Panel on Better Health in Africa consists of a group of African leaders in health sector reform aimed at implementing the recommendations of Better Health in Africa: Experiences and Lessons Learned (The World Bank, 1994), which was used for reference in "Bridging Environmental Health Gaps."
47. Medium-term, Integrate Environmental Health into Other Sectors and Regions. From a health perspective, follow-up in agriculture or energy would make most sense for SSA to complement the work on infrastructure (Vol. I); for industry, occupational health would probably outrank environmental health. Lessons and priorities will change for other Regions, and should be consolidated Bankwide.

- Project management: i. prepare checklists for industry sector; ii. conduct case studies on linkages among indoor pollution, respiratory disease and energy; iii. re-package "checklists" and studies on targeted collaboration into "guidelines" and best practices; and, iv. evaluate Bank documentation for gaps in environmental health (200 documents already reviewed, unpublished Annex, Vol. I);

- Bank Procedures and Environmental Assessments: produce an Environmental Health manual which consolidates lessons learned and documents best practices from the sectoral checklists (i.e., Vol. I and others not yet begun);

- Training: prepare training materials for agriculture, energy, industry sectors and for targeted collaboration;

- Applied Research: i. develop the concept of airshed management to identify localized intense air pollution; ii. prepare a handbook on combatting pollution at the household level (e.g., monitoring kits, pesticide storage); iii. apply geographic information systems (GIS) to environmental health; iv. use subtitles in documents dealing with "sustainability" and "environment" to clarify content; v. expand the Glossary (Vol. I) to other sectors (agriculture, energy, industry) and publish it; vi. expand work on costs of ambient air pollution to indoor pollution; vii. consider production of multimedia training modules/videos like those for water supply/sanitation; viii. conduct a study on eliminating carcinogens in cooking oils, important for women/children; ix. conduct a study on eliminating carcinogens in cooking oils, important for women/children; x. conduct a study on nutrition-agriculture-sanitation linkages.

48. Medium-term, Address Cross-sectoral Cutting-edge Issues Inside and Outside the Bank. These issues are based on the premise that there are no experts, only specialists. Responses to these issues could range from applied research to interdisciplinary task forces if deemed beneficial to have a separate agenda from those already existing. Topics could include:

- health and climate change, with concentration on project responses to "urbanizing" rural diseases, roles of infrastructure and migrations;
- privatization, focusing on infrastructure services and their effects on health;
- industrial pollution, preventive strategies for key industries; phase-out and promotion of substitutes for 12 key pollutants; redefining "clean technology"; and,
- economics, externalities, opportunity costs and evaluation techniques, which are still imprecise; equity, i.e., does pollution abatement maximize poverty alleviation?